CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 6

(1) **PROJECT NAME:** ADA Compliance - FY24
PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

Implementing recommendations generated by the City's Disability Commission will improve accessibility for all who live, work, and visit neighborhoods. The goal of this item is to provide funding for improvements that are beyond the scope of work of comprehensive highway and sidewalk projects, which are part of other specific requests.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

Added to address specific issues raised by the Disabilities Commission that are not part of major highway and sidewalk improvements.

(3) **PURPOSE OF PROJECT:**

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
x	New infrastructure
	New capital asset
	New vehicle
	New equipment
x	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	150,000	150,000	150,000	150,000	150,000	
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	150,000	150,000	150,000	150,000	150,000	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2) **Grants**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

City-wide

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

Chapter 90

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

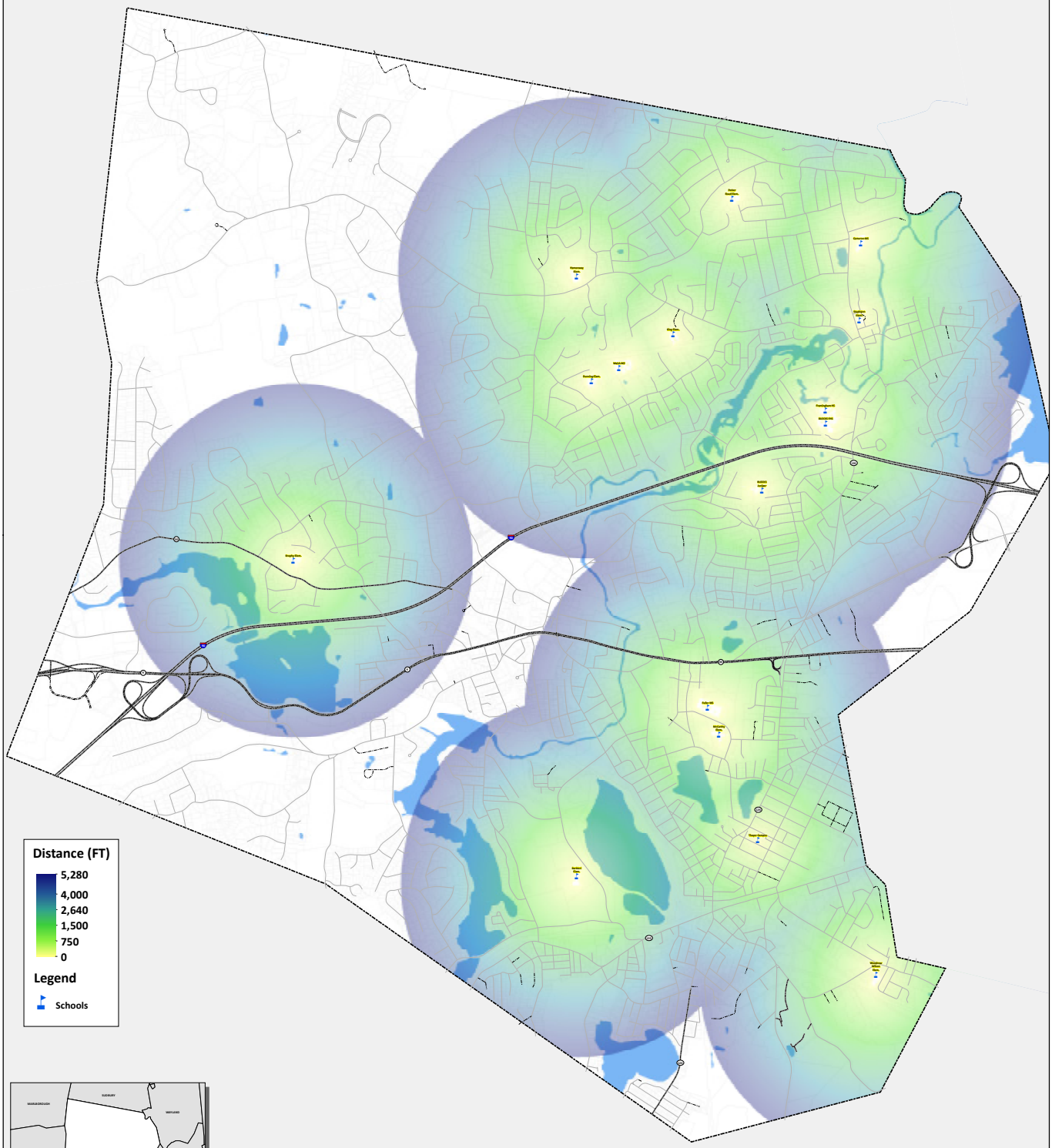
Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

City of Framingham, Massachusetts

Buffer Analysis

Tier A - 1 Mile



City of Framingham, Massachusetts

Buffer Analysis

Tier A - 1 Mile

N
W
E
S

Potter Road Elem.
Cameron MS
Hemenway Elem.
Stapleton Elem.
King Elem.
Walsh MS
Dunning Elem.
Framingham HS
BLOCKS FHS
BLOCKS Juniper
Brophy Elem.
Fuller MS
McCarthy Elem.
Thayer Campus
Barbieri Elem.
Woodrow Wilson Elem.

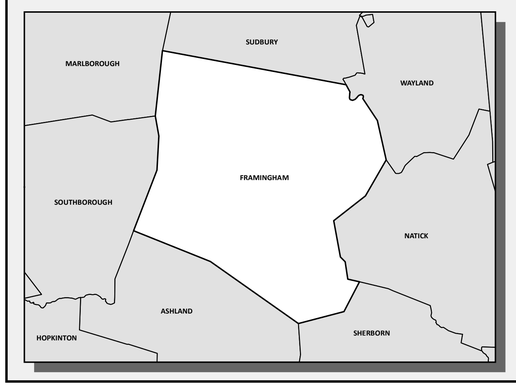
126
135
30
90
9

Distance (FT)

5,280
4,000
2,640
1,500
750
0

Legend

Schools



DRAFT

Issue Date: June 17, 2021

This Map is Intended for Planning Purposes Only

0 0.25 0.5 Miles

BETA
IMPROVING COMMUNITIES TOGETHER

Curb Ramp Inventory & Assessment

Final Report

City of Framingham, Massachusetts

Date: February 10, 2019

Date of Inspections: Summer 2019

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

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- Ramp Totals by Street with Inspection Data
- Ramp Locations with Obstructions
- Ramps Sorted by Street with Inspections Data and Picture
- Ramp Compliance Summary
    - Compliance By Street with Inspection Data
    - Non-Compliance By Street with Inspection Data
    - Retrofit Candidates

Parallel Ramps

- Ramp Totals by Street
- Ramp Totals by Street with Inspection Data
- Ramp Locations with Obstructions
- Ramps Sorted by Street with Inspections Data and Picture
- Ramp Compliance Summary
    - Compliance By Street with Inspection Data
    - Non-Compliance By Street with Inspection Data
    - Retrofit Candidates

Potential Ramps

- Intersections with Sidewalks and Potential Ramps Summary
- Intersections with Sidewalks and No Ramps - By Location

Maps:

- *Curb Ramp Inventory & Assessment – Existing Conditions (36”x48“)*

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals

Street	Number of Ramps
A STREET	2
ANDERSON ROAD	4
APPLE D'OR ROAD	2
AUBURN STREET	2
BACON ROAD	2
BALDWIN AVENUE	1
BEACON STREET	16
BEAVER STREET	17
BELKNAP ROAD	6
BETHANY ROAD	4
BEULAH STREET	2
BIRCH ROAD	4
BLANDIN AVENUE	1
BRADFORD ROAD	2
BRIDGES STREET	5
BRIDGES STREET EXTENSION	2
BRIGATI TERRACE	2
BROOK STREET	21
BROOKFIELD AVENUE	2
BROWNLEA ROAD	2
BURR STREET	4
CAMPELLO ROAD	2
CEDAR STREET	4
CENTRAL STREET	6
CHERRY STREET	2
CLEARVIEW DRIVE	2
CLIFFORD STREET	4
COBURN STREET	6
COCHITUATE ROAD	7
CONANT ROAD	2
CONCORD STREET	26
COSTA CIRCLE	2
COTTAGE STREET	2
COVE AVENUE	2

Street	Number of Ramps
CYPRESS STREET	2
DANFORTH STREET	23
DAYTONA AVENUE	2
DONOVAN DRIVE	2
DOTTY ANN DRIVE	2
DOW STREET	2
EATON ROAD	2
EDGELL ROAD	10
EISENHOWER ROAD	2
ELIOT STREET	2
ELLIS STREET	2
ELM STREET	3
ELMFIELD ROAD	2
EMILY ROAD	2
FAIRBROOK ROAD	2
FAIRFIELD ROAD	2
FAY ROAD	4
FENWICK STREET	5
FENWOOD STREET	2
FLAGG DRIVE	2
FOUNTAIN STREET	2
FRANKLIN STREET	4
GARVEY ROAD	2
GIBSON DRIVE	2
GIL LEONARD LANE	1
GILBERT STREET	2
GOODNOW LANE	1
GRANT STREET	2
GREENLEAF CIRCLE	2
GREGORY ROAD	2
HADLEY ROAD	2
HAMILTON STREET	4
HARDY STREET	3
HARTFORD STREET	18
HEMENWAY ROAD	2
HIALEAH LANE	2
HILTON STREET	4

Street	Number of Ramps
INDIAN HEAD ROAD	10
IRVING STREET	2
JOHN J BRADY DRIVE	2
JOHN J. GALLAGHER DRIVE	2
JOHN MCQUINN CIRCLE	1
JOSEPH ROAD	2
JOYCE LUNDBERG DRIVE	2
JOYCE ROAD	1
KELLOGG STREET	2
KENDALL AVENUE	14
KNIGHT ROAD	2
KNOX AVENUE	2
LANCASTER DRIVE	2
LANEWOOD AVENUE	2
LARRABEE AVENUE	2
LEGGATT MCCALL	9
LELAND STREET	2
LEO CHASSE WAY	2
LIBERTY STREET	2
LINDA AVENUE	2
LITTLE TREE LANE	2
LOCKLAND AVENUE	1
MAIN STREET	4
MAJOR HALE DRIVE	1
MARY AGNES ROAD	2
MAYNARD ROAD	5
MELLEN STREET	4
MERRIAM ROAD	2
MICHAUD DRIVE	2
MILL STREET	2
MONTEREY LANE	1
MURPHY CIRCLE	2
NAPLES STREET	4
NEWBURY STREET	5
NICHOLAS ROAD	4
NORMANDY ROAD	2
NORMANDY ROAD	7

Street	Number of Ramps
OAK CREST DRIVE	2
OAK STREET	4
OAKWOOD COURT	2
OLD CONNECTICUT PATH	24
OLD WOOD ROAD	2
OLD WORCESTER ROAD	3
PALMETTO AVENUE	2
PAMELA ROAD	2
PARKING LOT	5
PERSHING AVENUE	4
PLEASANT STREET	5
POTTER ROAD	12
PROSPECT STREET	6
RESERVOIR RIDGE	2
RHUBENA STREET	2
RIVERPATH DRIVE	2
RON'S WAY	2
ROSE KENNEDY LANE	1
ROYAL MEADOW LANE	1
SAGE LANE	1
SALEM END ROAD	4
SAUCIER STREET	2
SAVOY ROAD	2
SAXONY ROAD	2
SCHOOL ENTRANCE	4
SCHOOL STREET	7
SECOND STREET	6
SHEFFIELD ROAD	2
SLOANE DRIVE	1
SPEEN STREET	4
SPRING LANE	2
STATE STREET	2
SUDBURY LANDING	2
SUMMER STREET	2
SUN VALLEY DRIVE	1
SWANSON ROAD	2
TEMI ROAD	2

Street	Number of Ramps
TEMPLE STREET	4
THELMA ROAD	2
THIRD STREET	4
TREELAND DRIVE	2
UPTON ROAD	2
VERNON STREET	13
WALKERS WAY	2
WARREN PLACE	2
WATER STREET	31
WAVENEY ROAD	2
WAVERLEY STREET	35
WESLEY ROAD	2
WEST STREET	2
WHITING ROAD	2
WHITTIER STREET	6
WILDE AVENUE	2
WILSON AVENUE	2
WINTER STREET	7
WINTHROP STREET	11
WINTHROP TERRACE	2
WOODLEIGH ROAD	6
WOODMERE ROAD	2
WOODSIDE COTTAGE WAY	2
WYNDSTONE WAY	2
Total:	**693**

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals - By Street With Inspection Data

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
A STREET		**2 Ramps**				
At CONCORD STREET		2 Ramps				
222.4	Yes	Yes	Good	Concrete	Yes	Utillity Pole
222.5	Yes	No	Good	Concrete	Yes	Gate
ANDERSON ROAD		**4 Ramps**				
At BROOK STREET		4 Ramps				
90.1	No	No	Fair	Asphalt	Yes	Man Hole
90.2	No	No	Fair	Concrete	No	None
90.3	No	No	Fair	Concrete	No	None
90.4	No	No	Poor	Asphalt	No	None
APPLE D'OR ROAD		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
126.1	No	No	Fair	Asphalt	No	None
126.2	No	No	Fair	Asphalt	No	None
AUBURN STREET		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
316.1	Yes	No	Good	Concrete	No	None
316.2	Yes	No	Good	Concrete	No	None
BACON ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
118.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
118.2	Yes	No	Good	Concrete	No	None
BALDWIN AVENUE		**1 Ramps**				
At APPLE D'OR ROAD		1 Ramps				
131.1	No	No	Fair	Asphalt	No	None
BEACON STREET		**16 Ramps**				
At CAVANAUGH ROAD		2 Ramps				
275.1	No	No	Fair	Asphalt	No	None
275.2	No	No	Fair	Asphalt	No	None
At COCHITUATE ROAD		4 Ramps				
295.1	Yes	No	Good	Concrete	No	None
295.2	Yes	No	Good	Concrete	No	None
295.4	Yes	No	Good	Concrete	No	None
295.5	Yes	No	Good	Concrete	No	None
At FAIRBANKS WAY		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
265.1	No	No	Fair	Asphalt	No	None
265.2	No	No	Poor	Asphalt	No	None
At HASTINGS STREET		2 Ramps				
260.1	No	No	Fair	Asphalt	No	None
260.2	No	No	Fair	Asphalt	No	None
At LOHNES ROAD		2 Ramps				
279.1	No	No	Fair	Asphalt	No	None
279.2	No	No	Fair	Asphalt	No	None
At MAGNOLIA STREET		2 Ramps				
277.1	No	No	Fair	Asphalt	No	None
277.2	No	No	Fair	Asphalt	No	None
At WORCESTER ROAD		2 Ramps				
297.1	Yes	No	Good	Concrete	No	None
297.2	Yes	No	Good	Concrete	No	None
BEAVER STREET		**17 Ramps**				
At BEAVER COURT		2 Ramps				
500.1	Yes	No	Good	Concrete	No	None
500.2	Yes	No	Fair	Concrete	No	None
At BEAVER PARK ROAD		2 Ramps				
502.1	Yes	Yes	Good	Concrete	No	None
502.2	Yes	No	Good	Concrete	No	None
At FIRST STREET		2 Ramps				
502.3	Yes	No	Good	Concrete	No	None
502.4	Yes	No	Good	Concrete	No	None
At MARIAN ROAD		2 Ramps				
501.1	Yes	No	Good	Concrete	No	None
501.2	Yes	No	Good	Concrete	No	None
At PARKING LOT		6 Ramps				
499.1	Yes	No	Good	Concrete	No	None
499.2	Yes	No	Good	Concrete	No	None
577.1	Yes	No	Good	Concrete	No	None
577.2	Yes	No	Good	Concrete	No	None
578.1	Yes	No	Good	Concrete	No	None
578.2	Yes	No	Good	Concrete	Yes	Curbing
At SECOND STREET		1 Ramps				
503.3	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
498.3	Yes	No	Good	Concrete	No	None
498.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
BELKNAP ROAD		**6 Ramps**				
At CLEARVIEW DRIVE		2 Ramps				
22.3	Yes	No	Good	Concrete	No	None
22.4	Yes	No	Good	Concrete	No	None
At FLANAGAN DRIVE		2 Ramps				
30.1	Yes	No	Good	Concrete	Yes	Curbing
30.2	Yes	No	Fair	Concrete	No	None
At PLEASANT STREET		2 Ramps				
23.1	Yes	No	Good	Concrete	No	None
23.2	Yes	No	Good	Concrete	No	None
BETHANY ROAD		**4 Ramps**				
At WAVERLEY STREET		2 Ramps				
535.1	Yes	No	Good	Concrete	No	None
535.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
553.1	Yes	No	Good	Concrete	No	None
553.2	Yes	No	Good	Concrete	No	None
BEULAH STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
322.1	Yes	No	Fair	Concrete	No	None
322.2	Yes	No	Fair	Concrete	No	None
BIRCH ROAD		**4 Ramps**				
At OLD CONNECTICUT PATH		4 Ramps				
199.2	No	No	Fair	Asphalt	No	None
199.3	No	No	Fair	Asphalt	No	None
200.1	No	No	Fair	Asphalt	No	None
200.2	No	No	Fair	Asphalt	No	None
BLANDIN AVENUE		**1 Ramps**				
At BEAVER STREET		1 Ramps				
499.4	Yes	No	Fair	Asphalt	No	None
BRADFORD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
171.3	Yes	Yes	Good	Concrete	No	None
171.4	Yes	No	Good	Concrete	No	None
BRIDGES STREET		**5 Ramps**				
At COBURN STREET		2 Ramps				
564.3	Yes	No	Good	Concrete	No	None
564.4	Yes	No	Fair	Concrete	No	None
At NAPLES STREET		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
570.2	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
534.1	Yes	No	Good	Concrete	No	None
534.2	Yes	No	Good	Concrete	No	None
BRIDGES STREET EXTENSION		**2 Ramps**				
At COBURN STREET		2 Ramps				
564.1	Yes	No	Good	Concrete	No	None
564.2	Yes	No	Good	Concrete	No	None
BRIGATI TERRACE		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
191.3	Yes	No	Good	Concrete	No	None
191.4	Yes	No	Good	Concrete	No	None
BROOK STREET		**21 Ramps**				
At BROOKBURY CIRCLE		2 Ramps				
94.1	No	No	Good	Concrete	No	None
94.2	Yes	No	Good	Concrete	No	None
At FROST STREET		3 Ramps				
89.1	No	No	Fair	Concrete	No	None
89.2	No	No	Fair	Concrete	No	None
89.3	No	No	Fair	Concrete	No	None
At LEIGH STREET		2 Ramps				
88.3	No	No	Fair	Concrete	No	None
88.4	No	No	Fair	Concrete	No	None
At MEREDITH CIRCLE		2 Ramps				
88.1	No	No	Fair	Concrete	Yes	Vegetation
88.2	No	No	Fair	Concrete	No	None
At PERRY H. HENDERSON DRIVE		2 Ramps				
87.3	No	No	Fair	Concrete	No	None
87.4	No	No	Fair	Concrete	No	None
At SALVI DRIVE		2 Ramps				
94.3	No	No	Good	Concrete	No	None
94.4	No	No	Good	Concrete	No	None
At SCHOOL ENTRANCE		2 Ramps				
86.3	No	No	Good	Concrete	No	None
86.4	No	No	Good	Concrete	No	None
At WARD FARM CIRCLE		2 Ramps				
87.1	No	No	Fair	Concrete	No	None
87.2	No	No	Fair	Concrete	No	None
At WATER STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
96.1	No	No	Good	Concrete	No	None
96.2	Yes	No	Good	Concrete	No	None
At WILD OAK RISE		2 Ramps				
84.1	No	No	Fair	Concrete	No	None
84.2	No	No	Fair	Asphalt	No	None
BROOKFIELD AVENUE		**2 Ramps**				
At BROOK STREET		2 Ramps				
95.1	No	No	Fair	Concrete	No	None
95.2	No	No	Fair	Concrete	No	None
BROWNLEA ROAD		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
210.1	No	No	Fair	Concrete	No	None
210.2	No	No	Fair	Concrete	No	None
BURR STREET		**4 Ramps**				
At COCHITUATE ROAD		2 Ramps				
243.1	No	No	Fair	Asphalt	No	None
243.2	No	No	Good	Concrete	No	None
At LEGGATT MCCALL CONNECTOR		2 Ramps				
244.1	No	No	Fair	Asphalt	No	None
244.2	No	No	Fair	Asphalt	No	None
CAMPELLO ROAD		**2 Ramps**				
At CONCORD STREET		2 Ramps				
235.1	Yes	No	Good	Concrete	No	None
235.2	Yes	No	Good	Concrete	No	None
CEDAR STREET		**4 Ramps**				
At CYPRESS STREET		2 Ramps				
561.1	Yes	No	Good	Concrete	No	None
561.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
560.1	Yes	Yes	Fair	Concrete	No	None
560.2	Yes	No	Fair	Concrete	No	None
CENTRAL STREET		**6 Ramps**				
At INDIAN HEAD ROAD		2 Ramps				
303.1	Yes	No	Good	Concrete	No	None
303.2	Yes	No	Good	Concrete	No	None
At MICHAUD DRIVE		2 Ramps				
306.3	Yes	No	Good	Concrete	No	None
306.4	Yes	No	Good	Concrete	No	None
At WATER STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
105.1	Yes	No	Good	Concrete	No	None
105.2	Yes	No	Good	Concrete	No	None
CHERRY STREET		**2 Ramps**				
At CONCORD STREET		2 Ramps				
239.1	Yes	No	Fair	Asphalt	No	None
239.2	Yes	No	Good	Concrete	No	None
CLEARVIEW DRIVE		**2 Ramps**				
At BELKNAP ROAD		2 Ramps				
22.1	Yes	No	Good	Concrete	No	None
22.2	Yes	No	Good	Concrete	No	None
CLIFFORD STREET		**4 Ramps**				
At BRIDGES STREET EXTENSION		2 Ramps				
563.1	Yes	No	Good	Concrete	No	None
563.2	Yes	No	Good	Concrete	Yes	Vegetation
At MELLEN STREET		2 Ramps				
562.1	Yes	No	Fair	Concrete	No	None
562.2	Yes	No	Good	Concrete	No	None
COBURN STREET		**6 Ramps**				
At BETHANY ROAD		2 Ramps				
554.1	Yes	No	Good	Concrete	No	None
554.2	Yes	No	Good	Concrete	No	None
At MELLEN STREET		2 Ramps				
566.1	Yes	No	Good	Concrete	No	None
566.2	Yes	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
565.1	Yes	No	Good	Concrete	No	None
565.2	Yes	No	Good	Concrete	Yes	Sign
COCHITUATE ROAD		**7 Ramps**				
At BEACON STREET		2 Ramps				
295.3	Yes	No	Good	Concrete	No	None
295.6	Yes	No	Good	Concrete	No	None
At SPEEN STREET		2 Ramps				
252.6	No	No	Fair	Concrete	No	None
252.7	Yes	No	Good	Concrete	No	None
At WHITTIER STREET		3 Ramps				
242.1	No	No	Good	Concrete	Yes	Excessive Ldg Slope
242.2	No	No	Good	Concrete	No	None
242.3	No	No	Fair	Concrete	No	None
CONANT ROAD		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At WINTHROP STREET		2 Ramps				
536.1	Yes	No	Good	Concrete	No	None
536.2	Yes	No	Good	Concrete	No	None
CONCORD STREET		**26 Ramps**				
At A STREET		6 Ramps				
222.1	Yes	No	Good	Concrete	No	None
222.2	Yes	No	Good	Concrete	No	None
222.3	Yes	No	Good	Concrete	Yes	Curbing
222.6	Yes	No	Good	Concrete	Yes	Utility Access
222.7	Yes	No	Good	Concrete	No	None
222.8	Yes	No	Good	Concrete	No	None
At CHERRY STREET		2 Ramps				
239.3	Yes	No	Good	Concrete	No	None
239.4	Yes	No	Good	Concrete	No	None
At DONLON STREET		2 Ramps				
236.1	Yes	No	Good	Concrete	No	None
236.2	Yes	No	Good	Concrete	No	None
At FEMIA ROAD		2 Ramps				
237.1	Yes	No	Good	Concrete	No	None
237.2	Yes	No	Good	Concrete	No	None
At GIBBS STREET		2 Ramps				
238.1	Yes	No	Good	Concrete	No	None
238.2	Yes	No	Good	Concrete	No	None
At HARTFORD STREET		4 Ramps				
520.1	Yes	No	Good	Concrete	No	None
520.2	Yes	No	Good	Concrete	No	None
520.5	Yes	No	Fair	Concrete	No	None
520.6	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
At NORMANDY ROAD		2 Ramps				
518.3	Yes	No	Good	Concrete	No	None
518.6	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
230.10	Yes	No	Good	Concrete	No	None
230.3	Yes	No	Good	Concrete	No	None
At SCHOOL STREET		2 Ramps				
221.1	Yes	No	Good	Concrete	No	None
221.2	Yes	No	Good	Concrete	No	None
At THELMA ROAD		2 Ramps				
518.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
518.7	Yes	No	Good	Concrete	No	None
COSTA CIRCLE		**2 Ramps**				
At WATER STREET		2 Ramps				
101.1	Yes	No	Good	Concrete	No	None
101.2	Yes	No	Good	Concrete	No	None
COTTAGE STREET		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
185.3	Yes	No	Good	Concrete	No	None
185.4	Yes	No	Good	Concrete	No	None
COVE AVENUE		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
556.1	Yes	No	Good	Concrete	No	None
556.2	Yes	No	Good	Concrete	No	None
CYPRESS STREET		**2 Ramps**				
At MELLEN STREET		2 Ramps				
559.1	Yes	No	Good	Concrete	No	None
559.2	Yes	No	Good	Concrete	No	None
DANFORTH STREET		**23 Ramps**				
At BRIGATI TERRACE		2 Ramps				
191.5	Yes	No	Good	Concrete	No	None
191.6	Yes	No	Good	Concrete	No	None
At COLBY AVENUE		2 Ramps				
189.1	Yes	No	Good	Concrete	No	None
189.2	Yes	No	Good	Concrete	No	None
At CONCORD STREET		2 Ramps				
181.1	No	No	Poor	Concrete	No	None
181.2	No	No	Fair	Concrete	No	None
At COTTAGE STREET		2 Ramps				
185.1	Yes	No	Good	Concrete	No	None
185.2	Yes	No	Good	Concrete	No	None
At DANFORTH COURT		2 Ramps				
182.3	Yes	No	Good	Concrete	No	None
182.4	Yes	No	Good	Concrete	No	None
At DERBY STREET		1 Ramps				
187.1	Yes	No	Good	Concrete	No	None
At FENWOOD STREET		1 Ramps				
187.2	Yes	No	Good	Concrete	No	None
At HIALEAH LANE		1 Ramps				
188.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At KING STREET		2 Ramps				
182.1	Yes	No	Good	Concrete	No	None
182.2	Yes	No	Good	Concrete	No	None
At MEADOW STREET		2 Ramps				
186.1	Yes	No	Good	Concrete	No	None
186.2	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
192.1	Yes	No	Good	Concrete	No	None
192.2	Yes	No	Good	Concrete	No	None
At SAXONY ROAD		2 Ramps				
190.1	Yes	No	Good	Concrete	No	None
190.2	Yes	No	Good	Concrete	No	None
At STEARNS STREET		2 Ramps				
184.1	Yes	No	Good	Concrete	No	None
184.2	Yes	No	Good	Concrete	No	None
DAYTONA AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
543.1	Yes	No	Good	Concrete	No	None
543.2	Yes	No	Good	Concrete	No	None
DONOVAN DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
125.1	No	No	Fair	Asphalt	No	None
125.2	No	No	Fair	Asphalt	No	None
DOTTY ANN DRIVE		**2 Ramps**				
At WATER STREET		2 Ramps				
109.1	Yes	No	Good	Concrete	No	None
109.2	Yes	No	Good	Concrete	No	None
DOW STREET		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
558.5	Yes	No	Good	Concrete	No	None
558.6	Yes	No	Good	Concrete	No	None
EATON ROAD		**2 Ramps**				
At EATON PINES LANE		1 Ramps				
167.1	No	No	Good	Asphalt	No	None
At POTTER ROAD		1 Ramps				
168.1	No	No	Fair	Asphalt	No	None
EDGELL ROAD		**10 Ramps**				
At AUBURN STREET		1 Ramps				
316.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At EDMANDS ROAD		1 Ramps				
121.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
At PARKING LOT		1 Ramps				
316.4	Yes	Yes	Good	Concrete	No	None
At VERNON STREET		3 Ramps				
315.1	Yes	No	Good	Concrete	No	None
315.2	Yes	No	Good	Concrete	No	None
315.7	Yes	No	Good	Concrete	No	None
At WATER STREET		2 Ramps				
121.5	Yes	No	Good	Concrete	No	None
121.6	Yes	No	Good	Concrete	No	None
At WHITING ROAD		2 Ramps				
124.3	Yes	No	Good	Concrete	Yes	Curbing
124.4	Yes	No	Good	Concrete	No	None
EISENHOWER ROAD		**2 Ramps**				
At EATON ROAD		2 Ramps				
157.1	Yes	No	Good	Concrete	No	None
157.2	Yes	No	Good	Concrete	No	None
ELIOT STREET		**2 Ramps**				
At HARTFORD STREET		2 Ramps				
521.1	No	No	Fair	Asphalt	No	None
521.2	No	No	Fair	Asphalt	No	None
ELLIS STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
333.1	Yes	No	Good	Concrete	No	None
333.2	Yes	No	Good	Concrete	No	None
ELM STREET		**3 Ramps**				
At POTTER ROAD		3 Ramps				
175.3	Yes	No	Good	Concrete	No	None
175.5	Yes	Yes	Good	Concrete	No	None
175.6	Yes	Yes	Good	Concrete	No	None
ELMFIELD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
174.1	Yes	No	Good	Concrete	No	None
174.2	Yes	No	Good	Concrete	No	None
EMILY ROAD		**2 Ramps**				
At HARDY STREET		2 Ramps				
233.1	Yes	No	Good	Concrete	No	None
233.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
FAIRBROOK ROAD		**2 Ramps**				
At BROOK STREET		2 Ramps				
92.1	No	No	Fair	Concrete	No	None
92.2	No	No	Fair	Concrete	No	None
FAIRFIELD ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
99.1	Yes	No	Good	Concrete	No	None
99.2	Yes	No	Good	Concrete	No	None
FAY ROAD		**4 Ramps**				
At OLD CENTRAL TURNPIKE		2 Ramps				
551.1	No	No	Fair	Asphalt	No	None
551.2	No	No	Fair	Asphalt	No	None
At WAVERLEY STREET		2 Ramps				
547.1	Yes	No	Good	Concrete	No	None
547.2	Yes	No	Good	Concrete	No	None
FENWICK STREET		**5 Ramps**				
At BROOK STREET		4 Ramps				
83.1	No	No	Fair	Asphalt	No	None
83.2	No	No	Fair	Concrete	No	None
83.3	No	No	Fair	Concrete	No	None
83.4	No	No	Fair	Asphalt	No	None
At WICKFORD ROAD		1 Ramps				
79.1	No	No	Fair	Asphalt	No	None
FENWOOD STREET		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
187.3	Yes	No	Good	Concrete	No	None
187.4	Yes	No	Good	Concrete	No	None
FLAGG DRIVE		**2 Ramps**				
At NORMANDY ROAD EXTENSION		2 Ramps				
515.1	Yes	No	Good	Concrete	No	None
515.2	Yes	No	Good	Concrete	No	None
FOUNTAIN STREET		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
532.5	Yes	No	Good	Concrete	No	None
532.6	Yes	No	Good	Concrete	No	None
FRANKLIN STREET		**4 Ramps**				
At MAIN STREET		2 Ramps				
400.1	Yes	No	Good	Concrete	No	None
400.2	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At MOULTON PARK ROAD		2 Ramps				
407.1	Yes	No	Good	Concrete	No	None
407.2	Yes	Yes	Good	Concrete	No	None
GARVEY ROAD		**2 Ramps**				
At EDMANDS ROAD		2 Ramps				
7.1	No	No	Fair	Asphalt	No	None
9.1	No	No	Fair	Asphalt	No	None
GIBSON DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
128.1	No	No	Poor	Asphalt	Yes	Vegetation
128.2	No	No	Fair	Asphalt	No	None
GIL LEONARD LANE		**1 Ramps**				
At WYNDSTONE WAY		1 Ramps				
312.1	No	No	Fair	Asphalt	No	None
GILBERT STREET		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
560.3	Yes	No	Good	Concrete	No	None
560.4	Yes	No	Good	Concrete	No	None
GOODNOW LANE		**1 Ramps**				
At GATES STREET		1 Ramps				
353.1	No	No	Fair	Asphalt	No	None
GRANT STREET		**2 Ramps**				
At JOHN J. GALLAGHER DRIVE		2 Ramps				
475.1	Yes	No	Good	Concrete	No	None
475.2	Yes	No	Good	Concrete	No	None
GREENLEAF CIRCLE		**2 Ramps**				
At NEWBURY STREET		2 Ramps				
240.1	Yes	No	Good	Concrete	No	None
240.2	Yes	No	Good	Concrete	No	None
GREGORY ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
116.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
116.2	Yes	No	Good	Concrete	No	None
HADLEY ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
165.1	Yes	No	Good	Concrete	No	None
165.2	Yes	No	Good	Concrete	No	None
HAMILTON STREET		**4 Ramps**				
At JACKSON PLACE		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
220.1	No	No	Fair	Concrete	Yes	Curbing
220.2	No	No	Fair	Concrete	No	None
At SCHOOL STREET		2 Ramps				
219.3	No	No	Fair	Concrete	No	None
219.4	No	No	Fair	Concrete	No	None
HARDY STREET		**3 Ramps**				
At CONCORD STREET		2 Ramps				
234.1	Yes	No	Good	Concrete	No	None
234.2	Yes	No	Good	Concrete	No	None
At DEBRA LANE		1 Ramps				
231.3	Yes	No	Good	Concrete	No	None
HARTFORD STREET		**18 Ramps**				
At BELVIDERE ROAD		2 Ramps				
526.1	No	No	Fair	Asphalt	No	None
526.2	No	No	Fair	Asphalt	No	None
At C STREET		2 Ramps				
525.1	No	No	Fair	Asphalt	No	None
525.2	No	No	Fair	Asphalt	No	None
At CONCORD STREET		2 Ramps				
520.3	Yes	No	Good	Concrete	No	None
520.4	Yes	No	Fair	Concrete	No	None
At DYER STREET		2 Ramps				
522.1	Yes	No	Good	Concrete	No	None
522.2	Yes	No	Good	Concrete	No	None
At GRANT STREET		3 Ramps				
526.3	No	No	Fair	Asphalt	No	None
527.1	No	No	Fair	Asphalt	No	None
527.2	No	No	Fair	Asphalt	No	None
At HARRISON STREET		2 Ramps				
524.1	No	No	Fair	Asphalt	No	None
524.2	No	No	Fair	Asphalt	No	None
At HOWE STREET		2 Ramps				
523.1	No	No	Fair	Asphalt	No	None
523.2	No	No	Fair	Asphalt	No	None
At LOKER STREET		2 Ramps				
527.3	No	No	Fair	Asphalt	No	None
527.4	No	No	Fair	Asphalt	No	None
At UNDERWOOD STREET		1 Ramps				
528.1	No	No	Fair	Asphalt	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
HEMENWAY ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
117.1	Yes	No	Good	Concrete	No	None
117.2	Yes	Yes	Good	Concrete	Yes	Excessive Ldg Slope
HIALEAH LANE		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
188.1	Yes	No	Good	Concrete	No	None
188.2	Yes	Yes	Good	Concrete	No	None
HILTON STREET		**4 Ramps**				
At BRIDGES STREET		2 Ramps				
569.1	Yes	No	Good	Concrete	No	None
569.2	Yes	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
567.1	Yes	No	Good	Concrete	No	None
567.2	Yes	No	Good	Concrete	No	None
INDIAN HEAD ROAD		**10 Ramps**				
At CRESTWOOD ROAD		2 Ramps				
302.1	Yes	No	Good	Concrete	No	None
302.2	Yes	No	Good	Concrete	No	None
At DONNA ROAD		2 Ramps				
299.1	Yes	No	Good	Concrete	No	None
299.2	Yes	No	Good	Concrete	No	None
At INDIAN HEAD HEIGHTS		2 Ramps				
301.1	Yes	No	Good	Concrete	No	None
301.2	Yes	No	Good	Concrete	No	None
At LOCKLAND AVENUE		2 Ramps				
300.1	Yes	No	Good	Concrete	No	None
300.2	Yes	Yes	Good	Concrete	No	None
At SUMMER STREET		2 Ramps				
298.1	Yes	Yes	Good	Concrete	No	None
298.2	Yes	No	Good	Concrete	No	None
IRVING STREET		**2 Ramps**				
At HERBERT STREET		1 Ramps				
487.1	Yes	No	Good	Concrete	No	None
At LORING DRIVE		1 Ramps				
487.2	No	No	Fair	Concrete	Yes	Curbing
JOHN J BRADY DRIVE		**2 Ramps**				
At NORMANDY ROAD EXTENSION		2 Ramps				
574.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
574.4	Yes	No	Good	Concrete	No	None
JOHN J. GALLAGHER DRIVE	**2 Ramps**					
At EVERIT AVENUE	2 Ramps					
476.1	Yes	No	Good	Concrete	No	None
476.2	Yes	No	Good	Concrete	No	None
JOHN MCQUINN CIRCLE	**1 Ramps**					
At WAVENEY ROAD	1 Ramps					
57.1	No	No	Fair	Asphalt	No	None
JOSEPH ROAD	**2 Ramps**					
At WATER STREET	2 Ramps					
107.1	Yes	No	Good	Concrete	No	None
107.2	Yes	No	Good	Concrete	No	None
JOYCE LUNDBERG DRIVE	**2 Ramps**					
At WATER STREET	2 Ramps					
110.1	Yes	No	Good	Concrete	No	None
110.2	Yes	Yes	Good	Concrete	No	None
JOYCE ROAD	**1 Ramps**					
At POTTER ROAD	1 Ramps					
163.1	No	No	Good	Asphalt	No	None
KELLOGG STREET	**2 Ramps**					
At CENTRAL STREET	2 Ramps					
309.2	No	No	Poor	Concrete	No	None
309.3	No	No	Poor	Concrete	No	None
KENDALL AVENUE	**14 Ramps**					
At ALLA STREET	2 Ramps					
510.1	Yes	No	Good	Concrete	No	None
510.2	Yes	No	Good	Concrete	No	None
At AMERICA STREET	2 Ramps					
508.1	Yes	No	Good	Concrete	No	None
508.2	Yes	No	Good	Concrete	No	None
At CURTIS STREET	2 Ramps					
507.1	Yes	No	Good	Concrete	No	None
507.2	Yes	No	Good	Concrete	No	None
At GLEN STREET	2 Ramps					
506.1	Yes	No	Good	Concrete	No	None
506.2	Yes	No	Good	Concrete	No	None
At KENDALL LANE	2 Ramps					
510.3	Yes	No	Good	Concrete	No	None
510.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At LELAND STREET		2 Ramps				
505.3	Yes	No	Good	Concrete	No	None
505.4	Yes	No	Good	Concrete	No	None
At STILLMAN STREET		2 Ramps				
509.1	Yes	No	Good	Concrete	No	None
509.2	Yes	No	Good	Concrete	No	None
KNIGHT ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
46.1	Yes	No	Good	Concrete	No	None
46.2	Yes	No	Good	Concrete	No	None
KNOX AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
545.1	Yes	No	Good	Concrete	No	None
545.2	Yes	No	Good	Concrete	No	None
LANCASTER DRIVE		**2 Ramps**				
At POTTER ROAD		2 Ramps				
164.1	Yes	No	Good	Concrete	No	None
164.2	Yes	No	Good	Concrete	No	None
LANEWOOD AVENUE		**2 Ramps**				
At CURRIER DRIVE		1 Ramps				
66.1	No	No	Fair	Asphalt	No	None
At WAVENEY ROAD		1 Ramps				
56.1	No	No	Poor	Asphalt	No	None
LARRABEE AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
539.1	Yes	No	Good	Concrete	No	None
539.2	Yes	No	Good	Concrete	No	None
LEGGATT MCCALL		**9 Ramps**				
At PARKING LOT		9 Ramps				
246.1	No	No	Fair	Asphalt	No	None
246.2	No	No	Fair	Asphalt	No	None
247.1	No	No	Fair	Asphalt	No	None
247.2	No	No	Fair	Asphalt	No	None
247.3	No	No	Fair	Asphalt	No	None
247.4	No	No	Fair	Asphalt	No	None
573.1	No	No	Fair	Concrete	No	None
573.2	No	No	Fair	Asphalt	No	None
573.3	No	No	Fair	Asphalt	No	None
LELAND STREET		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At KENDALL AVENUE		2 Ramps				
505.1	Yes	No	Good	Concrete	No	None
505.2	Yes	No	Good	Concrete	No	None
LEO CHASSE WAY		**2 Ramps**				
At GARVEY ROAD		2 Ramps				
8.1	No	No	Fair	Asphalt	No	None
8.2	No	No	Poor	Asphalt	No	None
LIBERTY STREET		**2 Ramps**				
At OAK STREET		2 Ramps				
318.1	Yes	No	Good	Concrete	No	None
318.2	Yes	No	Good	Concrete	No	None
LINDA AVENUE		**2 Ramps**				
At BROOK STREET		2 Ramps				
93.1	No	No	Fair	Concrete	No	None
93.2	No	No	Fair	Concrete	No	None
LITTLE TREE LANE		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
48.1	No	No	Fair	Asphalt	No	None
48.2	No	No	Fair	Asphalt	No	None
LOCKLAND AVENUE		**1 Ramps**				
At DONNA ROAD		1 Ramps				
289.1	No	No	Fair	Asphalt	No	None
MAIN STREET		**4 Ramps**				
At FRANKLIN STREET		2 Ramps				
400.3	Yes	No	Good	Concrete	No	None
400.4	Yes	No	Good	Concrete	No	None
At MOULTON PARK ROAD		2 Ramps				
399.1	No	No	Fair	Concrete	No	None
399.2	No	No	Fair	Concrete	No	None
MAJOR HALE DRIVE		**1 Ramps**				
At BELKNAP ROAD		1 Ramps				
31.1	No	No	Fair	Asphalt	No	None
MARY AGNES ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
161.1	Yes	No	Good	Concrete	No	None
161.2	Yes	No	Good	Concrete	No	None
MAYNARD ROAD		**5 Ramps**				
At CHURCH STREET		2 Ramps				
380.1	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
380.2	Yes	No	Good	Concrete	No	None
At SALEM END ROAD		3 Ramps				
375.1	Yes	No	Good	Concrete	No	None
375.2	Yes	No	Good	Concrete	No	None
375.3	Yes	No	Good	Concrete	No	None
MELLEN STREET		**4 Ramps**				
At WAVERLEY STREET		2 Ramps				
532.1	Yes	No	Good	Concrete	No	None
532.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
558.1	Yes	No	Good	Concrete	Yes	Curbing
558.2	Yes	No	Good	Concrete	No	None
MERRIAM ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
47.1	No	No	Fair	Asphalt	No	None
47.2	No	No	Fair	Asphalt	No	None
MICHAUD DRIVE		**2 Ramps**				
At CENTRAL STREET		2 Ramps				
306.1	Yes	No	Good	Concrete	No	None
306.2	Yes	No	Good	Concrete	No	None
MILL STREET		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
51.1	Yes	No	Good	Concrete	No	None
51.2	Yes	No	Good	Concrete	No	None
MONTEREY LANE		**1 Ramps**				
At BELKNAP ROAD		1 Ramps				
31.2	No	No	Fair	Asphalt	No	None
MURPHY CIRCLE		**2 Ramps**				
At COLONIAL DRIVE		2 Ramps				
152.1	Yes	No	Good	Concrete	Yes	ɛssive Slope & Ldg Sl
152.2	Yes	No	Good	Concrete	Yes	ɛssive Slope & Ldg Sl
NAPLES STREET		**4 Ramps**				
At BRIDGES STREET		2 Ramps				
570.1	Yes	No	Good	Concrete	No	None
570.3	No	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
568.1	Yes	No	Good	Concrete	No	None
568.2	Yes	No	Good	Concrete	No	None
NEWBURY STREET		**5 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At OLD CONNECTICUT PATH		2 Ramps				
228.1	Yes	No	Good	Concrete	No	None
228.2	Yes	No	Good	Concrete	No	None
At SPEEN STREET		1 Ramps				
251.2	Yes	No	Good	Concrete	No	None
At WHITTIER STREET		2 Ramps				
241.5	Yes	No	Good	Concrete	Yes	Utillity Pole
241.6	Yes	No	Good	Concrete	No	None
NICHOLAS ROAD		**4 Ramps**				
At WATER STREET		4 Ramps				
104.3	Yes	No	Good	Concrete	No	None
104.4	Yes	Yes	Good	Concrete	No	None
104.5	Yes	No	Good	Concrete	No	None
104.6	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**2 Ramps**				
At CONCORD STREET		2 Ramps				
518.4	Yes	No	Good	Concrete	No	None
518.5	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**7 Ramps**				
At ARSENAL ROAD		1 Ramps				
517.2	Yes	No	Good	Concrete	No	None
At FLAGG DRIVE		2 Ramps				
515.3	Yes	No	Good	Concrete	No	None
515.4	Yes	No	Good	Concrete	No	None
At JOHN J BRADY DRIVE		2 Ramps				
574.1	Yes	No	Good	Concrete	No	None
574.2	Yes	No	Good	Concrete	Yes	Utillity Pole
At ROSE KENNEDY LANE		2 Ramps				
516.3	Yes	No	Good	Concrete	No	None
516.4	Yes	No	Good	Concrete	No	None
OAK CREST DRIVE		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
350.1	Yes	No	Good	Concrete	No	None
350.2	Yes	Yes	Good	Concrete	No	None
OAK STREET		**4 Ramps**				
At EDGELL ROAD		2 Ramps				
317.1	Yes	Yes	Good	Concrete	No	None
317.2	Yes	No	Good	Concrete	No	None
At VERNON STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
319.1	Yes	Yes	Good	Concrete	No	None
319.2	Yes	No	Good	Concrete	No	None
OAKWOOD COURT	**2 Ramps**					
At POTTER ROAD	2 Ramps					
170.1	Yes	No	Good	Concrete	No	None
170.2	Yes	No	Good	Concrete	No	None
OLD CONNECTICUT PATH	**24 Ramps**					
At ARLENE ROAD	2 Ramps					
227.1	No	No	Fair	Concrete	No	None
227.2	No	No	Fair	Concrete	No	None
At BIRCH ROAD	2 Ramps					
199.1	No	No	Fair	Asphalt	No	None
199.4	No	No	Fair	Asphalt	No	None
At BROSSI CIRCLE	1 Ramps					
198.1	Yes	No	Good	Concrete	No	None
At BROWNLEA ROAD	1 Ramps					
210.3	No	No	Fair	Concrete	No	None
At CONCORD STREET	10 Ramps					
230.1	Yes	No	Good	Concrete	No	None
230.2	Yes	No	Good	Concrete	No	None
230.4	Yes	No	Good	Concrete	No	None
230.5	Yes	No	Good	Concrete	No	None
230.6	Yes	No	Good	Concrete	No	None
230.7	Yes	No	Good	Concrete	No	None
230.8	Yes	No	Good	Concrete	No	None
230.9	Yes	No	Good	Concrete	No	None
253.1	Yes	No	Good	Concrete	No	None
253.2	Yes	No	Good	Concrete	No	None
At HARDY STREET	2 Ramps					
229.1	Yes	No	Good	Concrete	No	None
229.3	No	No	Fair	Asphalt	No	None
At LAKE ROAD	1 Ramps					
202.2	No	No	Good	Concrete	No	None
At PARKING LOT	5 Ramps					
211.1	No	No	Poor	Concrete	No	None
211.2	Yes	No	Good	Concrete	No	None
211.3	Yes	No	Good	Concrete	No	None
211.4	Yes	No	Good	Concrete	No	None
223.5	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
OLD WOOD ROAD		**2 Ramps**				
At OLD WORCESTER ROAD		2 Ramps				
343.1	Yes	No	Good	Concrete	Yes	Curbing
343.2	Yes	No	Good	Concrete	Yes	Curbing
OLD WORCESTER ROAD		**3 Ramps**				
At OLD WOOD ROAD		2 Ramps				
343.3	Yes	No	Good	Concrete	Yes	Curbing
343.4	Yes	No	Good	Concrete	Yes	Curbing
At TEMPLE STREET		1 Ramps				
341.2	Yes	No	Good	Concrete	No	None
PALMETTO AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
544.1	Yes	No	Good	Concrete	No	None
544.2	Yes	No	Good	Concrete	No	None
PAMELA ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
111.3	Yes	No	Good	Concrete	No	None
111.4	Yes	No	Good	Concrete	No	None
PARKING LOT		**5 Ramps**				
At EDGELL ROAD		2 Ramps				
316.5	Yes	Yes	Good	Concrete	No	None
316.6	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		1 Ramps				
223.6	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
536.10	Yes	No	Good	Concrete	No	None
536.9	Yes	No	Good	Concrete	No	None
PERSHING AVENUE		**4 Ramps**				
At WAVERLEY STREET		4 Ramps				
549.1	Yes	No	Good	Concrete	No	None
549.2	Yes	No	Good	Concrete	No	None
576.1	Yes	No	Good	Concrete	No	None
576.2	Yes	No	Good	Concrete	No	None
PLEASANT STREET		**5 Ramps**				
At ARNOLD ROAD		1 Ramps				
329.2	Yes	No	Good	Concrete	No	None
At MAYNARD ROAD		2 Ramps				
327.1	Yes	No	Good	Concrete	No	None
327.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At VERNON STREET		2 Ramps				
325.1	Yes	No	Good	Concrete	No	None
325.2	Yes	No	Good	Concrete	No	None
POTTER ROAD		**12 Ramps**				
At BRADFORD ROAD		2 Ramps				
171.1	Yes	No	Good	Concrete	No	None
171.2	Yes	No	Good	Concrete	No	None
At EATON ROAD		2 Ramps				
168.2	Yes	No	Good	Concrete	No	None
168.3	Yes	No	Good	Concrete	No	None
At ELM STREET		2 Ramps				
175.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
175.4	Yes	No	Good	Concrete	No	None
At JOYCE ROAD		2 Ramps				
163.2	Yes	No	Good	Concrete	No	None
163.3	Yes	No	Good	Concrete	No	None
At LOWRY ROAD		2 Ramps				
177.1	Yes	No	Good	Concrete	No	None
177.2	Yes	No	Good	Concrete	Yes	Curbing
At SCHOOL ENTRANCE		1 Ramps				
162.4	Yes	No	Good	Concrete	No	None
At WATER STREET		1 Ramps				
115.1	Yes	No	Good	Concrete	Yes	Curbing
PROSPECT STREET		**6 Ramps**				
At CENTRAL STREET		2 Ramps				
306.5	Yes	No	Good	Concrete	No	None
306.6	Yes	No	Good	Concrete	No	None
At LILIAN ROAD		1 Ramps				
310.4	Yes	No	Good	Concrete	No	None
At WOODSIDE COTTAGE WAY		1 Ramps				
310.3	Yes	No	Good	Concrete	No	None
At WYNDSTONE WAY		2 Ramps				
311.3	Yes	No	Good	Concrete	No	None
311.4	Yes	No	Good	Concrete	No	None
RESERVOIR RIDGE		**2 Ramps**				
At TEMPLE STREET		2 Ramps				
370.1	No	No	Fair	Asphalt	No	None
370.2	No	No	Fair	Asphalt	No	None
RHUBENA STREET		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At WAVERLEY STREET		2 Ramps				
537.1	Yes	No	Good	Concrete	No	None
537.2	Yes	No	Good	Concrete	No	None
RIVERPATH DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
201.1	Yes	No	Good	Concrete	No	None
201.2	Yes	No	Good	Concrete	No	None
RON'S WAY		**2 Ramps**				
At WATER STREET		2 Ramps				
108.1	Yes	No	Good	Concrete	No	None
108.2	Yes	No	Good	Concrete	No	None
ROSE KENNEDY LANE		**1 Ramps**				
At NORMANDY ROAD EXTENSION		1 Ramps				
516.2	Yes	No	Good	Concrete	No	None
ROYAL MEADOW LANE		**1 Ramps**				
At KINGS ROW LANE		1 Ramps				
27.1	No	No	Fair	Asphalt	No	None
SAGE LANE		**1 Ramps**				
At WINCH STREET		1 Ramps				
11.1	No	No	Fair	Asphalt	No	None
SALEM END ROAD		**4 Ramps**				
At MAYHEW STREET		2 Ramps				
374.1	No	No	Fair	Concrete	No	None
374.2	No	No	Fair	Concrete	No	None
At SALEM END LANE		2 Ramps				
368.1	No	No	Good	Concrete	No	None
368.2	No	No	Good	Concrete	No	None
SAUCIER STREET		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
533.1	Yes	No	Good	Concrete	No	None
533.2	Yes	Yes	Fair	Concrete	No	None
SAVOY ROAD		**2 Ramps**				
At MARY AGNES ROAD		2 Ramps				
160.1	No	No	Poor	Asphalt	Yes	Vegetation
160.2	No	No	Poor	Asphalt	Yes	Vegetation
SAXONY ROAD		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
191.1	Yes	No	Good	Concrete	No	None
191.2	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
SCHOOL ENTRANCE		**4 Ramps**				
At BROOK STREET		2 Ramps				
86.1	No	No	Good	Concrete	Yes	Excessive Ldg Slope
86.2	No	No	Good	Concrete	No	None
At POTTER ROAD		2 Ramps				
162.1	Yes	No	Good	Concrete	No	None
162.2	Yes	No	Good	Concrete	No	None
SCHOOL STREET		**7 Ramps**				
At CONCORD STREET		2 Ramps				
221.3	Yes	Yes	Good	Concrete	No	None
221.4	Yes	No	Good	Concrete	No	None
At HAMILTON STREET		4 Ramps				
219.1	No	No	Fair	Concrete	No	None
219.2	No	No	Fair	Concrete	No	None
219.5	Yes	No	Fair	Concrete	No	None
219.6	Yes	No	Fair	Concrete	Yes	ng & Excessive Ldg S
At OLD CONNECTICUT PATH		1 Ramps				
204.1	No	No	Fair	Concrete	Yes	Curbing
SECOND STREET		**6 Ramps**				
At BEAVER STREET		4 Ramps				
503.1	Yes	No	Good	Concrete	No	None
503.2	Yes	No	Good	Concrete	No	None
503.4	Yes	No	Good	Concrete	No	None
503.5	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
514.1	Yes	No	Good	Concrete	No	None
514.2	Yes	No	Good	Concrete	No	None
SHEFFIELD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
169.1	Yes	No	Good	Concrete	No	None
169.2	Yes	No	Good	Concrete	No	None
SLOANE DRIVE		**1 Ramps**				
At MARY AGNES ROAD		1 Ramps				
159.1	No	No	Fair	Asphalt	Yes	Vegetation
SPEEN STREET		**4 Ramps**				
At COCHITUATE ROAD		2 Ramps				
252.1	Yes	No	Good	Concrete	No	None
252.5	No	No	Poor	Concrete	No	None
At LEGGATT MCCALL CONNECTOR		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
248.1	Yes	No	Good	Concrete	No	None
248.2	Yes	No	Good	Concrete	No	None
SPRING LANE	**2 Ramps**					
At WATER STREET	2 Ramps					
114.1	Yes	No	Good	Concrete	No	None
114.2	Yes	No	Good	Concrete	No	None
STATE STREET	**2 Ramps**					
At HIGH STREET	2 Ramps					
377.1	Yes	No	Good	Concrete	No	None
377.2	Yes	Yes	Good	Concrete	No	None
SUDBURY LANDING	**2 Ramps**					
At DANFORTH STREET	2 Ramps					
183.1	Yes	No	Good	Concrete	No	None
183.2	Yes	No	Good	Concrete	No	None
SUMMER STREET	**2 Ramps**					
At CONCORD STREET	2 Ramps					
235.3	Yes	No	Good	Concrete	No	None
235.4	Yes	No	Good	Concrete	No	None
SUN VALLEY DRIVE	**1 Ramps**					
At PLEASANT STREET	1 Ramps					
331.1	No	No	Good	Asphalt	Yes	Hydrant
SWANSON ROAD	**2 Ramps**					
At WATER STREET	2 Ramps					
97.1	Yes	No	Good	Concrete	No	None
97.2	Yes	No	Good	Concrete	No	None
TEMI ROAD	**2 Ramps**					
At POTTER ROAD	2 Ramps					
173.1	Yes	No	Good	Concrete	No	None
173.2	Yes	Yes	Good	Concrete	No	None
TEMPLE STREET	**4 Ramps**					
At TEMPLE PLACE	2 Ramps					
339.1	No	No	Fair	Asphalt	No	None
339.6	No	No	Fair	Asphalt	No	None
At WOODLEIGH ROAD	2 Ramps					
339.2	No	No	Fair	Asphalt	No	None
339.5	No	No	Fair	Asphalt	No	None
THELMA ROAD	**2 Ramps**					
At CONCORD STREET	2 Ramps					
518.1	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
518.8	Yes	No	Good	Concrete	No	None
THIRD STREET		**4 Ramps**				
At BEAVER STREET		4 Ramps				
504.1	Yes	No	Good	Concrete	No	None
504.2	Yes	No	Good	Concrete	No	None
504.3	Yes	No	Good	Concrete	No	None
504.4	Yes	No	Good	Concrete	No	None
TREELAND DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
129.1	No	No	Fair	Asphalt	Yes	Vegetation
129.2	No	No	Fair	Asphalt	No	None
UPTON ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
176.1	Yes	No	Good	Concrete	No	None
176.2	Yes	Yes	Good	Concrete	No	None
VERNON STREET		**13 Ramps**				
At EDGELL ROAD		4 Ramps				
315.3	Yes	Yes	Good	Concrete	No	None
315.4	Yes	Yes	Good	Concrete	No	None
315.5	Yes	No	Good	Concrete	No	None
315.6	Yes	No	Good	Concrete	No	None
At GROVE STREET		2 Ramps				
324.1	Yes	No	Good	Concrete	No	None
324.2	Yes	No	Good	Concrete	No	None
At OAK STREET		2 Ramps				
319.3	Yes	No	Good	Concrete	No	None
319.4	Yes	No	Good	Concrete	No	None
At PLEASANT STREET		5 Ramps				
325.3	Yes	No	Good	Concrete	No	None
325.4	Yes	Yes	Good	Concrete	No	None
325.5	Yes	No	Good	Asphalt	No	None
325.6	No	No	Fair	Asphalt	No	None
325.7	No	No	Fair	Asphalt	No	None
WALKERS WAY		**2 Ramps**				
At LANEWOOD AVENUE		2 Ramps				
65.1	No	No	Fair	Asphalt	No	None
65.2	No	No	Fair	Asphalt	No	None
WARREN PLACE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
314.1	Yes	No	Good	Concrete	No	None
314.2	Yes	No	Good	Concrete	No	None
WATER STREET		**31 Ramps**				
At BROOK STREET		2 Ramps				
96.3	Yes	No	Good	Concrete	No	None
96.4	Yes	No	Good	Concrete	No	None
At CART PATH		2 Ramps				
100.1	No	No	Good	Asphalt	No	None
100.2	No	No	Good	Asphalt	No	None
At CENTRAL STREET		2 Ramps				
105.3	Yes	No	Good	Concrete	No	None
105.4	Yes	No	Good	Concrete	No	None
At EDGELL ROAD		1 Ramps				
121.4	Yes	No	Good	Concrete	Yes	Curbing
At JOYCE LUNDBERG DRIVE		2 Ramps				
110.3	Yes	No	Good	Concrete	No	None
110.4	Yes	No	Good	Concrete	No	None
At LARIVIERE ROAD		2 Ramps				
98.1	Yes	No	Good	Concrete	No	None
98.2	Yes	No	Good	Concrete	No	None
At LIBRARY ENTRANCE		2 Ramps				
119.1	Yes	No	Good	Concrete	No	None
119.4	Yes	No	Good	Concrete	No	None
At NICHOLAS ROAD		2 Ramps				
104.1	Yes	No	Good	Concrete	No	None
104.2	Yes	No	Good	Concrete	No	None
At PAMELA ROAD		2 Ramps				
111.1	Yes	Yes	Good	Concrete	No	None
111.2	Yes	No	Good	Concrete	No	None
At PARK AVENUE		4 Ramps				
102.1	Yes	No	Good	Concrete	No	None
102.2	Yes	No	Good	Concrete	Yes	Utility Access
103.1	Yes	No	Good	Concrete	No	None
103.2	Yes	No	Good	Concrete	No	None
At POTTER ROAD		2 Ramps				
115.3	Yes	No	Fair	Concrete	Yes	Excessive Ldg Slope
115.4	Yes	No	Good	Concrete	No	None
At SCHOOL ENTRANCE		6 Ramps				
120.1	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
120.2	Yes	Yes	Good	Concrete	No	None
120.3	Yes	No	Good	Concrete	No	None
120.4	Yes	Yes	Good	Concrete	No	None
120.5	Yes	No	Good	Concrete	No	None
120.6	Yes	Yes	Good	Concrete	No	None
At SWANSON ROAD		2 Ramps				
97.3	Yes	No	Good	Concrete	No	None
97.4	Yes	No	Good	Concrete	No	None
WAVENEY ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
55.1	Yes	No	Good	Concrete	No	None
55.2	Yes	No	Good	Concrete	No	None
WAVERLEY STREET		**35 Ramps**				
At BEAVER STREET		2 Ramps				
498.2	Yes	Yes	Good	Concrete	No	None
498.5	Yes	No	Good	Concrete	No	None
At BISHOP STREET		2 Ramps				
498.1	Yes	No	Fair	Concrete	No	None
498.6	Yes	No	Good	Concrete	No	None
At CASEY COURT		2 Ramps				
530.1	No	No	Good	Concrete	No	None
530.2	No	No	Good	Concrete	No	None
At CEDAR STREET		2 Ramps				
529.1	Yes	No	Good	Concrete	No	None
529.2	Yes	No	Good	Concrete	No	None
At COOLIDGE STREET		2 Ramps				
511.1	Yes	No	Good	Concrete	No	None
511.2	Yes	No	Good	Concrete	No	None
At FOUNTAIN STREET		2 Ramps				
532.4	Yes	No	Good	Concrete	No	None
532.7	Yes	No	Good	Concrete	No	None
At LIBERTY STREET		2 Ramps				
550.1	No	No	Good	Concrete	No	None
550.2	No	No	Good	Concrete	No	None
At MELLEN STREET		2 Ramps				
532.3	Yes	No	Good	Concrete	No	None
532.8	Yes	No	Good	Concrete	No	None
At PARKING LOT		2 Ramps				
539.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
539.4	Yes	No	Good	Concrete	No	None
At PERSHING AVENUE		2 Ramps				
549.3	Yes	No	Good	Concrete	No	None
549.4	Yes	No	Good	Concrete	Yes	Curbing
At SECOND STREET		2 Ramps				
514.3	Yes	No	Good	Concrete	No	None
514.4	Yes	No	Good	Concrete	No	None
At TARALLI TERRACE		2 Ramps				
512.1	Yes	No	Good	Concrete	No	None
512.2	Yes	No	Good	Concrete	No	None
At WAVERLY COURT		3 Ramps				
531.1	Yes	No	Good	Concrete	No	None
531.2	Yes	No	Good	Concrete	No	None
531.3	Yes	No	Good	Concrete	No	None
At WILLIS STREET		2 Ramps				
513.1	Yes	No	Good	Concrete	No	None
513.2	Yes	No	Good	Concrete	No	None
At WINTER STREET		2 Ramps				
546.1	Yes	No	Good	Concrete	No	None
546.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		4 Ramps				
536.11	Yes	No	Good	Concrete	No	None
536.12	Yes	No	Good	Concrete	No	None
536.7	Yes	No	Good	Concrete	No	None
536.8	Yes	No	Good	Concrete	No	None
WESLEY ROAD		**2 Ramps**				
At BROOK STREET		2 Ramps				
85.1	No	No	Fair	Concrete	No	None
85.2	No	No	Fair	Concrete	No	None
WEST STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
334.1	Yes	No	Good	Concrete	No	None
334.2	Yes	No	Fair	Concrete	No	None
WHITING ROAD		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
124.1	Yes	No	Good	Concrete	No	None
124.2	Yes	No	Good	Concrete	Yes	Curbing
WHITTIER STREET		**6 Ramps**				
At COCHITUATE ROAD		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
242.4	No	No	Good	Concrete	No	None
242.5	No	No	Fair	Concrete	Yes	Excessive Ldg Slope
At NEWBURY STREET		4 Ramps				
241.1	Yes	No	Good	Concrete	No	None
241.2	Yes	No	Good	Concrete	No	None
241.3	Yes	No	Good	Concrete	Yes	Utillity Pole
241.4	Yes	No	Good	Concrete	No	None
WILDE AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
538.1	Yes	No	Good	Concrete	No	None
538.2	Yes	No	Good	Concrete	No	None
WILSON AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
548.1	Yes	No	Good	Concrete	No	None
548.2	Yes	No	Good	Concrete	No	None
WINTER STREET		**7 Ramps**				
At MAPLE STREET		1 Ramps				
386.1	No	No	Poor	Asphalt	No	None
At MAYHEW STREET EXTENSION		2 Ramps				
378.1	No	No	Poor	Asphalt	No	None
378.2	No	No	Poor	Asphalt	No	None
At SALEM END ROAD		3 Ramps				
373.1	No	No	Poor	Concrete	No	None
373.2	No	No	Fair	Concrete	No	None
373.3	No	No	Fair	Asphalt	No	None
At WORCESTER ROAD		1 Ramps				
379.2	Yes	No	Good	Concrete	No	None
WINTHROP STREET		**11 Ramps**				
At BETHANY ROAD		1 Ramps				
553.3	Yes	No	Good	Concrete	No	None
At BRIDGES STREET EXTENSION		2 Ramps				
555.3	Yes	No	Fair	Concrete	No	None
555.4	Yes	No	Good	Concrete	No	None
At CONANT ROAD		2 Ramps				
536.3	Yes	No	Good	Concrete	No	None
536.4	Yes	No	Fair	Concrete	Yes	Major Curbing
At COVE AVENUE		2 Ramps				
556.3	Yes	No	Good	Concrete	No	None
556.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At DOW STREET		1 Ramps				
558.4	Yes	No	Good	Concrete	No	None
At MELLEN STREET		1 Ramps				
558.3	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
536.5	Yes	Yes	Good	Concrete	No	None
536.6	Yes	No	Good	Concrete	No	None
WINTHROP TERRACE		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
557.1	Yes	No	Good	Concrete	No	None
557.2	Yes	No	Good	Concrete	No	None
WOODLEIGH ROAD		**6 Ramps**				
At OLD WOOD ROAD		2 Ramps				
342.1	No	No	Poor	Asphalt	Yes	Vegetation
342.2	No	No	Fair	Asphalt	No	None
At PRIMO DRIVE		2 Ramps				
344.1	No	No	Fair	Asphalt	No	None
344.2	No	No	Fair	Asphalt	No	None
At TEMPLE STREET		2 Ramps				
339.3	No	No	Fair	Asphalt	No	None
339.4	No	No	Fair	Asphalt	No	None
WOODMERE ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
37.1	Yes	No	Good	Concrete	No	None
37.2	Yes	No	Good	Concrete	No	None
WOODSIDE COTTAGE WAY		**2 Ramps**				
At PROSPECT STREET		2 Ramps				
310.1	Yes	No	Good	Concrete	No	None
310.2	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
WYNDSTONE WAY		**2 Ramps**				
At PROSPECT STREET		2 Ramps				
311.1	Yes	No	Good	Concrete	No	None
311.2	Yes	No	Good	Concrete	No	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Total: 50

Ramp Locations With Obstructions

		Obstruction	Obstruction Type	Material
A STREET	**2 Ramps Total**			
At CONCORD STREET	2 Ramps			
222.4		Yes	Utillity Pole	Concrete
222.5		Yes	Gate	Concrete
ANDERSON ROAD	**1 Ramps Total**			
At BROOK STREET	1 Ramps			
90.1		Yes	Man Hole	Asphalt
BACON ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
118.1		Yes	xcessive Ldg Slop	Concrete
BEAVER STREET	**1 Ramps Total**			
At PARKING LOT	1 Ramps			
578.2		Yes	Curbing	Concrete
BELKNAP ROAD	**1 Ramps Total**			
At FLANAGAN DRIVE	1 Ramps			
30.1		Yes	Curbing	Concrete
BROOK STREET	**1 Ramps Total**			
At MEREDITH CIRCLE	1 Ramps			
88.1		Yes	Vegetation	Concrete
CLIFFORD STREET	**1 Ramps Total**			
At BRIDGES STREET EXTENSION	1 Ramps			
563.2		Yes	Vegetation	Concrete
COBURN STREET	**1 Ramps Total**			
At SAUCIER STREET	1 Ramps			
565.2		Yes	Sign	Concrete
COCHITUATE ROAD	**1 Ramps Total**			
At WHITTIER STREET	1 Ramps			
242.1		Yes	xcessive Ldg Slop	Concrete
CONCORD STREET	**3 Ramps Total**			
At A STREET	2 Ramps			
222.3		Yes	Curbing	Concrete
222.6		Yes	Utility Access	Concrete
At HARTFORD STREET	1 Ramps			
520.6		Yes	xcessive Ldg Slop	Concrete
EDGELL ROAD	**2 Ramps Total**			
At EDMANDS ROAD	1 Ramps			
121.1		Yes	xcessive Ldg Slop	Concrete
At WHITING ROAD	1 Ramps			

		Obstruction	Obstruction Type	Material
124.3		Yes	Curbing	Concrete
GIBSON DRIVE	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
128.1		Yes	Vegetation	Asphalt
GREGORY ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
116.1		Yes	xcessive Ldg Slop	Concrete
HAMILTON STREET	**1 Ramps Total**			
At JACKSON PLACE	1 Ramps			
220.1		Yes	Curbing	Concrete
HEMENWAY ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
117.2		Yes	xcessive Ldg Slop	Concrete
IRVING STREET	**1 Ramps Total**			
At LORING DRIVE	1 Ramps			
487.2		Yes	Curbing	Concrete
MELLEN STREET	**1 Ramps Total**			
At WINTHROP STREET	1 Ramps			
558.1		Yes	Curbing	Concrete
MURPHY CIRCLE	**2 Ramps Total**			
At COLONIAL DRIVE	2 Ramps			
152.1		Yes	sive Slope & Ldg S	Concrete
152.2		Yes	sive Slope & Ldg S	Concrete
NEWBURY STREET	**1 Ramps Total**			
At WHITTIER STREET	1 Ramps			
241.5		Yes	Utillity Pole	Concrete
NORMANDY ROAD EXTENSION	**1 Ramps Total**			
At JOHN J BRADY DRIVE	1 Ramps			
574.2		Yes	Utillity Pole	Concrete
OLD WOOD ROAD	**2 Ramps Total**			
At OLD WORCESTER ROAD	2 Ramps			
343.1		Yes	Curbing	Concrete
343.2		Yes	Curbing	Concrete
OLD WORCESTER ROAD	**2 Ramps Total**			
At OLD WOOD ROAD	2 Ramps			
343.3		Yes	Curbing	Concrete
343.4		Yes	Curbing	Concrete
POTTER ROAD	**3 Ramps Total**			
At ELM STREET	1 Ramps			
175.1		Yes	xcessive Ldg Slop	Concrete
At LOWRY ROAD	1 Ramps			
177.2		Yes	Curbing	Concrete

		Obstruction	Obstruction Type	Material
At WATER STREET	1 Ramps			
115.1		Yes	Curbing	Concrete
SAVOY ROAD	**2 Ramps Total**			
At MARY AGNES ROAD	2 Ramps			
160.1		Yes	Vegetation	Asphalt
160.2		Yes	Vegetation	Asphalt
SCHOOL ENTRANCE	**1 Ramps Total**			
At BROOK STREET	1 Ramps			
86.1		Yes	xcessive Ldg Slop	Concrete
SCHOOL STREET	**2 Ramps Total**			
At HAMILTON STREET	1 Ramps			
219.6		Yes	g & Excessive Ldg	Concrete
At OLD CONNECTICUT PATH	1 Ramps			
204.1		Yes	Curbing	Concrete
SLOANE DRIVE	**1 Ramps Total**			
At MARY AGNES ROAD	1 Ramps			
159.1		Yes	Vegetation	Asphalt
SUN VALLEY DRIVE	**1 Ramps Total**			
At PLEASANT STREET	1 Ramps			
331.1		Yes	Hydrant	Asphalt
TREELAND DRIVE	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
129.1		Yes	Vegetation	Asphalt
WATER STREET	**3 Ramps Total**			
At EDGELL ROAD	1 Ramps			
121.4		Yes	Curbing	Concrete
At PARK AVENUE	1 Ramps			
102.2		Yes	Utility Access	Concrete
At POTTER ROAD	1 Ramps			
115.3		Yes	xcessive Ldg Slop	Concrete
WAVERLEY STREET	**1 Ramps Total**			
At PERSHING AVENUE	1 Ramps			
549.4		Yes	Curbing	Concrete
WHITING ROAD	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
124.2		Yes	Curbing	Concrete
WHITTIER STREET	**2 Ramps Total**			
At COCHITUATE ROAD	1 Ramps			
242.5		Yes	xcessive Ldg Slop	Concrete
At NEWBURY STREET	1 Ramps			
241.3		Yes	Utillity Pole	Concrete
WINTHROP STREET	**1 Ramps Total**			

		Obstruction	Obstruction Type	Material
At CONANT ROAD	1 Ramps			
536.4		Yes	Major Curbing	Concrete
WOODLEIGH ROAD	**1 Ramps Total**			
At OLD WOOD ROAD	1 Ramps			
342.1		Yes	Vegetation	Asphalt
WOODSIDE COTTAGE WAY	**1 Ramps Total**			
At PROSPECT STREET	1 Ramps			
310.2		Yes	xcessive Ldg Slop	Concrete

City of Framingham, Massachusetts
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Ramp ID:	222.4
Street:	**A STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	222.5
Street:	**A STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Gate
Condition:	Good



Ramp ID:	90.1
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Man Hole
Condition:	Fair



Ramp ID:	90.2
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	90.3
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	90.4
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	126.1
Street:	**APPLE D'OR ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	126.2
Street:	**APPLE D'OR ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	316.1
Street:	**AUBURN STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.2
Street:	**AUBURN STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	118.1
Street:	**BACON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	118.2
Street:	**BACON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	131.1
Street:	**BALDWIN AVENUE**
Intersecting Street:	APPLE D'OR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	260.1
Street:	**BEACON STREET**
Intersecting Street:	HASTINGS STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	260.2
Street:	**BEACON STREET**
Intersecting Street:	HASTINGS STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	265.1
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	265.2
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	275.1
Street:	**BEACON STREET**
Intersecting Street:	CAVANAUGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	275.2
Street:	**BEACON STREET**
Intersecting Street:	CAVANAUGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	277.1
Street:	**BEACON STREET**
Intersecting Street:	MAGNOLIA STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	277.2
Street:	**BEACON STREET**
Intersecting Street:	MAGNOLIA STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	279.1
Street:	**BEACON STREET**
Intersecting Street:	LOHNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	279.2
Street:	**BEACON STREET**
Intersecting Street:	LOHNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	295.1
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	295.2
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.4
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.5
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	297.1
Street:	**BEACON STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	297.2
Street:	**BEACON STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.3
Street:	**BEAVER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.4
Street:	**BEAVER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	499.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	499.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	500.1
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	500.2
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	501.1
Street:	**BEAVER STREET**
Intersecting Street:	MARIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	501.2
Street:	**BEAVER STREET**
Intersecting Street:	MARIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.1
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.2
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.3
Street:	**BEAVER STREET**
Intersecting Street:	FIRST STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	502.4
Street:	**BEAVER STREET**
Intersecting Street:	FIRST STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.3
Street:	**BEAVER STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	577.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	577.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	578.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	578.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	22.3
Street:	**BELKNAP ROAD**
Intersecting Street:	CLEARVIEW DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.4
Street:	**BELKNAP ROAD**
Intersecting Street:	CLEARVIEW DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	23.1
Street:	**BELKNAP ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	23.2
Street:	**BELKNAP ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	30.1
Street:	**BELKNAP ROAD**
Intersecting Street:	FLANAGAN DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	30.2
Street:	**BELKNAP ROAD**
Intersecting Street:	FLANAGAN DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	535.1
Street:	**BETHANY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	535.2
Street:	**BETHANY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.1
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.2
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	322.1
Street:	**BEULAH STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	322.2
Street:	**BEULAH STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.2
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.3
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	200.1
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	200.2
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	499.4
Street:	**BLANDIN AVENUE**
Intersecting Street:	BEAVER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	171.3
Street:	**BRADFORD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	171.4
Street:	**BRADFORD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	534.1
Street:	**BRIDGES STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	534.2
Street:	**BRIDGES STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.3
Street:	**BRIDGES STREET**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.4
Street:	**BRIDGES STREET**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	570.2
Street:	**BRIDGES STREET**
Intersecting Street:	NAPLES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.1
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.2
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.3
Street:	**BRIGATI TERRACE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.4
Street:	**BRIGATI TERRACE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	84.1
Street:	**BROOK STREET**
Intersecting Street:	WILD OAK RISE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	84.2
Street:	**BROOK STREET**
Intersecting Street:	WILD OAK RISE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	86.3
Street:	**BROOK STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	86.4
Street:	**BROOK STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	87.1
Street:	**BROOK STREET**
Intersecting Street:	WARD FARM CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	87.2
Street:	**BROOK STREET**
Intersecting Street:	WARD FARM CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	87.3
Street:	**BROOK STREET**
Intersecting Street:	PERRY H. HENDERSON DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	87.4
Street:	**BROOK STREET**
Intersecting Street:	PERRY H. HENDERSON DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	88.1
Street:	**BROOK STREET**
Intersecting Street:	MEREDITH CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	88.2
Street:	**BROOK STREET**
Intersecting Street:	MEREDITH CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	88.3
Street:	**BROOK STREET**
Intersecting Street:	LEIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	88.4
Street:	**BROOK STREET**
Intersecting Street:	LEIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.1
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.2
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.3
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	94.1
Street:	**BROOK STREET**
Intersecting Street:	BROOKBURY CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.2
Street:	**BROOK STREET**
Intersecting Street:	BROOKBURY CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.3
Street:	**BROOK STREET**
Intersecting Street:	SALVI DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.4
Street:	**BROOK STREET**
Intersecting Street:	SALVI DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.1
Street:	**BROOK STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.2
Street:	**BROOK STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	95.1
Street:	**BROOKFIELD AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	95.2
Street:	**BROOKFIELD AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.1
Street:	**BROWNLEA ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.2
Street:	**BROWNLEA ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	243.1
Street:	**BURR STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	243.2
Street:	**BURR STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	244.1
Street:	**BURR STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	244.2
Street:	**BURR STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	235.1
Street:	**CAMPELLO ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	235.2
Street:	**CAMPELLO ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	560.1
Street:	**CEDAR STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	560.2
Street:	**CEDAR STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	561.1
Street:	**CEDAR STREET**
Intersecting Street:	CYPRESS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	561.2
Street:	**CEDAR STREET**
Intersecting Street:	CYPRESS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.1
Street:	**CENTRAL STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.2
Street:	**CENTRAL STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	303.1
Street:	**CENTRAL STREET**
Intersecting Street:	INDIAN HEAD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	303.2
Street:	**CENTRAL STREET**
Intersecting Street:	INDIAN HEAD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.3
Street:	**CENTRAL STREET**
Intersecting Street:	MICHAUD DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.4
Street:	**CENTRAL STREET**
Intersecting Street:	MICHAUD DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.1
Street:	**CHERRY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	239.2
Street:	**CHERRY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.1
Street:	**CLEARVIEW DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.2
Street:	**CLEARVIEW DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	562.1
Street:	**CLIFFORD STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	562.2
Street:	**CLIFFORD STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	563.1
Street:	**CLIFFORD STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	563.2
Street:	**CLIFFORD STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Good



Ramp ID:	554.1
Street:	**COBURN STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	554.2
Street:	**COBURN STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	565.1
Street:	**COBURN STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	565.2
Street:	**COBURN STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Sign
Condition:	Good



Ramp ID:	566.1
Street:	**COBURN STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	566.2
Street:	**COBURN STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.1
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	242.2
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.6
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.7
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	BEACON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.6
Street:	**COCHITUATE ROAD**
Intersecting Street:	BEACON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	536.1
Street:	**CONANT ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.2
Street:	**CONANT ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.1
Street:	**CONCORD STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.2
Street:	**CONCORD STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.1
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.2
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.3
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	222.6
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



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Ramp ID:	222.7
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.8
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.10
Street:	**CONCORD STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.3
Street:	**CONCORD STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	236.1
Street:	**CONCORD STREET**
Intersecting Street:	DONLON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	236.2
Street:	**CONCORD STREET**
Intersecting Street:	DONLON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	237.1
Street:	**CONCORD STREET**
Intersecting Street:	FEMIA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	237.2
Street:	**CONCORD STREET**
Intersecting Street:	FEMIA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	238.1
Street:	**CONCORD STREET**
Intersecting Street:	GIBBS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	238.2
Street:	**CONCORD STREET**
Intersecting Street:	GIBBS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.3
Street:	**CONCORD STREET**
Intersecting Street:	CHERRY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.4
Street:	**CONCORD STREET**
Intersecting Street:	CHERRY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	518.2
Street:	**CONCORD STREET**
Intersecting Street:	THELMA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.3
Street:	**CONCORD STREET**
Intersecting Street:	NORMANDY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.6
Street:	**CONCORD STREET**
Intersecting Street:	NORMANDY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.7
Street:	**CONCORD STREET**
Intersecting Street:	THELMA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.1
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.2
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.5
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	520.6
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	101.1
Street:	**COSTA CIRCLE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	101.2
Street:	**COSTA CIRCLE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.3
Street:	**COTTAGE STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.4
Street:	**COTTAGE STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.1
Street:	**COVE AVENUE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.2
Street:	**COVE AVENUE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	559.1
Street:	**CYPRESS STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	559.2
Street:	**CYPRESS STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	181.1
Street:	**DANFORTH STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	181.2
Street:	**DANFORTH STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	182.1
Street:	**DANFORTH STREET**
Intersecting Street:	KING STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.2
Street:	**DANFORTH STREET**
Intersecting Street:	KING STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.3
Street:	**DANFORTH STREET**
Intersecting Street:	DANFORTH COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.4
Street:	**DANFORTH STREET**
Intersecting Street:	DANFORTH COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	184.1
Street:	**DANFORTH STREET**
Intersecting Street:	STEARNS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	184.2
Street:	**DANFORTH STREET**
Intersecting Street:	STEARNS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.1
Street:	**DANFORTH STREET**
Intersecting Street:	COTTAGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.2
Street:	**DANFORTH STREET**
Intersecting Street:	COTTAGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	186.1
Street:	**DANFORTH STREET**
Intersecting Street:	MEADOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	186.2
Street:	**DANFORTH STREET**
Intersecting Street:	MEADOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.1
Street:	**DANFORTH STREET**
Intersecting Street:	DERBY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.2
Street:	**DANFORTH STREET**
Intersecting Street:	FENWOOD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	188.3
Street:	**DANFORTH STREET**
Intersecting Street:	HIALEAH LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	189.1
Street:	**DANFORTH STREET**
Intersecting Street:	COLBY AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	189.2
Street:	**DANFORTH STREET**
Intersecting Street:	COLBY AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	190.1
Street:	**DANFORTH STREET**
Intersecting Street:	SAXONY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	190.2
Street:	**DANFORTH STREET**
Intersecting Street:	SAXONY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.5
Street:	**DANFORTH STREET**
Intersecting Street:	BRIGATI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.6
Street:	**DANFORTH STREET**
Intersecting Street:	BRIGATI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	192.1
Street:	**DANFORTH STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	192.2
Street:	**DANFORTH STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	543.1
Street:	**DAYTONA AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	543.2
Street:	**DAYTONA AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	125.1
Street:	**DONOVAN DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	125.2
Street:	**DONOVAN DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	109.1
Street:	**DOTTY ANN DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	109.2
Street:	**DOTTY ANN DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.5
Street:	**DOW STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.6
Street:	**DOW STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	167.1
Street:	**EATON ROAD**
Intersecting Street:	EATON PINES LANE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	168.1
Street:	**EATON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	121.1
Street:	**EDGELL ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	121.5
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.6
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	124.3
Street:	**EDGELL ROAD**
Intersecting Street:	WHITING ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	124.4
Street:	**EDGELL ROAD**
Intersecting Street:	WHITING ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.1
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.2
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	315.7
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.3
Street:	**EDGELL ROAD**
Intersecting Street:	AUBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.4
Street:	**EDGELL ROAD**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	157.1
Street:	**EISENHOWER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	157.2
Street:	**EISENHOWER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	521.1
Street:	**ELIOT STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	521.2
Street:	**ELIOT STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	333.1
Street:	**ELLIS STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	333.2
Street:	**ELLIS STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.3
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.5
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.6
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	174.1
Street:	**ELMFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	174.2
Street:	**ELMFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	233.1
Street:	**EMILY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	233.2
Street:	**EMILY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	92.1
Street:	**FAIRBROOK ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	92.2
Street:	**FAIRBROOK ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	99.1
Street:	**FAIRFIELD ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	99.2
Street:	**FAIRFIELD ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	547.1
Street:	**FAY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	547.2
Street:	**FAY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	551.1
Street:	**FAY ROAD**
Intersecting Street:	OLD CENTRAL TURNPIKE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	551.2
Street:	**FAY ROAD**
Intersecting Street:	OLD CENTRAL TURNPIKE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	79.1
Street:	**FENWICK STREET**
Intersecting Street:	WICKFORD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.1
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.2
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.3
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.4
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	187.3
Street:	**FENWOOD STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.4
Street:	**FENWOOD STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.1
Street:	**FLAGG DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.2
Street:	**FLAGG DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.5
Street:	**FOUNTAIN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.6
Street:	**FOUNTAIN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.1
Street:	**FRANKLIN STREET**
Intersecting Street:	MAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.2
Street:	**FRANKLIN STREET**
Intersecting Street:	MAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	407.1
Street:	**FRANKLIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	407.2
Street:	**FRANKLIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	7.1
Street:	**GARVEY ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	9.1
Street:	**GARVEY ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	128.1
Street:	**GIBSON DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	128.2
Street:	**GIBSON DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	312.1
Street:	**GIL LEONARD LANE**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	560.3
Street:	**GILBERT STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	560.4
Street:	**GILBERT STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	353.1
Street:	**GOODNOW LANE**
Intersecting Street:	GATES STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	475.1
Street:	**GRANT STREET**
Intersecting Street:	JOHN J. GALLAGHER DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	475.2
Street:	**GRANT STREET**
Intersecting Street:	JOHN J. GALLAGHER DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	240.1
Street:	**GREENLEAF CIRCLE**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	240.2
Street:	**GREENLEAF CIRCLE**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	116.1
Street:	**GREGORY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	116.2
Street:	**GREGORY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	165.1
Street:	**HADLEY ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	165.2
Street:	**HADLEY ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	219.3
Street:	**HAMILTON STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.4
Street:	**HAMILTON STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	220.1
Street:	**HAMILTON STREET**
Intersecting Street:	JACKSON PLACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	220.2
Street:	**HAMILTON STREET**
Intersecting Street:	JACKSON PLACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	231.3
Street:	**HARDY STREET**
Intersecting Street:	DEBRA LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	234.1
Street:	**HARDY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	234.2
Street:	**HARDY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.3
Street:	**HARTFORD STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.4
Street:	**HARTFORD STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	522.1
Street:	**HARTFORD STREET**
Intersecting Street:	DYER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	522.2
Street:	**HARTFORD STREET**
Intersecting Street:	DYER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	523.1
Street:	**HARTFORD STREET**
Intersecting Street:	HOWE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	523.2
Street:	**HARTFORD STREET**
Intersecting Street:	HOWE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	524.1
Street:	**HARTFORD STREET**
Intersecting Street:	HARRISON STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	524.2
Street:	**HARTFORD STREET**
Intersecting Street:	HARRISON STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	525.1
Street:	**HARTFORD STREET**
Intersecting Street:	C STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	525.2
Street:	**HARTFORD STREET**
Intersecting Street:	C STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.1
Street:	**HARTFORD STREET**
Intersecting Street:	BELVIDERE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.2
Street:	**HARTFORD STREET**
Intersecting Street:	BELVIDERE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.3
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.1
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	527.2
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.3
Street:	**HARTFORD STREET**
Intersecting Street:	LOKER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.4
Street:	**HARTFORD STREET**
Intersecting Street:	LOKER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	528.1
Street:	**HARTFORD STREET**
Intersecting Street:	UNDERWOOD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	117.1
Street:	**HEMENWAY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	117.2
Street:	**HEMENWAY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	188.1
Street:	**HIALEAH LANE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	188.2
Street:	**HIALEAH LANE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	567.1
Street:	**HILTON STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	567.2
Street:	**HILTON STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	569.1
Street:	**HILTON STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	569.2
Street:	**HILTON STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	298.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	SUMMER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	298.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	SUMMER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	299.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	DONNA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	299.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	DONNA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	300.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	LOCKLAND AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	300.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	LOCKLAND AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	301.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	INDIAN HEAD HEIGHTS
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	301.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	INDIAN HEAD HEIGHTS
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	302.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	CRESTWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	302.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	CRESTWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	487.1
Street:	**IRVING STREET**
Intersecting Street:	HERBERT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	487.2
Street:	**IRVING STREET**
Intersecting Street:	LORING DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



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Ramp ID:	574.3
Street:	**JOHN J BRADY DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.4
Street:	**JOHN J BRADY DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	476.1
Street:	**JOHN J. GALLAGHER DRIVE**
Intersecting Street:	EVERIT AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	476.2
Street:	**JOHN J. GALLAGHER DRIVE**
Intersecting Street:	EVERIT AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	57.1
Street:	**JOHN MCQUINN CIRCLE**
Intersecting Street:	WAVENEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	107.1
Street:	**JOSEPH ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	107.2
Street:	**JOSEPH ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	110.1
Street:	**JOYCE LUNDBERG DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	110.2
Street:	**JOYCE LUNDBERG DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	163.1
Street:	**JOYCE ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	309.2
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	309.3
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	505.3
Street:	**KENDALL AVENUE**
Intersecting Street:	LELAND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	505.4
Street:	**KENDALL AVENUE**
Intersecting Street:	LELAND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	506.1
Street:	**KENDALL AVENUE**
Intersecting Street:	GLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	506.2
Street:	**KENDALL AVENUE**
Intersecting Street:	GLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	507.1
Street:	**KENDALL AVENUE**
Intersecting Street:	CURTIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	507.2
Street:	**KENDALL AVENUE**
Intersecting Street:	CURTIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	508.1
Street:	**KENDALL AVENUE**
Intersecting Street:	AMERICA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	508.2
Street:	**KENDALL AVENUE**
Intersecting Street:	AMERICA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	509.1
Street:	**KENDALL AVENUE**
Intersecting Street:	STILLMAN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	509.2
Street:	**KENDALL AVENUE**
Intersecting Street:	STILLMAN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.1
Street:	**KENDALL AVENUE**
Intersecting Street:	ALLA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.2
Street:	**KENDALL AVENUE**
Intersecting Street:	ALLA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.3
Street:	**KENDALL AVENUE**
Intersecting Street:	KENDALL LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.4
Street:	**KENDALL AVENUE**
Intersecting Street:	KENDALL LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	46.1
Street:	**KNIGHT ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	46.2
Street:	**KNIGHT ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	545.1
Street:	**KNOX AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



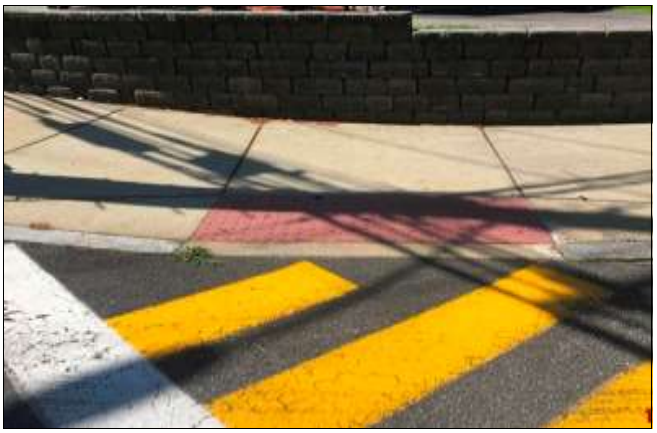
Ramp ID:	545.2
Street:	**KNOX AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	164.1
Street:	**LANCASTER DRIVE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	164.2
Street:	**LANCASTER DRIVE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	56.1
Street:	**LANEWOOD AVENUE**
Intersecting Street:	WAVENEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	66.1
Street:	**LANEWOOD AVENUE**
Intersecting Street:	CURRIER DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	539.1
Street:	**LARRABEE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.2
Street:	**LARRABEE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	246.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	246.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	247.3
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.4
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	573.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	573.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	573.3
Street:	**LEGGATT MCCALL CONNECTOR ROAD**
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	505.1
Street:	**LELAND STREET**
Intersecting Street:	KENDALL AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	505.2
Street:	**LELAND STREET**
Intersecting Street:	KENDALL AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	8.1
Street:	**LEO CHASSE WAY**
Intersecting Street:	GARVEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	8.2
Street:	**LEO CHASSE WAY**
Intersecting Street:	GARVEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	318.1
Street:	**LIBERTY STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	318.2
Street:	**LIBERTY STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	93.1
Street:	**LINDA AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	93.2
Street:	**LINDA AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	48.1
Street:	**LITTLE TREE LANE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	48.2
Street:	**LITTLE TREE LANE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	289.1
Street:	**LOCKLAND AVENUE**
Intersecting Street:	DONNA ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	399.1
Street:	**MAIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	399.2
Street:	**MAIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	400.3
Street:	**MAIN STREET**
Intersecting Street:	FRANKLIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.4
Street:	**MAIN STREET**
Intersecting Street:	FRANKLIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	31.1
Street:	**MAJOR HALE DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	161.1
Street:	**MARY AGNES ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	161.2
Street:	**MARY AGNES ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.1
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.2
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.3
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	380.1
Street:	**MAYNARD ROAD**
Intersecting Street:	CHURCH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	380.2
Street:	**MAYNARD ROAD**
Intersecting Street:	CHURCH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	532.1
Street:	**MELLEN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.2
Street:	**MELLEN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.1
Street:	**MELLEN STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	558.2
Street:	**MELLEN STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	47.1
Street:	**MERRIAM ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	47.2
Street:	**MERRIAM ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	306.1
Street:	**MICHAUD DRIVE**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.2
Street:	**MICHAUD DRIVE**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	51.1
Street:	**MILL STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	51.2
Street:	**MILL STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	31.2
Street:	**MONTEREY LANE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	152.1
Street:	**MURPHY CIRCLE**
Intersecting Street:	COLONIAL DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Slope & Ldg Slope
Condition:	Good



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Ramp ID:	152.2
Street:	**MURPHY CIRCLE**
Intersecting Street:	COLONIAL DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Slope & Ldg Slope
Condition:	Good



Ramp ID:	568.1
Street:	**NAPLES STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	568.2
Street:	**NAPLES STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	570.1
Street:	**NAPLES STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	570.3
Street:	**NAPLES STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	228.1
Street:	**NEWBURY STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	228.2
Street:	**NEWBURY STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	241.5
Street:	**NEWBURY STREET**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



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Ramp ID:	241.6
Street:	**NEWBURY STREET**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	251.2
Street:	**NEWBURY STREET**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.3
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.4
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	104.5
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.6
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.4
Street:	**NORMANDY ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.5
Street:	**NORMANDY ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.3
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	FLAGG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.4
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	FLAGG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.3
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ROSE KENNEDY LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.4
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ROSE KENNEDY LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	517.2
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ARSENAL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.1
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	JOHN J BRADY DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.2
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	JOHN J BRADY DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	350.1
Street:	**OAK CREST DRIVE**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	350.2
Street:	**OAK CREST DRIVE**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	317.1
Street:	**OAK STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	317.2
Street:	**OAK STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.1
Street:	**OAK STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.2
Street:	**OAK STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	170.1
Street:	**OAKWOOD COURT**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	170.2
Street:	**OAKWOOD COURT**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	198.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROSSI CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	199.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BIRCH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BIRCH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	202.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LAKE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	210.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROWNLEA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	211.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	211.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	211.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	211.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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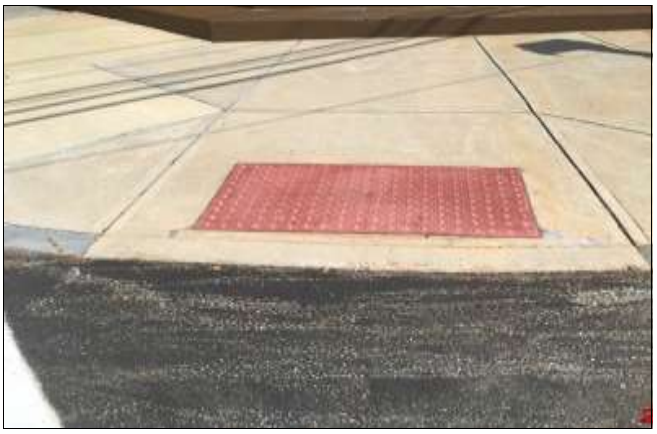
Ramp ID:	223.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	227.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	ARLENE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	227.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	ARLENE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	229.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	229.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	230.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	230.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.6
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.7
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.8
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	230.9
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	253.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	253.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	343.1
Street:	**OLD WOOD ROAD**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



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Ramp ID:	343.2
Street:	**OLD WOOD ROAD**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	341.2
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	343.3
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	343.4
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



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Ramp ID:	544.1
Street:	**PALMETTO AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	544.2
Street:	**PALMETTO AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.3
Street:	**PAMELA ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.4
Street:	**PAMELA ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	223.6
Street:	**PARKING LOT**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.5
Street:	**PARKING LOT**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.6
Street:	**PARKING LOT**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.10
Street:	**PARKING LOT**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	536.9
Street:	**PARKING LOT**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.1
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.2
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	576.1
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	576.2
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.1
Street:	**PLEASANT STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.2
Street:	**PLEASANT STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	327.1
Street:	**PLEASANT STREET**
Intersecting Street:	MAYNARD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	327.2
Street:	**PLEASANT STREET**
Intersecting Street:	MAYNARD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	329.2
Street:	**PLEASANT STREET**
Intersecting Street:	ARNOLD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	115.1
Street:	**POTTER ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	162.4
Street:	**POTTER ROAD**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	163.2
Street:	**POTTER ROAD**
Intersecting Street:	JOYCE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	163.3
Street:	**POTTER ROAD**
Intersecting Street:	JOYCE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	168.2
Street:	**POTTER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	168.3
Street:	**POTTER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	171.1
Street:	**POTTER ROAD**
Intersecting Street:	BRADFORD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	171.2
Street:	**POTTER ROAD**
Intersecting Street:	BRADFORD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.1
Street:	**POTTER ROAD**
Intersecting Street:	ELM STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	175.4
Street:	**POTTER ROAD**
Intersecting Street:	ELM STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	177.1
Street:	**POTTER ROAD**
Intersecting Street:	LOWRY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	177.2
Street:	**POTTER ROAD**
Intersecting Street:	LOWRY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	306.5
Street:	**PROSPECT STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.6
Street:	**PROSPECT STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	310.3
Street:	**PROSPECT STREET**
Intersecting Street:	WOODSIDE COTTAGE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.4
Street:	**PROSPECT STREET**
Intersecting Street:	LILIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	311.3
Street:	**PROSPECT STREET**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	311.4
Street:	**PROSPECT STREET**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	370.1
Street:	**RESERVOIR RIDGE**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	370.2
Street:	**RESERVOIR RIDGE**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	537.1
Street:	**RHUBENA STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	537.2
Street:	**RHUBENA STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	201.1
Street:	**RIVERPATH DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	201.2
Street:	**RIVERPATH DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	108.1
Street:	**RON'S WAY**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	108.2
Street:	**RON'S WAY**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	516.2
Street:	**ROSE KENNEDY LANE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	27.1
Street:	**ROYAL MEADOW LANE**
Intersecting Street:	KINGS ROW LANE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	11.1
Street:	**SAGE LANE**
Intersecting Street:	WINCH STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	368.1
Street:	**SALEM END ROAD**
Intersecting Street:	SALEM END LANE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	368.2
Street:	**SALEM END ROAD**
Intersecting Street:	SALEM END LANE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	374.1
Street:	**SALEM END ROAD**
Intersecting Street:	MAYHEW STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	374.2
Street:	**SALEM END ROAD**
Intersecting Street:	MAYHEW STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	533.1
Street:	**SAUCIER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	533.2
Street:	**SAUCIER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	160.1
Street:	**SAVOY ROAD**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	160.2
Street:	**SAVOY ROAD**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	191.1
Street:	**SAXONY ROAD**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	191.2
Street:	**SAXONY ROAD**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.1
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.2
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	86.1
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



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Ramp ID:	86.2
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	204.1
Street:	**SCHOOL STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	219.1
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.2
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	219.5
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.6
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing & Excessive Ldg Slope
Condition:	Fair



Ramp ID:	221.3
Street:	**SCHOOL STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.4
Street:	**SCHOOL STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	503.1
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.2
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.4
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.5
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	514.1
Street:	**SECOND STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	514.2
Street:	**SECOND STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	169.1
Street:	**SHEFFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	169.2
Street:	**SHEFFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	159.1
Street:	**SLOANE DRIVE**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	248.1
Street:	**SPEEN STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	248.2
Street:	**SPEEN STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	252.1
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	252.5
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	114.1
Street:	**SPRING LANE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	114.2
Street:	**SPRING LANE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	377.1
Street:	**STATE STREET**
Intersecting Street:	HIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	377.2
Street:	**STATE STREET**
Intersecting Street:	HIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	183.1
Street:	**SUDBURY LANDING**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	183.2
Street:	**SUDBURY LANDING**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	235.3
Street:	**SUMMER STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	235.4
Street:	**SUMMER STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	331.1
Street:	**SUN VALLEY DRIVE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Hydrant
Condition:	Good



Ramp ID:	97.1
Street:	**SWANSON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	97.2
Street:	**SWANSON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	173.1
Street:	**TEMI ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	173.2
Street:	**TEMI ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	339.1
Street:	**TEMPLE STREET**
Intersecting Street:	TEMPLE PLACE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.2
Street:	**TEMPLE STREET**
Intersecting Street:	WOODLEIGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	339.5
Street:	**TEMPLE STREET**
Intersecting Street:	WOODLEIGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.6
Street:	**TEMPLE STREET**
Intersecting Street:	TEMPLE PLACE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	518.1
Street:	**THELMA ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.8
Street:	**THELMA ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	504.1
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.2
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.3
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.4
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	129.1
Street:	**TREELAND DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	129.2
Street:	**TREELAND DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	176.1
Street:	**UPTON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	176.2
Street:	**UPTON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	315.3
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.4
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.5
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.6
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	319.3
Street:	**VERNON STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.4
Street:	**VERNON STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	324.1
Street:	**VERNON STREET**
Intersecting Street:	GROVE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	324.2
Street:	**VERNON STREET**
Intersecting Street:	GROVE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	325.3
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.4
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.5
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.6
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	325.7
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	65.1
Street:	**WALKERS WAY**
Intersecting Street:	LANEWOOD AVENUE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	65.2
Street:	**WALKERS WAY**
Intersecting Street:	LANEWOOD AVENUE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	314.1
Street:	**WARREN PLACE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	314.2
Street:	**WARREN PLACE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	100.1
Street:	**WATER STREET**
Intersecting Street:	CART PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	100.2
Street:	**WATER STREET**
Intersecting Street:	CART PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	102.1
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	102.2
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	103.1
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	103.2
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.1
Street:	**WATER STREET**
Intersecting Street:	NICHOLAS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	104.2
Street:	**WATER STREET**
Intersecting Street:	NICHOLAS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.3
Street:	**WATER STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.4
Street:	**WATER STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	110.3
Street:	**WATER STREET**
Intersecting Street:	JOYCE LUNDBERG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	110.4
Street:	**WATER STREET**
Intersecting Street:	JOYCE LUNDBERG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.1
Street:	**WATER STREET**
Intersecting Street:	PAMELA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.2
Street:	**WATER STREET**
Intersecting Street:	PAMELA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	115.3
Street:	**WATER STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Fair



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Ramp ID:	115.4
Street:	**WATER STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.1
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.4
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.1
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	120.2
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.3
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.4
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.5
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	120.6
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.4
Street:	**WATER STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	96.3
Street:	**WATER STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.4
Street:	**WATER STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	97.3
Street:	**WATER STREET**
Intersecting Street:	SWANSON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	97.4
Street:	**WATER STREET**
Intersecting Street:	SWANSON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	98.1
Street:	**WATER STREET**
Intersecting Street:	LARIVIERE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	98.2
Street:	**WATER STREET**
Intersecting Street:	LARIVIERE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	55.1
Street:	**WAVENEY ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	55.2
Street:	**WAVENEY ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.1
Street:	**WAVERLEY STREET**
Intersecting Street:	BISHOP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	498.2
Street:	**WAVERLEY STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	498.5
Street:	**WAVERLEY STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.6
Street:	**WAVERLEY STREET**
Intersecting Street:	BISHOP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	511.1
Street:	**WAVERLEY STREET**
Intersecting Street:	COOLIDGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	511.2
Street:	**WAVERLEY STREET**
Intersecting Street:	COOLIDGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	512.1
Street:	**WAVERLEY STREET**
Intersecting Street:	TARALLI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	512.2
Street:	**WAVERLEY STREET**
Intersecting Street:	TARALLI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	513.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WILLIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	513.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WILLIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	514.3
Street:	**WAVERLEY STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	514.4
Street:	**WAVERLEY STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	529.1
Street:	**WAVERLEY STREET**
Intersecting Street:	CEDAR STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	529.2
Street:	**WAVERLEY STREET**
Intersecting Street:	CEDAR STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	530.1
Street:	**WAVERLEY STREET**
Intersecting Street:	CASEY COURT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	530.2
Street:	**WAVERLEY STREET**
Intersecting Street:	CASEY COURT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	531.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	531.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	531.3
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.3
Street:	**WAVERLEY STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.4
Street:	**WAVERLEY STREET**
Intersecting Street:	FOUNTAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.7
Street:	**WAVERLEY STREET**
Intersecting Street:	FOUNTAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	532.8
Street:	**WAVERLEY STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.11
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.12
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.7
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	536.8
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.3
Street:	**WAVERLEY STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.4
Street:	**WAVERLEY STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	546.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	546.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.3
Street:	**WAVERLEY STREET**
Intersecting Street:	PERSHING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.4
Street:	**WAVERLEY STREET**
Intersecting Street:	PERSHING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	550.1
Street:	**WAVERLEY STREET**
Intersecting Street:	LIBERTY STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	550.2
Street:	**WAVERLEY STREET**
Intersecting Street:	LIBERTY STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	85.1
Street:	**WESLEY ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	85.2
Street:	**WESLEY ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	334.1
Street:	**WEST STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	334.2
Street:	**WEST STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	124.1
Street:	**WHITING ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	124.2
Street:	**WHITING ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	241.1
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	241.2
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	241.3
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	241.4
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.4
Street:	**WHITTIER STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	242.5
Street:	**WHITTIER STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Fair



Ramp ID:	538.1
Street:	**WILDE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	538.2
Street:	**WILDE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	548.1
Street:	**WILSON AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	548.2
Street:	**WILSON AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	373.1
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	373.2
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	373.3
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	378.1
Street:	**WINTER STREET**
Intersecting Street:	MAYHEW STREET EXTENSION
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	378.2
Street:	**WINTER STREET**
Intersecting Street:	MAYHEW STREET EXTENSION
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	379.2
Street:	**WINTER STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	386.1
Street:	**WINTER STREET**
Intersecting Street:	MAPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



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Ramp ID:	536.3
Street:	**WINTHROP STREET**
Intersecting Street:	CONANT ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.4
Street:	**WINTHROP STREET**
Intersecting Street:	CONANT ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Major Curbing
Condition:	Fair



Ramp ID:	536.5
Street:	**WINTHROP STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.6
Street:	**WINTHROP STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	553.3
Street:	**WINTHROP STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.3
Street:	**WINTHROP STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	555.4
Street:	**WINTHROP STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.3
Street:	**WINTHROP STREET**
Intersecting Street:	COVE AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	556.4
Street:	**WINTHROP STREET**
Intersecting Street:	COVE AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.3
Street:	**WINTHROP STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.4
Street:	**WINTHROP STREET**
Intersecting Street:	DOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	557.1
Street:	**WINTHROP TERRACE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	557.2
Street:	**WINTHROP TERRACE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	339.3
Street:	**WOODLEIGH ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.4
Street:	**WOODLEIGH ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	342.1
Street:	**WOODLEIGH ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



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Ramp ID:	342.2
Street:	**WOODLEIGH ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	344.1
Street:	**WOODLEIGH ROAD**
Intersecting Street:	PRIMO DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	344.2
Street:	**WOODLEIGH ROAD**
Intersecting Street:	PRIMO DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	37.1
Street:	**WOODMERE ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	37.2
Street:	**WOODMERE ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.1
Street:	**WOODSIDE COTTAGE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.2
Street:	**WOODSIDE COTTAGE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	311.1
Street:	**WYNDSTONE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	311.2
Street:	**WYNDSTONE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Curb Ramp Inventory & Assessment

Ramp Compliance - By Street With Inspection Data Total: 316

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
AUBURN STREET			***1 Ramps***							
At EDGELL ROAD			1 Ramps							
316.2	Concrete	Good	Yes	No	60	6.4	60	60	None	Yes
BEACON STREET			***3 Ramps***							
At COCHITUATE ROAD			2 Ramps							
295.1	Concrete	Good	Yes	No	60	7.2	60	36	None	Yes
295.4	Concrete	Good	Yes	No	60	7.2	60	44	None	Yes
At WORCESTER ROAD			1 Ramps							
297.1	Concrete	Good	Yes	No	60	8.2	60	66	None	Yes
BEAVER STREET			***12 Ramps***							
At BEAVER COURT			2 Ramps							
500.1	Concrete	Good	Yes	No	62	6.1	65	60	None	Yes
500.2	Concrete	Fair	Yes	No	38	4.8	60	60	None	Yes
At BEAVER PARK ROAD			1 Ramps							
502.2	Concrete	Good	Yes	No	42	6.6	60	60	None	Yes
At FIRST STREET			1 Ramps							
502.3	Concrete	Good	Yes	No	48	2.3	60	60	None	Yes
At MARIAN ROAD			1 Ramps							
501.1	Concrete	Good	Yes	No	48	7.6	60	60	None	Yes
At PARKING LOT			4 Ramps							
499.2	Concrete	Good	Yes	No	170	0.5	170	42	None	Yes
577.1	Concrete	Good	Yes	No	60	1.6	60	36	None	Yes
577.2	Concrete	Good	Yes	No	60	1.3	60	38	None	Yes
578.1	Concrete	Good	Yes	No	60	2.2	60	36	None	Yes
At SECOND STREET			1 Ramps							
503.3	Concrete	Good	Yes	No	60	0.1	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WAVERLEY STREET		2 Ramps								
498.3	Concrete	Good	Yes	No	60	2.8	60	67	None	Yes
498.4	Concrete	Good	Yes	No	48	4.4	55	43	None	Yes
BELKNAP ROAD		***4 Ramps***								
At CLEARVIEW DRIVE		1 Ramps								
22.3	Concrete	Good	Yes	No	60	2.1	60	41	None	Yes
At FLANAGAN DRIVE		1 Ramps								
30.2	Concrete	Fair	Yes	No	82	1.1	82	60	None	Yes
At PLEASANT STREET		2 Ramps								
23.1	Concrete	Good	Yes	No	62	2.6	62	45	None	Yes
23.2	Concrete	Good	Yes	No	72	3.6	80	60	None	Yes
BETHANY ROAD		***3 Ramps***								
At WAVERLEY STREET		1 Ramps								
535.2	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
At WINTHROP STREET		2 Ramps								
553.1	Concrete	Good	Yes	No	60	2.7	60	60	None	Yes
553.2	Concrete	Good	Yes	No	58	5.1	58	48	None	Yes
BEULAH STREET		***2 Ramps***								
At WORCESTER ROAD		2 Ramps								
322.1	Concrete	Fair	Yes	No	48	4.7	96	60	None	Yes
322.2	Concrete	Fair	Yes	No	55	3.5	62	60	None	Yes
BRIDGES STREET		***3 Ramps***								
At COBURN STREET		2 Ramps								
564.3	Concrete	Good	Yes	No	60	3.1	60	50	None	Yes
564.4	Concrete	Fair	Yes	No	60	7.5	60	48	None	Yes
At WAVERLEY STREET		1 Ramps								
534.1	Concrete	Good	Yes	No	60	6.4	60	54	None	Yes
BRIDGES STREET EXTENSION		***2 Ramps***								
At COBURN STREET		2 Ramps								
564.1	Concrete	Good	Yes	No	60	5.5	60	52	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
564.2	Concrete	Good	Yes	No	60	0.8	60	46	None	Yes
BRIGATI TERRACE			***2 Ramps***							
At DANFORTH STREET			2 Ramps							
191.3	Concrete	Good	Yes	No	60	5.3	60	55	None	Yes
191.4	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
CAMPELLO ROAD			***2 Ramps***							
At CONCORD STREET			2 Ramps							
235.1	Concrete	Good	Yes	No	64	6.1	64	50	None	Yes
235.2	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
CEDAR STREET			***3 Ramps***							
At CYPRESS STREET			2 Ramps							
561.1	Concrete	Good	Yes	No	60	1.9	60	50	None	Yes
561.2	Concrete	Good	Yes	No	60	0.5	60	40	None	Yes
At WINTHROP STREET			1 Ramps							
560.2	Concrete	Fair	Yes	No	60	0.8	60	48	None	Yes
CENTRAL STREET			***6 Ramps***							
At INDIAN HEAD ROAD			2 Ramps							
303.1	Concrete	Good	Yes	No	60	6.4	60	42	None	Yes
303.2	Concrete	Good	Yes	No	60	5.4	60	57	None	Yes
At MICHAUD DRIVE			2 Ramps							
306.3	Concrete	Good	Yes	No	60	1.3	60	42	None	Yes
306.4	Concrete	Good	Yes	No	60	2.1	60	40	None	Yes
At WATER STREET			2 Ramps							
105.1	Concrete	Good	Yes	No	60	5.8	60	48	None	Yes
105.2	Concrete	Good	Yes	No	60	3.4	60	46	None	Yes
CHERRY STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
239.2	Concrete	Good	Yes	No	60	5.8	60	48	None	Yes
CLEARVIEW DRIVE			***2 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BELKNAP ROAD			2 Ramps							
22.1	Concrete	Good	Yes	No	60	7.1	60	51	None	Yes
22.2	Concrete	Good	Yes	No	60	4.8	60	48	None	Yes
CLIFFORD STREET			***3 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.1	Concrete	Good	Yes	No	60	7.5	60	55	None	Yes
At MELLEN STREET			2 Ramps							
562.1	Concrete	Fair	Yes	No	60	2	60	39	None	Yes
562.2	Concrete	Good	Yes	No	58	1.9	58	40	None	Yes
COBURN STREET			***5 Ramps***							
At BETHANY ROAD			2 Ramps							
554.1	Concrete	Good	Yes	No	60	6.3	60	45	None	Yes
554.2	Concrete	Good	Yes	No	60	0.4	60	46	None	Yes
At MELLEN STREET			2 Ramps							
566.1	Concrete	Good	Yes	No	58	6.1	58	60	None	Yes
566.2	Concrete	Good	Yes	No	54	3.1	60	43	None	Yes
At SAUCIER STREET			1 Ramps							
565.1	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
COCHITUATE ROAD			***2 Ramps***							
At BEACON STREET			2 Ramps							
295.3	Concrete	Good	Yes	No	60	7.5	60	42	None	Yes
295.6	Concrete	Good	Yes	No	60	6.4	60	40	None	Yes
CONCORD STREET			***17 Ramps***							
At A STREET			4 Ramps							
222.1	Concrete	Good	Yes	No	60	4.1	60	52	None	Yes
222.2	Concrete	Good	Yes	No	60	4.1	60	54	None	Yes
222.7	Concrete	Good	Yes	No	60	7.4	60	60	None	Yes
222.8	Concrete	Good	Yes	No	60	5.1	60	60	None	Yes
At CHERRY STREET			2 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
239.3	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
239.4	Concrete	Good	Yes	No	60	6.8	60	48	None	Yes
At DONLON STREET		2 Ramps								
236.1	Concrete	Good	Yes	No	50	6.9	98	60	None	Yes
236.2	Concrete	Good	Yes	No	48	6.2	78	60	None	Yes
At GIBBS STREET		1 Ramps								
238.2	Concrete	Good	Yes	No	50	1.2	70	60	None	Yes
At HARTFORD STREET		1 Ramps								
520.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At NORMANDY ROAD		2 Ramps								
518.3	Concrete	Good	Yes	No	60	5.1	60	42	None	Yes
518.6	Concrete	Good	Yes	No	60	4.3	60	48	None	Yes
At OLD CONNECTICUT PATH		1 Ramps								
230.10	Concrete	Good	Yes	No	60	3.6	60	48	None	Yes
At SCHOOL STREET		2 Ramps								
221.1	Concrete	Good	Yes	No	60	5.3	60	55	None	Yes
221.2	Concrete	Good	Yes	No	60	6.5	60	60	None	Yes
At THELMA ROAD		2 Ramps								
518.2	Concrete	Good	Yes	No	60	4.8	60	58	None	Yes
518.7	Concrete	Good	Yes	No	60	6.1	60	60	None	Yes
COSTA CIRCLE		***1 Ramps***								
At WATER STREET		1 Ramps								
101.2	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
COTTAGE STREET		***1 Ramps***								
At DANFORTH STREET		1 Ramps								
185.4	Concrete	Good	Yes	No	60	4.9	60	44	None	Yes
COVE AVENUE		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
556.1	Concrete	Good	Yes	No	60	0.9	60	40	None	Yes
556.2	Concrete	Good	Yes	No	60	0.8	60	38	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
CYPRESS STREET		***1 Ramps***								
At MELLEN STREET		1 Ramps								
559.2	Concrete	Good	Yes	No	60	2.6	60	40	None	Yes
DANFORTH STREET		***14 Ramps***								
At BRIGATI TERRACE		2 Ramps								
191.5	Concrete	Good	Yes	No	60	6.5	60	46	None	Yes
191.6	Concrete	Good	Yes	No	60	1.3	60	40	None	Yes
At COLBY AVENUE		2 Ramps								
189.1	Concrete	Good	Yes	No	62	6.4	66	60	None	Yes
189.2	Concrete	Good	Yes	No	64	3.1	64	60	None	Yes
At COTTAGE STREET		2 Ramps								
185.1	Concrete	Good	Yes	No	60	6.1	60	49	None	Yes
185.2	Concrete	Good	Yes	No	60	5.6	60	82	None	Yes
At DANFORTH COURT		1 Ramps								
182.3	Concrete	Good	Yes	No	36	7.6	62	60	None	Yes
At DERBY STREET		1 Ramps								
187.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At FENWOOD STREET		1 Ramps								
187.2	Concrete	Good	Yes	No	60	0.9	60	48	None	Yes
At HIALEAH LANE		1 Ramps								
188.3	Concrete	Good	Yes	No	60	1.1	60	36	None	Yes
At KING STREET		1 Ramps								
182.2	Concrete	Good	Yes	No	48	5.1	48	60	None	Yes
At OLD CONNECTICUT PATH		2 Ramps								
192.1	Concrete	Good	Yes	No	60	5.4	60	48	None	Yes
192.2	Concrete	Good	Yes	No	60	5.6	60	51	None	Yes
At SAXONY ROAD		1 Ramps								
190.1	Concrete	Good	Yes	No	60	5.7	60	42	None	Yes
DAYTONA AVENUE		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
543.1	Concrete	Good	Yes	No	60	5.5	60	64	None	Yes
DOTTY ANN DRIVE		***2 Ramps***								
At WATER STREET		2 Ramps								
109.1	Concrete	Good	Yes	No	60	1.6	60	40	None	Yes
109.2	Concrete	Good	Yes	No	60	0.2	60	36	None	Yes
DOW STREET		***1 Ramps***								
At WINTHROP STREET		1 Ramps								
558.6	Concrete	Good	Yes	No	60	6.3	60	43	None	Yes
EDGELL ROAD		***7 Ramps***								
At AUBURN STREET		1 Ramps								
316.3	Concrete	Good	Yes	No	58	2.4	60	60	None	Yes
At VERNON STREET		3 Ramps								
315.1	Concrete	Good	Yes	No	60	7.6	60	60	None	Yes
315.2	Concrete	Good	Yes	No	60	5.5	60	72	None	Yes
315.7	Concrete	Good	Yes	No	60	1.3	60	60	None	Yes
At WATER STREET		2 Ramps								
121.5	Concrete	Good	Yes	No	60	2.3	60	40	None	Yes
121.6	Concrete	Good	Yes	No	60	7.6	60	48	None	Yes
At WHITING ROAD		1 Ramps								
124.4	Concrete	Good	Yes	No	60	4.1	60	46	None	Yes
ELLIS STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
333.2	Concrete	Good	Yes	No	48	7.1	65	60	None	Yes
ELM STREET		***1 Ramps***								
At POTTER ROAD		1 Ramps								
175.3	Concrete	Good	Yes	No	60	4.2	60	46	None	Yes
ELMFIELD ROAD		***2 Ramps***								
At POTTER ROAD		2 Ramps								
174.1	Concrete	Good	Yes	No	59	6.1	59	42	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
174.2	Concrete	Good	Yes	No	59	5.3	59	42	None	Yes
EMILY ROAD			***2 Ramps***							
At HARDY STREET			2 Ramps							
233.1	Concrete	Good	Yes	No	50	6.7	50	48	None	Yes
233.2	Concrete	Good	Yes	No	48	5.7	48	50	None	Yes
FAIRFIELD ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
99.1	Concrete	Good	Yes	No	60	4.8	60	58	None	Yes
99.2	Concrete	Good	Yes	No	60	4.1	60	40	None	Yes
FAY ROAD			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
547.1	Concrete	Good	Yes	No	60	4.2	60	64	None	Yes
547.2	Concrete	Good	Yes	No	60	6.3	60	50	None	Yes
FENWOOD STREET			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
187.3	Concrete	Good	Yes	No	60	2.3	60	38	None	Yes
FLAGG DRIVE			***2 Ramps***							
At NORMANDY ROAD EXTENSION			2 Ramps							
515.1	Concrete	Good	Yes	No	60	5.4	60	50	None	Yes
515.2	Concrete	Good	Yes	No	60	6.6	60	48	None	Yes
FOUNTAIN STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.6	Concrete	Good	Yes	No	58	1.1	58	38	None	Yes
FRANKLIN STREET			***1 Ramps***							
At MAIN STREET			1 Ramps							
400.1	Concrete	Good	Yes	No	58	6.6	60	36	None	Yes
GILBERT STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.3	Concrete	Good	Yes	No	60	7.4	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
GRANT STREET			***1 Ramps***							
At JOHN J. GALLAGHER DRIVE			1 Ramps							
475.1	Concrete	Good	Yes	No	65	0.2	65	36	None	Yes
GREENLEAF CIRCLE			***2 Ramps***							
At NEWBURY STREET			2 Ramps							
240.1	Concrete	Good	Yes	No	60	6.3	60	63	None	Yes
240.2	Concrete	Good	Yes	No	60	6.2	60	50	None	Yes
HADLEY ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
165.1	Concrete	Good	Yes	No	60	0.1	60	48	None	Yes
165.2	Concrete	Good	Yes	No	59	0.4	59	48	None	Yes
HARDY STREET			***2 Ramps***							
At CONCORD STREET			1 Ramps							
234.2	Concrete	Good	Yes	No	72	0.5	72	60	None	Yes
At DEBRA LANE			1 Ramps							
231.3	Concrete	Good	Yes	No	48	1.1	48	48	None	Yes
HARTFORD STREET			***3 Ramps***							
At CONCORD STREET			2 Ramps							
520.3	Concrete	Good	Yes	No	48	5.3	48	58	None	Yes
520.4	Concrete	Fair	Yes	No	48	7.1	48	48	None	Yes
At DYER STREET			1 Ramps							
522.2	Concrete	Good	Yes	No	64	3.1	64	40	None	Yes
HEMENWAY ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
117.1	Concrete	Good	Yes	No	60	2.2	60	36	None	Yes
HIALEAH LANE			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
188.1	Concrete	Good	Yes	No	60	3.7	60	48	None	Yes
HILTON STREET			***4 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BRIDGES STREET		2 Ramps								
569.1	Concrete	Good	Yes	No	60	1.2	60	36	None	Yes
569.2	Concrete	Good	Yes	No	58	6.3	60	52	None	Yes
At SAUCIER STREET		2 Ramps								
567.1	Concrete	Good	Yes	No	60	2.3	60	42	None	Yes
567.2	Concrete	Good	Yes	No	40	5.4	64	60	None	Yes
INDIAN HEAD ROAD		***4 Ramps***								
At CRESTWOOD ROAD		1 Ramps								
302.1	Concrete	Good	Yes	No	60	1.8	60	39	None	Yes
At DONNA ROAD		1 Ramps								
299.2	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
At INDIAN HEAD HEIGHTS		1 Ramps								
301.1	Concrete	Good	Yes	No	48	1.5	65	60	None	Yes
At SUMMER STREET		1 Ramps								
298.2	Concrete	Good	Yes	No	58	4.1	58	42	None	Yes
IRVING STREET		***1 Ramps***								
At HERBERT STREET		1 Ramps								
487.1	Concrete	Good	Yes	No	65	2.4	65	57	None	Yes
JOHN J BRADY DRIVE		***1 Ramps***								
At NORMANDY ROAD EXTENSION		1 Ramps								
574.4	Concrete	Good	Yes	No	59	3.9	80	60	None	Yes
JOHN J. GALLAGHER DRIVE		***1 Ramps***								
At EVERIT AVENUE		1 Ramps								
476.1	Concrete	Good	Yes	No	60	6.8	60	48	None	Yes
JOSEPH ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
107.1	Concrete	Good	Yes	No	59	2.2	59	36	None	Yes
JOYCE LUNDBERG DRIVE		***1 Ramps***								
At WATER STREET		1 Ramps								
110.1	Concrete	Good	Yes	No	60	2.1	60	36	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
KENDALL AVENUE		***10 Ramps***								
At ALLA STREET		1 Ramps								
510.1	Concrete	Good	Yes	No	50	6.1	60	60	None	Yes
At AMERICA STREET		2 Ramps								
508.1	Concrete	Good	Yes	No	58	2.4	72	60	None	Yes
508.2	Concrete	Good	Yes	No	56	5.9	60	60	None	Yes
At CURTIS STREET		1 Ramps								
507.1	Concrete	Good	Yes	No	48	4.2	60	60	None	Yes
At GLEN STREET		2 Ramps								
506.1	Concrete	Good	Yes	No	40	7.6	70	60	None	Yes
506.2	Concrete	Good	Yes	No	64	5.8	64	40	None	Yes
At LELAND STREET		2 Ramps								
505.3	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
505.4	Concrete	Good	Yes	No	48	0.9	48	48	None	Yes
At STILLMAN STREET		2 Ramps								
509.1	Concrete	Good	Yes	No	48	3.8	64	60	None	Yes
509.2	Concrete	Good	Yes	No	42	6.6	70	60	None	Yes
KNIGHT ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
46.1	Concrete	Good	Yes	No	60	5.3	60	48	None	Yes
KNOX AVENUE		***2 Ramps***								
At WAVERLEY STREET		2 Ramps								
545.1	Concrete	Good	Yes	No	60	7.5	60	78	None	Yes
545.2	Concrete	Good	Yes	No	60	2.8	60	67	None	Yes
LANCASTER DRIVE		***2 Ramps***								
At POTTER ROAD		2 Ramps								
164.1	Concrete	Good	Yes	No	59	0.6	59	48	None	Yes
164.2	Concrete	Good	Yes	No	58	0.2	59	66	None	Yes
LARRABEE AVENUE		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
539.1	Concrete	Good	Yes	No	58	5.5	58	48	None	Yes
LELAND STREET			***2 Ramps***							
At KENDALL AVENUE			2 Ramps							
505.1	Concrete	Good	Yes	No	60	2.6	60	48	None	Yes
505.2	Concrete	Good	Yes	No	60	5.7	60	48	None	Yes
MAIN STREET			***2 Ramps***							
At FRANKLIN STREET			2 Ramps							
400.3	Concrete	Good	Yes	No	60	5.2	60	42	None	Yes
400.4	Concrete	Good	Yes	No	60	4.1	60	50	None	Yes
MARY AGNES ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
161.1	Concrete	Good	Yes	No	60	2.2	60	48	None	Yes
161.2	Concrete	Good	Yes	No	59	1.6	59	48	None	Yes
MAYNARD ROAD			***3 Ramps***							
At SALEM END ROAD			3 Ramps							
375.1	Concrete	Good	Yes	No	58	7.1	60	53	None	Yes
375.2	Concrete	Good	Yes	No	60	7.3	60	54	None	Yes
375.3	Concrete	Good	Yes	No	48	4.6	48	48	None	Yes
MELLEN STREET			***2 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.1	Concrete	Good	Yes	No	60	3.3	60	50	None	Yes
At WINTHROP STREET			1 Ramps							
558.2	Concrete	Good	Yes	No	60	3.5	60	48	None	Yes
MICHAUD DRIVE			***2 Ramps***							
At CENTRAL STREET			2 Ramps							
306.1	Concrete	Good	Yes	No	60	1.1	60	40	None	Yes
306.2	Concrete	Good	Yes	No	60	1.1	60	40	None	Yes
NAPLES STREET			***3 Ramps***							
At BRIDGES STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
570.1	Concrete	Good	Yes	No	50	7.9	65	60	None	Yes
At SAUCIER STREET		2 Ramps								
568.1	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
568.2	Concrete	Good	Yes	No	36	8.1	50	60	None	Yes
NEWBURY STREET		***3 Ramps***								
At OLD CONNECTICUT PATH		2 Ramps								
228.1	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
228.2	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
At WHITTIER STREET		1 Ramps								
241.6	Concrete	Good	Yes	No	60	5.5	60	60	None	Yes
NICHOLAS ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
104.5	Concrete	Good	Yes	No	120	2.1	120	100	None	Yes
104.6	Concrete	Good	Yes	No	120	3.2	120	91	None	Yes
NORMANDY ROAD		***1 Ramps***								
At CONCORD STREET		1 Ramps								
518.5	Concrete	Good	Yes	No	60	6.9	60	48	None	Yes
NORMANDY ROAD		***5 Ramps***								
At ARSENAL ROAD		1 Ramps								
517.2	Concrete	Good	Yes	No	60	6.3	60	45	None	Yes
At FLAGG DRIVE		1 Ramps								
515.3	Concrete	Good	Yes	No	58	5.6	58	50	None	Yes
At JOHN J BRADY DRIVE		1 Ramps								
574.1	Concrete	Good	Yes	No	60	6.8	60	55	None	Yes
At ROSE KENNEDY LANE		2 Ramps								
516.3	Concrete	Good	Yes	No	60	7.4	60	46	None	Yes
516.4	Concrete	Good	Yes	No	60	8.1	60	45	None	Yes
OAK CREST DRIVE		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
350.1	Concrete	Good	Yes	No	68	4.4	68	60	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
OAK STREET			***1 Ramps***							
At VERNON STREET			1 Ramps							
319.2	Concrete	Good	Yes	No	60	0.7	60	60	None	Yes
OAKWOOD COURT			***1 Ramps***							
At POTTER ROAD			1 Ramps							
170.1	Concrete	Good	Yes	No	59	4.7	59	46	None	Yes
OLD CONNECTICUT PATH			***13 Ramps***							
At CONCORD STREET			10 Ramps							
230.1	Concrete	Good	Yes	No	58	1.7	58	42	None	Yes
230.2	Concrete	Good	Yes	No	58	3.9	58	60	None	Yes
230.4	Concrete	Good	Yes	No	60	7.8	60	50	None	Yes
230.5	Concrete	Good	Yes	No	60	6.5	60	60	None	Yes
230.6	Concrete	Good	Yes	No	60	3.1	60	60	None	Yes
230.7	Concrete	Good	Yes	No	60	3.1	60	60	None	Yes
230.8	Concrete	Good	Yes	No	60	5.9	60	60	None	Yes
230.9	Concrete	Good	Yes	No	60	4.3	60	48	None	Yes
253.1	Concrete	Good	Yes	No	48	1.2	90	60	None	Yes
253.2	Concrete	Good	Yes	No	55	4.2	90	60	None	Yes
At PARKING LOT			3 Ramps							
211.2	Concrete	Good	Yes	No	60	0.4	60	60	None	Yes
211.3	Concrete	Good	Yes	No	120	1.1	120	40	None	Yes
211.4	Concrete	Good	Yes	No	120	2.5	120	40	None	Yes
PALMETTO AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
544.1	Concrete	Good	Yes	No	60	4.9	60	60	None	Yes
544.2	Concrete	Good	Yes	No	60	4.5	60	51	None	Yes
PAMELA ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
111.4	Concrete	Good	Yes	No	38	8.3	62	60	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
PARKING LOT			***3 Ramps***							
At OLD CONNECTICUT PATH			1 Ramps							
223.6	Concrete	Good	Yes	No	62	5.2	65	60	None	Yes
At WAVERLEY STREET			2 Ramps							
536.10	Concrete	Good	Yes	No	60	4.7	60	48	None	Yes
536.9	Concrete	Good	Yes	No	60	5.3	60	58	None	Yes
PERSHING AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
549.1	Concrete	Good	Yes	No	60	5.3	60	50	None	Yes
576.2	Concrete	Good	Yes	No	60	0.3	60	39	None	Yes
PLEASANT STREET			***5 Ramps***							
At ARNOLD ROAD			1 Ramps							
329.2	Concrete	Good	Yes	No	50	6.6	60	60	None	Yes
At MAYNARD ROAD			2 Ramps							
327.1	Concrete	Good	Yes	No	48	0.2	60	60	None	Yes
327.2	Concrete	Good	Yes	No	48	7.1	58	60	None	Yes
At VERNON STREET			2 Ramps							
325.1	Concrete	Good	Yes	No	52	2.5	54	60	None	Yes
325.2	Concrete	Good	Yes	No	50	7.2	50	55	None	Yes
POTTER ROAD			***8 Ramps***							
At BRADFORD ROAD			2 Ramps							
171.1	Concrete	Good	Yes	No	60	7.7	60	43	None	Yes
171.2	Concrete	Good	Yes	No	60	3.9	60	45	None	Yes
At EATON ROAD			2 Ramps							
168.2	Concrete	Good	Yes	No	60	4.5	60	40	None	Yes
168.3	Concrete	Good	Yes	No	60	5.2	60	46	None	Yes
At ELM STREET			1 Ramps							
175.4	Concrete	Good	Yes	No	60	1.2	63	45	None	Yes
At JOYCE ROAD			1 Ramps							
163.3	Concrete	Good	Yes	No	59	0.2	59	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At LOWRY ROAD			1 Ramps							
177.1	Concrete	Good	Yes	No	59	7.3	60	38	None	Yes
At SCHOOL ENTRANCE			1 Ramps							
162.4	Concrete	Good	Yes	No	59	5.8	59	45	None	Yes
PROSPECT STREET			***2 Ramps***							
At CENTRAL STREET			1 Ramps							
306.6	Concrete	Good	Yes	No	46	3.2	84	60	None	Yes
At LILIAN ROAD			1 Ramps							
310.4	Concrete	Good	Yes	No	60	0.4	60	36	None	Yes
RHUBENA STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
537.1	Concrete	Good	Yes	No	60	2.6	60	45	None	Yes
RIVERPATH DRIVE			***2 Ramps***							
At OLD CONNECTICUT PATH			2 Ramps							
201.1	Concrete	Good	Yes	No	60	7.2	60	57	None	Yes
201.2	Concrete	Good	Yes	No	60	6.3	60	58	None	Yes
SAUCIER STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
533.1	Concrete	Good	Yes	No	60	7.4	60	63	None	Yes
SAXONY ROAD			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
191.1	Concrete	Good	Yes	No	60	4.1	60	48	None	Yes
SCHOOL ENTRANCE			***2 Ramps***							
At POTTER ROAD			2 Ramps							
162.1	Concrete	Good	Yes	No	60	7.6	60	38	None	Yes
162.2	Concrete	Good	Yes	No	59	5.1	59	41	None	Yes
SCHOOL STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
221.4	Concrete	Good	Yes	No	60	7.5	60	86	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
SECOND STREET			***5 Ramps***							
At BEAVER STREET			3 Ramps							
503.2	Concrete	Good	Yes	No	62	3.1	62	48	None	Yes
503.4	Concrete	Good	Yes	No	60	0.2	60	48	None	Yes
503.5	Concrete	Good	Yes	No	48	4.8	60	60	None	Yes
At WAVERLEY STREET			2 Ramps							
514.1	Concrete	Good	Yes	No	60	1.2	60	50	None	Yes
514.2	Concrete	Good	Yes	No	60	1.2	60	43	None	Yes
SHEFFIELD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
169.2	Concrete	Good	Yes	No	59	0.7	59	36	None	Yes
SPEEN STREET			***3 Ramps***							
At COCHITUATE ROAD			1 Ramps							
252.1	Concrete	Good	Yes	No	60	3.8	60	52	None	Yes
At LEGGATT MCCALL CONNECTOR			2 Ramps							
248.1	Concrete	Good	Yes	No	60	1.2	60	36	None	Yes
248.2	Concrete	Good	Yes	No	60	2.3	60	44	None	Yes
SPRING LANE			***1 Ramps***							
At WATER STREET			1 Ramps							
114.1	Concrete	Good	Yes	No	60	1.6	60	55	None	Yes
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.1	Concrete	Good	Yes	No	60	2.6	60	45	None	Yes
SUDBURY LANDING			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
183.1	Concrete	Good	Yes	No	60	6.6	60	44	None	Yes
SUMMER STREET			***2 Ramps***							
At CONCORD STREET			2 Ramps							
235.3	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
235.4	Concrete	Good	Yes	No	56	1.4	56	48	None	Yes
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.1	Concrete	Good	Yes	No	60	5.6	60	43	None	Yes
THELMA ROAD			***2 Ramps***							
At CONCORD STREET			2 Ramps							
518.1	Concrete	Good	Yes	No	60	4.6	60	48	None	Yes
518.8	Concrete	Good	Yes	No	60	6.3	60	50	None	Yes
THIRD STREET			***1 Ramps***							
At BEAVER STREET			1 Ramps							
504.3	Concrete	Good	Yes	No	48	5.3	54	60	None	Yes
VERNON STREET			***7 Ramps***							
At EDGELL ROAD			2 Ramps							
315.5	Concrete	Good	Yes	No	60	8.3	60	60	None	Yes
315.6	Concrete	Good	Yes	No	60	7.3	60	60	None	Yes
At GROVE STREET			2 Ramps							
324.1	Concrete	Good	Yes	No	60	1.3	60	60	None	Yes
324.2	Concrete	Good	Yes	No	60	5.4	60	36	None	Yes
At OAK STREET			2 Ramps							
319.3	Concrete	Good	Yes	No	60	2.3	60	60	None	Yes
319.4	Concrete	Good	Yes	No	60	1.9	60	36	None	Yes
At PLEASANT STREET			1 Ramps							
325.3	Concrete	Good	Yes	No	60	7.7	60	60	None	Yes
WARREN PLACE			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
314.1	Concrete	Good	Yes	No	60	5.5	60	60	None	Yes
314.2	Concrete	Good	Yes	No	60	1.2	60	60	None	Yes
WATER STREET			***8 Ramps***							
At JOYCE LUNDBERG DRIVE			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
110.4	Concrete	Good	Yes	No	60	1.9	60	36	None	Yes
At LARIVIERE ROAD		1 Ramps								
98.1	Concrete	Good	Yes	No	60	6.1	90	60	None	Yes
At PARK AVENUE		2 Ramps								
102.1	Concrete	Good	Yes	No	70	4.5	78	60	None	Yes
103.1	Concrete	Good	Yes	No	39	2.1	58	60	None	Yes
At SCHOOL ENTRANCE		2 Ramps								
120.3	Concrete	Good	Yes	No	45	1.2	45	50	None	Yes
120.5	Concrete	Good	Yes	No	60	8.1	60	60	None	Yes
At SWANSON ROAD		2 Ramps								
97.3	Concrete	Good	Yes	No	60	1.1	60	36	None	Yes
97.4	Concrete	Good	Yes	No	60	3.1	60	36	None	Yes
WAVENEY ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
55.1	Concrete	Good	Yes	No	66	1.5	66	49	None	Yes
WAVERLEY STREET		***25 Ramps***								
At BEAVER STREET		1 Ramps								
498.5	Concrete	Good	Yes	No	48	4.8	54	52	None	Yes
At BISHOP STREET		2 Ramps								
498.1	Concrete	Fair	Yes	No	58	3.3	58	48	None	Yes
498.6	Concrete	Good	Yes	No	60	7.7	60	68	None	Yes
At CEDAR STREET		1 Ramps								
529.2	Concrete	Good	Yes	No	60	1.3	60	42	None	Yes
At COOLIDGE STREET		2 Ramps								
511.1	Concrete	Good	Yes	No	60	3.7	60	50	None	Yes
511.2	Concrete	Good	Yes	No	60	4.3	60	50	None	Yes
At FOUNTAIN STREET		1 Ramps								
532.7	Concrete	Good	Yes	No	60	1.3	60	44	None	Yes
At MELLEN STREET		1 Ramps								
532.8	Concrete	Good	Yes	No	60	4.8	60	55	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At PARKING LOT		2 Ramps								
539.3	Concrete	Good	Yes	No	60	1.4	60	45	None	Yes
539.4	Concrete	Good	Yes	No	60	3.3	60	45	None	Yes
At PERSHING AVENUE		1 Ramps								
549.3	Concrete	Good	Yes	No	60	6.4	60	48	None	Yes
At SECOND STREET		1 Ramps								
514.3	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
At TARALLI TERRACE		2 Ramps								
512.1	Concrete	Good	Yes	No	48	2.6	55	43	None	Yes
512.2	Concrete	Good	Yes	No	48	2.9	58	48	None	Yes
At WAVERLY COURT		3 Ramps								
531.1	Concrete	Good	Yes	No	60	5.3	60	48	None	Yes
531.2	Concrete	Good	Yes	No	60	0.2	60	48	None	Yes
531.3	Concrete	Good	Yes	No	60	4.9	60	50	None	Yes
At WILLIS STREET		2 Ramps								
513.1	Concrete	Good	Yes	No	48	1.7	57	63	None	Yes
513.2	Concrete	Good	Yes	No	48	1.7	48	54	None	Yes
At WINTER STREET		2 Ramps								
546.1	Concrete	Good	Yes	No	60	6.5	60	50	None	Yes
546.2	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
At WINTHROP STREET		4 Ramps								
536.11	Concrete	Good	Yes	No	60	2.9	60	48	None	Yes
536.12	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
536.7	Concrete	Good	Yes	No	60	2.5	60	48	None	Yes
536.8	Concrete	Good	Yes	No	60	6.1	60	76	None	Yes
WEST STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
334.2	Concrete	Fair	Yes	No	50	7.2	72	60	None	Yes
WHITING ROAD		***1 Ramps***								
At EDGELL ROAD		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
124.1	Concrete	Good	Yes	No	60	5.9	60	40	None	Yes
WHITTIER STREET			***3 Ramps***							
At NEWBURY STREET			3 Ramps							
241.1	Concrete	Good	Yes	No	60	5.1	60	48	None	Yes
241.2	Concrete	Good	Yes	No	60	5.1	60	48	None	Yes
241.4	Concrete	Good	Yes	No	60	6.1	60	54	None	Yes
WILDE AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
538.1	Concrete	Good	Yes	No	60	5.1	60	80	None	Yes
538.2	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
WILSON AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
548.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
548.2	Concrete	Good	Yes	No	60	4.6	60	48	None	Yes
WINTER STREET			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
379.2	Concrete	Good	Yes	No	60	5.5	96	60	None	Yes
WINTHROP STREET			***9 Ramps***							
At BETHANY ROAD			1 Ramps							
553.3	Concrete	Good	Yes	No	60	7.3	60	46	None	Yes
At BRIDGES STREET EXTENSION			2 Ramps							
555.3	Concrete	Fair	Yes	No	48	6.4	48	55	None	Yes
555.4	Concrete	Good	Yes	No	48	1.8	48	53	None	Yes
At CONANT ROAD			1 Ramps							
536.3	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At COVE AVENUE			2 Ramps							
556.3	Concrete	Good	Yes	No	60	2.4	60	42	None	Yes
556.4	Concrete	Good	Yes	No	55	3.1	55	40	None	Yes
At DOW STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
558.4	Concrete	Good	Yes	No	60	6.5	60	53	None	Yes
At MELLEN STREET		1 Ramps								
558.3	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
At WAVERLEY STREET		1 Ramps								
536.6	Concrete	Good	Yes	No	64	5.5	64	48	None	Yes
WINTHROP TERRACE		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
557.1	Concrete	Good	Yes	No	60	3.3	60	36	None	Yes
557.2	Concrete	Good	Yes	No	38	5.3	68	60	None	Yes

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Non-Compliance - By Street With Inspection Data Total: 377

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
A STREET		***2 Ramps***								
At CONCORD STREET		2 Ramps								
222.4	Concrete	Good	Yes	Yes	60	8.2	60	75	Utillity Pole	No
222.5	Concrete	Good	Yes	No	52	7.9	60	48	Gate	No
ANDERSON ROAD		***4 Ramps***								
At BROOK STREET		4 Ramps								
90.1	Asphalt	Fair	No	No	0	0	0	0	Man Hole	No
90.2	Concrete	Fair	No	No	60	4.8	0	0	None	No
90.3	Concrete	Fair	No	No	60	2.9	0	0	None	No
90.4	Asphalt	Poor	No	No	0	0	0	0	None	No
APPLE D'OR ROAD		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
126.1	Asphalt	Fair	No	No	0	0	0	0	None	No
126.2	Asphalt	Fair	No	No	0	0	0	0	None	No
AUBURN STREET		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
316.1	Concrete	Good	Yes	No	60	0.1	56	60	None	No
BACON ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
118.1	Concrete	Good	Yes	No	60	2.3	60	36	cessive Ldg Slop	No
118.2	Concrete	Good	Yes	No	60	1.6	60	32	None	No
BALDWIN AVENUE		***1 Ramps***								
At APPLE D'OR ROAD		1 Ramps								
131.1	Asphalt	Fair	No	No	0	0	0	0	None	No
BEACON STREET		***13 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CAVANAUGH ROAD		2 Ramps								
275.1	Asphalt	Fair	No	No	0	0	0	0	None	No
275.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At COCHITUATE ROAD		2 Ramps								
295.2	Concrete	Good	Yes	No	56	6.6	54	51	None	No
295.5	Concrete	Good	Yes	No	60	9.5	60	48	None	No
At FAIRBANKS WAY		2 Ramps								
265.1	Asphalt	Fair	No	No	0	0	0	0	None	No
265.2	Asphalt	Poor	No	No	0	0	0	0	None	No
At HASTINGS STREET		2 Ramps								
260.1	Asphalt	Fair	No	No	0	0	0	0	None	No
260.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At LOHNES ROAD		2 Ramps								
279.1	Asphalt	Fair	No	No	0	0	0	0	None	No
279.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At MAGNOLIA STREET		2 Ramps								
277.1	Asphalt	Fair	No	No	0	0	0	0	None	No
277.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At WORCESTER ROAD		1 Ramps								
297.2	Concrete	Good	Yes	No	60	4.9	0	0	None	No
BEAVER STREET		***5 Ramps***								
At BEAVER PARK ROAD		1 Ramps								
502.1	Concrete	Good	Yes	Yes	60	0.6	60	32	None	No
At FIRST STREET		1 Ramps								
502.4	Concrete	Good	Yes	No	60	3.8	0	0	None	No
At MARIAN ROAD		1 Ramps								
501.2	Concrete	Good	Yes	No	60	0.9	60	26	None	No
At PARKING LOT		2 Ramps								
499.1	Concrete	Good	Yes	No	60	3.6	0	0	None	No
578.2	Concrete	Good	Yes	No	60	1.4	60	40	Curbing	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
BELKNAP ROAD			***2 Ramps***							
At CLEARVIEW DRIVE			1 Ramps							
22.4	Concrete	Good	Yes	No	60	0.1	60	30	None	No
At FLANAGAN DRIVE			1 Ramps							
30.1	Concrete	Good	Yes	No	62	5.8	55	58	Curbing	No
BETHANY ROAD			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
535.1	Concrete	Good	Yes	No	62	3.3	57	55	None	No
BIRCH ROAD			***4 Ramps***							
At OLD CONNECTICUT PATH			4 Ramps							
199.2	Asphalt	Fair	No	No	0	0	0	0	None	No
199.3	Asphalt	Fair	No	No	0	0	0	0	None	No
200.1	Asphalt	Fair	No	No	0	0	0	0	None	No
200.2	Asphalt	Fair	No	No	0	0	0	0	None	No
BLANDIN AVENUE			***1 Ramps***							
At BEAVER STREET			1 Ramps							
499.4	Asphalt	Fair	Yes	No	0	0	0	0	None	No
BRADFORD ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
171.3	Concrete	Good	Yes	Yes	60	6.1	60	48	None	No
171.4	Concrete	Good	Yes	No	59	5.2	58	40	None	No
BRIDGES STREET			***2 Ramps***							
At NAPLES STREET			1 Ramps							
570.2	Concrete	Good	Yes	No	60	6.4	58	60	None	No
At WAVERLEY STREET			1 Ramps							
534.2	Concrete	Good	Yes	No	58	4.4	56	48	None	No
BROOK STREET			***21 Ramps***							
At BROOKBURY CIRCLE			2 Ramps							
94.1	Concrete	Good	No	No	48	9.1	48	58	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
94.2	Concrete	Good	Yes	No	50	0.8	48	38	None	No
At FROST STREET		3 Ramps								
89.1	Concrete	Fair	No	No	54	6.2	0	0	None	No
89.2	Concrete	Fair	No	No	54	3.7	0	0	None	No
89.3	Concrete	Fair	No	No	54	8.4	0	0	None	No
At LEIGH STREET		2 Ramps								
88.3	Concrete	Fair	No	No	54	3.8	0	0	None	No
88.4	Concrete	Fair	No	No	60	2.7	0	0	None	No
At MEREDITH CIRCLE		2 Ramps								
88.1	Concrete	Fair	No	No	48	2.1	0	0	Vegetation	No
88.2	Concrete	Fair	No	No	48	6.3	0	0	None	No
At PERRY H. HENDERSON DRIVE		2 Ramps								
87.3	Concrete	Fair	No	No	46	5.1	0	0	None	No
87.4	Concrete	Fair	No	No	56	2.7	56	34	None	No
At SALVI DRIVE		2 Ramps								
94.3	Concrete	Good	No	No	60	4.3	0	0	None	No
94.4	Concrete	Good	No	No	62	5.4	0	0	None	No
At SCHOOL ENTRANCE		2 Ramps								
86.3	Concrete	Good	No	No	52	10.1	52	60	None	No
86.4	Concrete	Good	No	No	60	13.1	60	48	None	No
At WARD FARM CIRCLE		2 Ramps								
87.1	Concrete	Fair	No	No	48	7.9	0	0	None	No
87.2	Concrete	Fair	No	No	46	6.1	0	0	None	No
At WATER STREET		2 Ramps								
96.1	Concrete	Good	No	No	65	2.8	0	0	None	No
96.2	Concrete	Good	Yes	No	60	0.6	60	34	None	No
At WILD OAK RISE		2 Ramps								
84.1	Concrete	Fair	No	No	62	3.3	0	0	None	No
84.2	Asphalt	Fair	No	No	0	0	0	0	None	No

BROOKFIELD AVENUE ***2 Ramps***

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BROOK STREET			2 Ramps							
95.1	Concrete	Fair	No	No	55	3.7	0	0	None	No
95.2	Concrete	Fair	No	No	60	3.2	0	0	None	No
BROWNLEA ROAD			***2 Ramps***							
At OLD CONNECTICUT PATH			2 Ramps							
210.1	Concrete	Fair	No	No	60	3.8	0	0	None	No
210.2	Concrete	Fair	No	No	70	3.4	0	0	None	No
BURR STREET			***4 Ramps***							
At COCHITUATE ROAD			2 Ramps							
243.1	Asphalt	Fair	No	No	0	0	0	0	None	No
243.2	Concrete	Good	No	No	54	16.1	0	0	None	No
At LEGGATT MCCALL CONNECTOR			2 Ramps							
244.1	Asphalt	Fair	No	No	0	0	0	0	None	No
244.2	Asphalt	Fair	No	No	0	0	0	0	None	No
CEDAR STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.1	Concrete	Fair	Yes	Yes	60	2.2	60	45	None	No
CHERRY STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
239.1	Asphalt	Fair	Yes	No	0	0	0	0	None	No
CLIFFORD STREET			***1 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.2	Concrete	Good	Yes	No	60	1.5	60	39	Vegetation	No
COBURN STREET			***1 Ramps***							
At SAUCIER STREET			1 Ramps							
565.2	Concrete	Good	Yes	No	60	1.6	60	38	Sign	No
COCHITUATE ROAD			***5 Ramps***							
At SPEEN STREET			2 Ramps							
252.6	Concrete	Fair	No	No	58	2.5	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
252.7	Concrete	Good	Yes	No	57	2.6	56	36	None	No
At WHITTIER STREET		3 Ramps								
242.1	Concrete	Good	No	No	60	3.3	58	48	cessive Ldg Slop	No
242.2	Concrete	Good	No	No	46	1.9	46	59	None	No
242.3	Concrete	Fair	No	No	60	0.4	60	40	None	No
CONANT ROAD		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
536.1	Concrete	Good	Yes	No	58	1.9	56	38	None	No
536.2	Concrete	Good	Yes	No	58	3.7	56	48	None	No
CONCORD STREET		***9 Ramps***								
At A STREET		2 Ramps								
222.3	Concrete	Good	Yes	No	60	0.3	58	54	Curbing	No
222.6	Concrete	Good	Yes	No	60	7.3	60	61	Utility Access	No
At FEMIA ROAD		2 Ramps								
237.1	Concrete	Good	Yes	No	52	7.2	0	0	None	No
237.2	Concrete	Good	Yes	No	72	0.3	65	43	None	No
At GIBBS STREET		1 Ramps								
238.1	Concrete	Good	Yes	No	50	9.9	0	0	None	No
At HARTFORD STREET		3 Ramps								
520.2	Concrete	Good	Yes	No	63	5.5	60	73	None	No
520.5	Concrete	Fair	Yes	No	55	5.4	52	56	None	No
520.6	Concrete	Good	Yes	No	62	6.8	62	42	cessive Ldg Slop	No
At OLD CONNECTICUT PATH		1 Ramps								
230.3	Concrete	Good	Yes	No	52	4.5	50	60	None	No
COSTA CIRCLE		***1 Ramps***								
At WATER STREET		1 Ramps								
101.1	Concrete	Good	Yes	No	60	1.8	60	34	None	No
COTTAGE STREET		***1 Ramps***								
At DANFORTH STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
185.3	Concrete	Good	Yes	No	60	0.5	60	29	None	No
CYPRESS STREET			***1 Ramps***							
At MELLEN STREET			1 Ramps							
559.1	Concrete	Good	Yes	No	58	2.3	57	39	None	No
DANFORTH STREET			***9 Ramps***							
At CONCORD STREET			2 Ramps							
181.1	Concrete	Poor	No	No	56	1.4	0	0	None	No
181.2	Concrete	Fair	No	No	65	2.5	0	0	None	No
At DANFORTH COURT			1 Ramps							
182.4	Concrete	Good	Yes	No	43	8.6	0	0	None	No
At KING STREET			1 Ramps							
182.1	Concrete	Good	Yes	No	46	4.3	0	0	None	No
At MEADOW STREET			2 Ramps							
186.1	Concrete	Good	Yes	No	81	4.3	70	53	None	No
186.2	Concrete	Good	Yes	No	77	0.1	72	28	None	No
At SAXONY ROAD			1 Ramps							
190.2	Concrete	Good	Yes	No	80	4.4	75	44	None	No
At STEARNS STREET			2 Ramps							
184.1	Concrete	Good	Yes	No	84	0.4	70	48	None	No
184.2	Concrete	Good	Yes	No	94	5.5	81	48	None	No
DAYTONA AVENUE			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
543.2	Concrete	Good	Yes	No	60	6.9	56	55	None	No
DONOVAN DRIVE			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
125.1	Asphalt	Fair	No	No	0	0	0	0	None	No
125.2	Asphalt	Fair	No	No	0	0	0	0	None	No
DOW STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
558.5	Concrete	Good	Yes	No	60	1.2	60	30	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
EATON ROAD		***2 Ramps***								
At EATON PINES LANE		1 Ramps								
167.1	Asphalt	Good	No	No	0	0	0	0	None	No
At POTTER ROAD		1 Ramps								
168.1	Asphalt	Fair	No	No	0	0	0	0	None	No
EDGELL ROAD		***3 Ramps***								
At EDMANDS ROAD		1 Ramps								
121.1	Concrete	Good	Yes	No	60	4.7	82	100	cessive Ldg Slop	No
At PARKING LOT		1 Ramps								
316.4	Concrete	Good	Yes	Yes	48	7.4	70	60	None	No
At WHITING ROAD		1 Ramps								
124.3	Concrete	Good	Yes	No	60	6.7	60	42	Curbing	No
EISENHOWER ROAD		***2 Ramps***								
At EATON ROAD		2 Ramps								
157.1	Concrete	Good	Yes	No	60	6.6	58	48	None	No
157.2	Concrete	Good	Yes	No	60	6.6	58	48	None	No
ELIOT STREET		***2 Ramps***								
At HARTFORD STREET		2 Ramps								
521.1	Asphalt	Fair	No	No	0	0	0	0	None	No
521.2	Asphalt	Fair	No	No	0	0	0	0	None	No
ELLIS STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
333.1	Concrete	Good	Yes	No	52	7.4	48	60	None	No
ELM STREET		***2 Ramps***								
At POTTER ROAD		2 Ramps								
175.5	Concrete	Good	Yes	Yes	60	7.7	60	49	None	No
175.6	Concrete	Good	Yes	Yes	60	1.3	60	38	None	No
FAIRBROOK ROAD		***2 Ramps***								
At BROOK STREET		2 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
92.1	Concrete	Fair	No	No	54	5.3	0	0	None	No
92.2	Concrete	Fair	No	No	68	2.1	0	0	None	No
FAY ROAD			***2 Ramps***							
At OLD CENTRAL TURNPIKE			2 Ramps							
551.1	Asphalt	Fair	No	No	0	0	0	0	None	No
551.2	Asphalt	Fair	No	No	0	0	0	0	None	No
FENWICK STREET			***5 Ramps***							
At BROOK STREET			4 Ramps							
83.1	Asphalt	Fair	No	No	0	0	0	0	None	No
83.2	Concrete	Fair	No	No	58	2.3	0	0	None	No
83.3	Concrete	Fair	No	No	56	2.1	0	0	None	No
83.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At WICKFORD ROAD			1 Ramps							
79.1	Asphalt	Fair	No	No	0	0	0	0	None	No
FENWOOD STREET			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
187.4	Concrete	Good	Yes	No	90	2.4	84	45	None	No
FOUNTAIN STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.5	Concrete	Good	Yes	No	62	0.7	56	60	None	No
FRANKLIN STREET			***3 Ramps***							
At MAIN STREET			1 Ramps							
400.2	Concrete	Good	Yes	Yes	60	4.1	60	40	None	No
At MOULTON PARK ROAD			2 Ramps							
407.1	Concrete	Good	Yes	No	38	7.2	64	60	None	No
407.2	Concrete	Good	Yes	Yes	38	2.2	64	60	None	No
GARVEY ROAD			***2 Ramps***							
At EDMANDS ROAD			2 Ramps							
7.1	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
9.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GIBSON DRIVE		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
128.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
128.2	Asphalt	Fair	No	No	0	0	0	0	None	No
GIL LEONARD LANE		***1 Ramps***								
At WYNDSTONE WAY		1 Ramps								
312.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GILBERT STREET		***1 Ramps***								
At WINTHROP STREET		1 Ramps								
560.4	Concrete	Good	Yes	No	60	0.7	60	35	None	No
GOODNOW LANE		***1 Ramps***								
At GATES STREET		1 Ramps								
353.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GRANT STREET		***1 Ramps***								
At JOHN J. GALLAGHER DRIVE		1 Ramps								
475.2	Concrete	Good	Yes	No	67	1.3	67	34	None	No
GREGORY ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
116.1	Concrete	Good	Yes	No	60	2.3	60	34	cessive Ldg Slop	No
116.2	Concrete	Good	Yes	No	60	0.8	60	34	None	No
HAMILTON STREET		***4 Ramps***								
At JACKSON PLACE		2 Ramps								
220.1	Concrete	Fair	No	No	57	1.4	0	0	Curbing	No
220.2	Concrete	Fair	No	No	64	5.2	0	0	None	No
At SCHOOL STREET		2 Ramps								
219.3	Concrete	Fair	No	No	58	7.9	0	0	None	No
219.4	Concrete	Fair	No	No	60	14.4	0	0	None	No
HARDY STREET		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CONCORD STREET		1 Ramps								
234.1	Concrete	Good	Yes	No	70	4.6	0	0	None	No
HARTFORD STREET		***15 Ramps***								
At BELVIDERE ROAD		2 Ramps								
526.1	Asphalt	Fair	No	No	0	0	0	0	None	No
526.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At C STREET		2 Ramps								
525.1	Asphalt	Fair	No	No	0	0	0	0	None	No
525.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At DYER STREET		1 Ramps								
522.1	Concrete	Good	Yes	No	62	3.1	66	34	None	No
At GRANT STREET		3 Ramps								
526.3	Asphalt	Fair	No	No	0	0	0	0	None	No
527.1	Asphalt	Fair	No	No	0	0	0	0	None	No
527.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At HARRISON STREET		2 Ramps								
524.1	Asphalt	Fair	No	No	0	0	0	0	None	No
524.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At HOWE STREET		2 Ramps								
523.1	Asphalt	Fair	No	No	0	0	0	0	None	No
523.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At LOKER STREET		2 Ramps								
527.3	Asphalt	Fair	No	No	0	0	0	0	None	No
527.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At UNDERWOOD STREET		1 Ramps								
528.1	Asphalt	Fair	No	No	0	0	0	0	None	No
HEMENWAY ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
117.2	Concrete	Good	Yes	Yes	60	2.5	60	33	cessive Ldg Slop	No
HIALEAH LANE		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At DANFORTH STREET			1 Ramps							
188.2	Concrete	Good	Yes	Yes	60	3.1	60	48	None	No
INDIAN HEAD ROAD			***6 Ramps***							
At CRESTWOOD ROAD			1 Ramps							
302.2	Concrete	Good	Yes	No	60	0.6	60	32	None	No
At DONNA ROAD			1 Ramps							
299.1	Concrete	Good	Yes	No	60	1.3	60	26	None	No
At INDIAN HEAD HEIGHTS			1 Ramps							
301.2	Concrete	Good	Yes	No	65	2.6	0	0	None	No
At LOCKLAND AVENUE			2 Ramps							
300.1	Concrete	Good	Yes	No	48	13.9	0	0	None	No
300.2	Concrete	Good	Yes	Yes	60	1.9	60	48	None	No
At SUMMER STREET			1 Ramps							
298.1	Concrete	Good	Yes	Yes	60	6.3	60	48	None	No
IRVING STREET			***1 Ramps***							
At LORING DRIVE			1 Ramps							
487.2	Concrete	Fair	No	No	60	2.2	0	0	Curbing	No
JOHN J BRADY DRIVE			***1 Ramps***							
At NORMANDY ROAD EXTENSION			1 Ramps							
574.3	Concrete	Good	Yes	No	65	0.1	59	60	None	No
JOHN J. GALLAGHER DRIVE			***1 Ramps***							
At EVERIT AVENUE			1 Ramps							
476.2	Concrete	Good	Yes	No	60	3.2	60	34	None	No
JOHN MCQUINN CIRCLE			***1 Ramps***							
At WAVENEY ROAD			1 Ramps							
57.1	Asphalt	Fair	No	No	0	0	0	0	None	No
JOSEPH ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
107.2	Concrete	Good	Yes	No	60	0.5	60	32	None	No
JOYCE LUNDBERG DRIVE			***1 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WATER STREET			1 Ramps							
110.2	Concrete	Good	Yes	Yes	60	2.4	60	34	None	No
JOYCE ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
163.1	Asphalt	Good	No	No	0	0	0	0	None	No
KELLOGG STREET			***2 Ramps***							
At CENTRAL STREET			2 Ramps							
309.2	Concrete	Poor	No	No	60	1.7	60	60	None	No
309.3	Concrete	Poor	No	No	75	5.5	70	60	None	No
KENDALL AVENUE			***4 Ramps***							
At ALLA STREET			1 Ramps							
510.2	Concrete	Good	Yes	No	60	1.1	60	32	None	No
At CURTIS STREET			1 Ramps							
507.2	Concrete	Good	Yes	No	55	6.1	0	0	None	No
At KENDALL LANE			2 Ramps							
510.3	Concrete	Good	Yes	No	60	0.8	60	32	None	No
510.4	Concrete	Good	Yes	No	58	2.6	58	27	None	No
KNIGHT ROAD			***1 Ramps***							
At PLEASANT STREET			1 Ramps							
46.2	Concrete	Good	Yes	No	70	0.3	66	48	None	No
LANEWOOD AVENUE			***2 Ramps***							
At CURRIER DRIVE			1 Ramps							
66.1	Asphalt	Fair	No	No	0	0	0	0	None	No
At WAVENEY ROAD			1 Ramps							
56.1	Asphalt	Poor	No	No	0	0	0	0	None	No
LARRABEE AVENUE			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
539.2	Concrete	Good	Yes	No	64	5.8	54	48	None	No
LEGGATT MCCALL			***9 Ramps***							
At PARKING LOT			9 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
246.1	Asphalt	Fair	No	No	0	0	0	0	None	No
246.2	Asphalt	Fair	No	No	0	0	0	0	None	No
247.1	Asphalt	Fair	No	No	0	0	0	0	None	No
247.2	Asphalt	Fair	No	No	0	0	0	0	None	No
247.3	Asphalt	Fair	No	No	0	0	0	0	None	No
247.4	Asphalt	Fair	No	No	0	0	0	0	None	No
573.1	Concrete	Fair	No	No	60	10.1	60	48	None	No
573.2	Asphalt	Fair	No	No	0	0	0	0	None	No
573.3	Asphalt	Fair	No	No	0	0	0	0	None	No
LEO CHASSE WAY		***2 Ramps***								
At GARVEY ROAD		2 Ramps								
8.1	Asphalt	Fair	No	No	0	0	0	0	None	No
8.2	Asphalt	Poor	No	No	0	0	0	0	None	No
LIBERTY STREET		***2 Ramps***								
At OAK STREET		2 Ramps								
318.1	Concrete	Good	Yes	No	60	0.8	60	35	None	No
318.2	Concrete	Good	Yes	No	58	3.9	48	44	None	No
LINDA AVENUE		***2 Ramps***								
At BROOK STREET		2 Ramps								
93.1	Concrete	Fair	No	No	58	4.7	0	0	None	No
93.2	Concrete	Fair	No	No	64	5.3	0	0	None	No
LITTLE TREE LANE		***2 Ramps***								
At PLEASANT STREET		2 Ramps								
48.1	Asphalt	Fair	No	No	0	0	0	0	None	No
48.2	Asphalt	Fair	No	No	0	0	0	0	None	No
LOCKLAND AVENUE		***1 Ramps***								
At DONNA ROAD		1 Ramps								
289.1	Asphalt	Fair	No	No	0	0	0	0	None	No
MAIN STREET		***2 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At MOULTON PARK ROAD			2 Ramps							
399.1	Concrete	Fair	No	No	44	3.4	54	60	None	No
399.2	Concrete	Fair	No	No	36	1.1	40	60	None	No
MAJOR HALE DRIVE			***1 Ramps***							
At BELKNAP ROAD			1 Ramps							
31.1	Asphalt	Fair	No	No	0	0	0	0	None	No
MAYNARD ROAD			***2 Ramps***							
At CHURCH STREET			2 Ramps							
380.1	Concrete	Good	Yes	Yes	60	1.7	60	48	None	No
380.2	Concrete	Good	Yes	No	44	17.3	0	0	None	No
MELLEN STREET			***2 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.2	Concrete	Good	Yes	No	55	7.1	54	48	None	No
At WINTHROP STREET			1 Ramps							
558.1	Concrete	Good	Yes	No	60	4.1	60	48	Curbing	No
MERRIAM ROAD			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
47.1	Asphalt	Fair	No	No	0	0	0	0	None	No
47.2	Asphalt	Fair	No	No	0	0	0	0	None	No
MILL STREET			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
51.1	Concrete	Good	Yes	No	72	4.2	65	50	None	No
51.2	Concrete	Good	Yes	No	69	4.7	65	54	None	No
MONTEREY LANE			***1 Ramps***							
At BELKNAP ROAD			1 Ramps							
31.2	Asphalt	Fair	No	No	0	0	0	0	None	No
MURPHY CIRCLE			***2 Ramps***							
At COLONIAL DRIVE			2 Ramps							
152.1	Concrete	Good	Yes	No	61	10.2	60	45	sive Slope & Ldg	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
152.2	Concrete	Good	Yes	No	61	10.4	60	46	sive Slope & Ldg	No
NAPLES STREET			***1 Ramps***							
At BRIDGES STREET			1 Ramps							
570.3	Concrete	Good	No	No	60	1.4	60	60	None	No
NEWBURY STREET			***2 Ramps***							
At SPEEN STREET			1 Ramps							
251.2	Concrete	Good	Yes	No	59	1.9	59	34	None	No
At WHITTIER STREET			1 Ramps							
241.5	Concrete	Good	Yes	No	60	1.1	60	26	Utillity Pole	No
NICHOLAS ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
104.3	Concrete	Good	Yes	No	60	2.1	60	35	None	No
104.4	Concrete	Good	Yes	Yes	60	6.2	56	46	None	No
NORMANDY ROAD			***1 Ramps***							
At CONCORD STREET			1 Ramps							
518.4	Concrete	Good	Yes	No	60	2	60	34	None	No
NORMANDY ROAD			***2 Ramps***							
At FLAGG DRIVE			1 Ramps							
515.4	Concrete	Good	Yes	No	54	4.7	52	48	None	No
At JOHN J BRADY DRIVE			1 Ramps							
574.2	Concrete	Good	Yes	No	60	4.2	60	45	Utillity Pole	No
OAK CREST DRIVE			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
350.2	Concrete	Good	Yes	Yes	60	8.3	70	60	None	No
OAK STREET			***3 Ramps***							
At EDGELL ROAD			2 Ramps							
317.1	Concrete	Good	Yes	Yes	72	0.4	72	60	None	No
317.2	Concrete	Good	Yes	No	60	2.6	60	33	None	No
At VERNON STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
319.1	Concrete	Good	Yes	Yes	60	6.2	60	44	None	No
OAKWOOD COURT		***1 Ramps***								
At POTTER ROAD		1 Ramps								
170.2	Concrete	Good	Yes	No	58	1.1	60	32	None	No
OLD CONNECTICUT PATH		***11 Ramps***								
At ARLENE ROAD		2 Ramps								
227.1	Concrete	Fair	No	No	65	0.5	64	60	None	No
227.2	Concrete	Fair	No	No	66	0.5	65	50	None	No
At BIRCH ROAD		2 Ramps								
199.1	Asphalt	Fair	No	No	0	0	0	0	None	No
199.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At BROSSI CIRCLE		1 Ramps								
198.1	Concrete	Good	Yes	No	64	5.1	62	48	None	No
At BROWNLEA ROAD		1 Ramps								
210.3	Concrete	Fair	No	No	54	3.6	0	0	None	No
At HARDY STREET		2 Ramps								
229.1	Concrete	Good	Yes	No	50	6.2	48	65	None	No
229.3	Asphalt	Fair	No	No	0	0	0	0	None	No
At LAKE ROAD		1 Ramps								
202.2	Concrete	Good	No	No	52	4.2	94	60	None	No
At PARKING LOT		2 Ramps								
211.1	Concrete	Poor	No	No	50	13.9	0	0	None	No
223.5	Concrete	Good	Yes	No	72	4.3	62	74	None	No
OLD WOOD ROAD		***2 Ramps***								
At OLD WORCESTER ROAD		2 Ramps								
343.1	Concrete	Good	Yes	No	58	3.3	58	43	Curbing	No
343.2	Concrete	Good	Yes	No	60	3.2	60	48	Curbing	No
OLD WORCESTER ROAD		***3 Ramps***								
At OLD WOOD ROAD		2 Ramps								
343.3	Concrete	Good	Yes	No	59	5.5	59	46	Curbing	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
343.4	Concrete	Good	Yes	No	60	2.7	60	44	Curbing	No
At TEMPLE STREET		1 Ramps								
341.2	Concrete	Good	Yes	No	57	5.8	55	60	None	No
PAMELA ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
111.3	Concrete	Good	Yes	No	60	1.9	59	33	None	No
PARKING LOT		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
316.5	Concrete	Good	Yes	Yes	64	1.6	64	48	None	No
316.6	Concrete	Good	Yes	No	60	2.4	0	0	None	No
PERSHING AVENUE		***2 Ramps***								
At WAVERLEY STREET		2 Ramps								
549.2	Concrete	Good	Yes	No	65	6.1	60	45	None	No
576.1	Concrete	Good	Yes	No	52	8.1	50	54	None	No
POTTER ROAD		***4 Ramps***								
At ELM STREET		1 Ramps								
175.1	Concrete	Good	Yes	No	60	6.1	60	45	cessive Ldg Slop	No
At JOYCE ROAD		1 Ramps								
163.2	Concrete	Good	Yes	No	59	1.2	57	35	None	No
At LOWRY ROAD		1 Ramps								
177.2	Concrete	Good	Yes	No	59	5.5	59	48	Curbing	No
At WATER STREET		1 Ramps								
115.1	Concrete	Good	Yes	No	58	5.2	70	60	Curbing	No
PROSPECT STREET		***4 Ramps***								
At CENTRAL STREET		1 Ramps								
306.5	Concrete	Good	Yes	No	60	0.4	60	34	None	No
At WOODSIDE COTTAGE WAY		1 Ramps								
310.3	Concrete	Good	Yes	No	60	2.2	60	35	None	No
At WYNDSTONE WAY		2 Ramps								
311.3	Concrete	Good	Yes	No	60	2.6	60	35	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
311.4	Concrete	Good	Yes	No	60	1.4	60	33	None	No
RESERVOIR RIDGE		***2 Ramps***								
At TEMPLE STREET		2 Ramps								
370.1	Asphalt	Fair	No	No	0	0	0	0	None	No
370.2	Asphalt	Fair	No	No	0	0	0	0	None	No
RHUBENA STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
537.2	Concrete	Good	Yes	No	64	4.1	58	48	None	No
RON'S WAY		***2 Ramps***								
At WATER STREET		2 Ramps								
108.1	Concrete	Good	Yes	No	60	0.7	60	35	None	No
108.2	Concrete	Good	Yes	No	60	1.1	60	32	None	No
ROSE KENNEDY LANE		***1 Ramps***								
At NORMANDY ROAD EXTENSION		1 Ramps								
516.2	Concrete	Good	Yes	No	58	4.6	52	42	None	No
ROYAL MEADOW LANE		***1 Ramps***								
At KINGS ROW LANE		1 Ramps								
27.1	Asphalt	Fair	No	No	0	0	0	0	None	No
SAGE LANE		***1 Ramps***								
At WINCH STREET		1 Ramps								
11.1	Asphalt	Fair	No	No	0	0	0	0	None	No
SALEM END ROAD		***4 Ramps***								
At MAYHEW STREET		2 Ramps								
374.1	Concrete	Fair	No	No	65	7.7	0	0	None	No
374.2	Concrete	Fair	No	No	65	3.2	54	60	None	No
At SALEM END LANE		2 Ramps								
368.1	Concrete	Good	No	No	64	5.4	0	0	None	No
368.2	Concrete	Good	No	No	64	0.5	64	60	None	No
SAUCIER STREET		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WAVERLEY STREET			1 Ramps							
533.2	Concrete	Fair	Yes	Yes	60	5.3	60	48	None	No
SAVOY ROAD			***2 Ramps***							
At MARY AGNES ROAD			2 Ramps							
160.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
160.2	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
SAXONY ROAD			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
191.2	Concrete	Good	Yes	Yes	84	5	80	50	None	No
SCHOOL ENTRANCE			***2 Ramps***							
At BROOK STREET			2 Ramps							
86.1	Concrete	Good	No	No	57	7.4	57	48	cessive Ldg Slop	No
86.2	Concrete	Good	No	No	56	8.1	56	48	None	No
SCHOOL STREET			***6 Ramps***							
At CONCORD STREET			1 Ramps							
221.3	Concrete	Good	Yes	Yes	60	6.1	60	60	None	No
At HAMILTON STREET			4 Ramps							
219.1	Concrete	Fair	No	No	52	15.7	0	0	None	No
219.2	Concrete	Fair	No	No	55	5.4	0	0	None	No
219.5	Concrete	Fair	Yes	No	58	4.2	0	0	None	No
219.6	Concrete	Fair	Yes	No	48	4.1	48	38	g & Excessive Ld	No
At OLD CONNECTICUT PATH			1 Ramps							
204.1	Concrete	Fair	No	No	105	3.8	0	0	Curbing	No
SECOND STREET			***1 Ramps***							
At BEAVER STREET			1 Ramps							
503.1	Concrete	Good	Yes	No	60	0.7	60	34	None	No
SHEFFIELD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
169.1	Concrete	Good	Yes	No	59	1.2	59	29	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
SLOANE DRIVE			***1 Ramps***							
At MARY AGNES ROAD			1 Ramps							
159.1	Asphalt	Fair	No	No	0	0	0	0	Vegetation	No
SPEEN STREET			***1 Ramps***							
At COCHITUATE ROAD			1 Ramps							
252.5	Concrete	Poor	No	No	62	3.3	0	0	None	No
SPRING LANE			***1 Ramps***							
At WATER STREET			1 Ramps							
114.2	Concrete	Good	Yes	No	60	2.7	60	34	None	No
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.2	Concrete	Good	Yes	Yes	58	2.2	58	48	None	No
SUDBURY LANDING			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
183.2	Concrete	Good	Yes	No	64	3.5	64	32	None	No
SUN VALLEY DRIVE			***1 Ramps***							
At PLEASANT STREET			1 Ramps							
331.1	Asphalt	Good	No	No	0	0	0	0	Hydrant	No
SWANSON ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
97.1	Concrete	Good	Yes	No	60	2.3	60	35	None	No
97.2	Concrete	Good	Yes	No	60	1.5	60	35	None	No
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.2	Concrete	Good	Yes	Yes	60	5.3	60	40	None	No
TEMPLE STREET			***4 Ramps***							
At TEMPLE PLACE			2 Ramps							
339.1	Asphalt	Fair	No	No	0	0	0	0	None	No
339.6	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WOODLEIGH ROAD		2 Ramps								
339.2	Asphalt	Fair	No	No	0	0	0	0	None	No
339.5	Asphalt	Fair	No	No	0	0	0	0	None	No
THIRD STREET		***3 Ramps***								
At BEAVER STREET		3 Ramps								
504.1	Concrete	Good	Yes	No	58	9.6	0	0	None	No
504.2	Concrete	Good	Yes	No	60	2.8	60	28	None	No
504.4	Concrete	Good	Yes	No	45	5.5	0	0	None	No
TREELAND DRIVE		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
129.1	Asphalt	Fair	No	No	0	0	0	0	Vegetation	No
129.2	Asphalt	Fair	No	No	0	0	0	0	None	No
UPTON ROAD		***2 Ramps***								
At POTTER ROAD		2 Ramps								
176.1	Concrete	Good	Yes	No	60	4.7	58	48	None	No
176.2	Concrete	Good	Yes	Yes	60	6.5	60	40	None	No
VERNON STREET		***6 Ramps***								
At EDGELL ROAD		2 Ramps								
315.3	Concrete	Good	Yes	Yes	60	6.9	60	48	None	No
315.4	Concrete	Good	Yes	Yes	60	7.9	60	60	None	No
At PLEASANT STREET		4 Ramps								
325.4	Concrete	Good	Yes	Yes	60	6.1	0	0	None	No
325.5	Asphalt	Good	Yes	No	0	0	0	0	None	No
325.6	Asphalt	Fair	No	No	0	0	0	0	None	No
325.7	Asphalt	Fair	No	No	0	0	0	0	None	No
WALKERS WAY		***2 Ramps***								
At LANEWOOD AVENUE		2 Ramps								
65.1	Asphalt	Fair	No	No	0	0	0	0	None	No
65.2	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
WATER STREET		***23 Ramps***								
At BROOK STREET		2 Ramps								
96.3	Concrete	Good	Yes	No	60	0.7	60	32	None	No
96.4	Concrete	Good	Yes	No	60	0.9	60	35	None	No
At CART PATH		2 Ramps								
100.1	Asphalt	Good	No	No	0	0	0	0	None	No
100.2	Asphalt	Good	No	No	0	0	0	0	None	No
At CENTRAL STREET		2 Ramps								
105.3	Concrete	Good	Yes	No	58	1.1	57	48	None	No
105.4	Concrete	Good	Yes	No	60	6.4	57	59	None	No
At EDGELL ROAD		1 Ramps								
121.4	Concrete	Good	Yes	No	60	6.4	60	48	Curbing	No
At JOYCE LUNDBERG DRIVE		1 Ramps								
110.3	Concrete	Good	Yes	No	60	2.2	60	34	None	No
At LARIVIERE ROAD		1 Ramps								
98.2	Concrete	Good	Yes	No	48	5.6	0	0	None	No
At LIBRARY ENTRANCE		2 Ramps								
119.1	Concrete	Good	Yes	No	41	2.3	38	60	None	No
119.4	Concrete	Good	Yes	No	48	5.9	40	60	None	No
At NICHOLAS ROAD		2 Ramps								
104.1	Concrete	Good	Yes	No	60	2.4	60	32	None	No
104.2	Concrete	Good	Yes	No	60	1.7	60	34	None	No
At PAMELA ROAD		2 Ramps								
111.1	Concrete	Good	Yes	Yes	60	1.9	60	36	None	No
111.2	Concrete	Good	Yes	No	60	1.8	60	35	None	No
At PARK AVENUE		2 Ramps								
102.2	Concrete	Good	Yes	No	55	1.3	68	60	Utility Access	No
103.2	Concrete	Good	Yes	No	40	6.5	0	0	None	No
At POTTER ROAD		2 Ramps								
115.3	Concrete	Fair	Yes	No	60	3.1	60	60	cessive Ldg Slop	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
115.4	Concrete	Good	Yes	No	60	2.3	60	35	None	No
At SCHOOL ENTRANCE		4 Ramps								
120.1	Concrete	Good	Yes	Yes	60	2.8	60	36	None	No
120.2	Concrete	Good	Yes	Yes	70	2.4	70	28	None	No
120.4	Concrete	Good	Yes	Yes	60	6.2	0	0	None	No
120.6	Concrete	Good	Yes	Yes	60	8.3	60	60	None	No
WAVENEY ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
55.2	Concrete	Good	Yes	No	72	0.4	68	50	None	No
WAVERLEY STREET		***10 Ramps***								
At BEAVER STREET		1 Ramps								
498.2	Concrete	Good	Yes	Yes	60	1.4	60	50	None	No
At CASEY COURT		2 Ramps								
530.1	Concrete	Good	No	No	64	5.8	82	60	None	No
530.2	Concrete	Good	No	No	64	5.4	78	60	None	No
At CEDAR STREET		1 Ramps								
529.1	Concrete	Good	Yes	No	68	2.5	64	32	None	No
At FOUNTAIN STREET		1 Ramps								
532.4	Concrete	Good	Yes	No	64	4.3	56	58	None	No
At LIBERTY STREET		2 Ramps								
550.1	Concrete	Good	No	No	48	7.4	0	0	None	No
550.2	Concrete	Good	No	No	70	1.6	54	60	None	No
At MELLEN STREET		1 Ramps								
532.3	Concrete	Good	Yes	No	58	1.8	58	35	None	No
At PERSHING AVENUE		1 Ramps								
549.4	Concrete	Good	Yes	No	55	0.3	59	43	Curbing	No
At SECOND STREET		1 Ramps								
514.4	Concrete	Good	Yes	No	60	2.2	60	32	None	No
WESLEY ROAD		***2 Ramps***								
At BROOK STREET		2 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
85.1	Concrete	Fair	No	No	60	2.3	0	0	None	No
85.2	Concrete	Fair	No	No	55	3.3	0	0	None	No
WEST STREET			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
334.1	Concrete	Good	Yes	No	50	5.1	48	60	None	No
WHITING ROAD			***1 Ramps***							
At EDGELL ROAD			1 Ramps							
124.2	Concrete	Good	Yes	No	60	6.1	60	42	Curbing	No
WHITTIER STREET			***3 Ramps***							
At COCHITUATE ROAD			2 Ramps							
242.4	Concrete	Good	No	No	55	2.5	51	50	None	No
242.5	Concrete	Fair	No	No	64	0.2	62	54	ccessive Ldg Slo	No
At NEWBURY STREET			1 Ramps							
241.3	Concrete	Good	Yes	No	60	1.6	60	32	Utillity Pole	No
WINTER STREET			***6 Ramps***							
At MAPLE STREET			1 Ramps							
386.1	Asphalt	Poor	No	No	0	0	0	0	None	No
At MAYHEW STREET EXTENSION			2 Ramps							
378.1	Asphalt	Poor	No	No	0	0	0	0	None	No
378.2	Asphalt	Poor	No	No	0	0	0	0	None	No
At SALEM END ROAD			3 Ramps							
373.1	Concrete	Poor	No	No	52	6.4	0	0	None	No
373.2	Concrete	Fair	No	No	60	1.1	0	0	None	No
373.3	Asphalt	Fair	No	No	0	0	0	0	None	No
WINTHROP STREET			***2 Ramps***							
At CONANT ROAD			1 Ramps							
536.4	Concrete	Fair	Yes	No	60	5.6	60	48	Major Curbing	No
At WAVERLEY STREET			1 Ramps							
536.5	Concrete	Good	Yes	Yes	60	6.2	60	42	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
WOODLEIGH ROAD			***6 Ramps***							
At OLD WOOD ROAD			2 Ramps							
342.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
342.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At PRIMO DRIVE			2 Ramps							
344.1	Asphalt	Fair	No	No	0	0	0	0	None	No
344.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At TEMPLE STREET			2 Ramps							
339.3	Asphalt	Fair	No	No	0	0	0	0	None	No
339.4	Asphalt	Fair	No	No	0	0	0	0	None	No
WOODMERE ROAD			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
37.1	Concrete	Good	Yes	No	60	5.1	50	43	None	No
37.2	Concrete	Good	Yes	No	62	3.1	60	48	None	No
WOODSIDE COTTAGE WAY			***2 Ramps***							
At PROSPECT STREET			2 Ramps							
310.1	Concrete	Good	Yes	No	60	2.1	60	35	None	No
310.2	Concrete	Good	Yes	No	62	2.5	0	0	ccessive Ldg Slop	No
WYNDSTONE WAY			***2 Ramps***							
At PROSPECT STREET			2 Ramps							
311.1	Concrete	Good	Yes	No	60	1.8	60	34	None	No
311.2	Concrete	Good	Yes	No	60	1.8	60	35	None	No

City of Framingham, Massachusetts

Concrete Ramps with no warning panel and/or repairable obstruction

Curb Ramp Inventory & Assessment

Ramp Retrofit - By Street With Inspection Data

Total: 49

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
BEAVER STREET			***1 Ramps***							
At PARKING LOT			1 Ramps							
578.2	Curbing	Good	Yes	No	60	1.4	60	40	Curbing	No
BRADFORD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
171.3	None	Good	Yes	Yes	60	6.1	60	48	None	No
CEDAR STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.1	None	Fair	Yes	Yes	60	2.2	60	45	None	No
CLIFFORD STREET			***1 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.2	Vegetation	Good	Yes	No	60	1.5	60	39	Vegetation	No
COCHITUATE ROAD			***2 Ramps***							
At WHITTIER STREET			2 Ramps							
242.2	None	Good	No	No	46	1.9	46	59	None	No
242.3	None	Fair	No	No	60	0.4	60	40	None	No
EDGELL ROAD			***2 Ramps***							
At PARKING LOT			1 Ramps							
316.4	None	Good	Yes	Yes	48	7.4	70	60	None	No
At WHITING ROAD			1 Ramps							
124.3	Curbing	Good	Yes	No	60	6.7	60	42	Curbing	No
ELM STREET			***2 Ramps***							
At POTTER ROAD			2 Ramps							
175.5	None	Good	Yes	Yes	60	7.7	60	49	None	No
175.6	None	Good	Yes	Yes	60	1.3	60	38	None	No

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
FRANKLIN STREET			***1 Ramps***							
At MAIN STREET			1 Ramps							
400.2	None	Good	Yes	Yes	60	4.1	60	40	None	No
HIALEAH LANE			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
188.2	None	Good	Yes	Yes	60	3.1	60	48	None	No
INDIAN HEAD ROAD			***2 Ramps***							
At LOCKLAND AVENUE			1 Ramps							
300.2	None	Good	Yes	Yes	60	1.9	60	48	None	No
At SUMMER STREET			1 Ramps							
298.1	None	Good	Yes	Yes	60	6.3	60	48	None	No
MAIN STREET			***2 Ramps***							
At MOULTON PARK ROAD			2 Ramps							
399.1	None	Fair	No	No	44	3.4	54	60	None	No
399.2	None	Fair	No	No	36	1.1	40	60	None	No
MAYNARD ROAD			***1 Ramps***							
At CHURCH STREET			1 Ramps							
380.1	None	Good	Yes	Yes	60	1.7	60	48	None	No
MELLEN STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
558.1	Curbing	Good	Yes	No	60	4.1	60	48	Curbing	No
NAPLES STREET			***1 Ramps***							
At BRIDGES STREET			1 Ramps							
570.3	None	Good	No	No	60	1.4	60	60	None	No
OAK CREST DRIVE			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
350.2	None	Good	Yes	Yes	60	8.3	70	60	None	No
OAK STREET			***2 Ramps***							
At EDGELL ROAD			1 Ramps							

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
317.1	None	Good	Yes	Yes	72	0.4	72	60	None	No
At VERNON STREET		1 Ramps								
319.1	None	Good	Yes	Yes	60	6.2	60	44	None	No
OLD CONNECTICUT PATH		***1 Ramps***								
At LAKE ROAD		1 Ramps								
202.2	None	Good	No	No	52	4.2	94	60	None	No
OLD WOOD ROAD		***2 Ramps***								
At OLD WORCESTER ROAD		2 Ramps								
343.1	Curbing	Good	Yes	No	58	3.3	58	43	Curbing	No
343.2	Curbing	Good	Yes	No	60	3.2	60	48	Curbing	No
OLD WORCESTER ROAD		***2 Ramps***								
At OLD WOOD ROAD		2 Ramps								
343.3	Curbing	Good	Yes	No	59	5.5	59	46	Curbing	No
343.4	Curbing	Good	Yes	No	60	2.7	60	44	Curbing	No
PARKING LOT		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
316.5	None	Good	Yes	Yes	64	1.6	64	48	None	No
POTTER ROAD		***2 Ramps***								
At LOWRY ROAD		1 Ramps								
177.2	Curbing	Good	Yes	No	59	5.5	59	48	Curbing	No
At WATER STREET		1 Ramps								
115.1	Curbing	Good	Yes	No	58	5.2	70	60	Curbing	No
SALEM END ROAD		***1 Ramps***								
At SALEM END LANE		1 Ramps								
368.2	None	Good	No	No	64	0.5	64	60	None	No
SAUCIER STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
533.2	None	Fair	Yes	Yes	60	5.3	60	48	None	No
SCHOOL ENTRANCE		***1 Ramps***								

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BROOK STREET			1 Ramps							
86.2	None	Good	No	No	56	8.1	56	48	None	No
SCHOOL STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
221.3	None	Good	Yes	Yes	60	6.1	60	60	None	No
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.2	None	Good	Yes	Yes	58	2.2	58	48	None	No
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.2	None	Good	Yes	Yes	60	5.3	60	40	None	No
UPTON ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
176.2	None	Good	Yes	Yes	60	6.5	60	40	None	No
VERNON STREET			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
315.3	None	Good	Yes	Yes	60	6.9	60	48	None	No
315.4	None	Good	Yes	Yes	60	7.9	60	60	None	No
WATER STREET			***4 Ramps***							
At EDGELL ROAD			1 Ramps							
121.4	Curbing	Good	Yes	No	60	6.4	60	48	Curbing	No
At PAMELA ROAD			1 Ramps							
111.1	None	Good	Yes	Yes	60	1.9	60	36	None	No
At SCHOOL ENTRANCE			2 Ramps							
120.1	None	Good	Yes	Yes	60	2.8	60	36	None	No
120.6	None	Good	Yes	Yes	60	8.3	60	60	None	No
WAVERLEY STREET			***4 Ramps***							
At BEAVER STREET			1 Ramps							
498.2	None	Good	Yes	Yes	60	1.4	60	50	None	No

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CASEY COURT		2 Ramps								
530.1	None	Good	No	No	64	5.8	82	60	None	No
530.2	None	Good	No	No	64	5.4	78	60	None	No
At PERSHING AVENUE		1 Ramps								
549.4	Curbing	Good	Yes	No	55	0.3	59	43	Curbing	No
WHITING ROAD		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
124.2	Curbing	Good	Yes	No	60	6.1	60	42	Curbing	No
WINTHROP STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
536.5	None	Good	Yes	Yes	60	6.2	60	42	None	No

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals

Street	Number of Ramps
AUBURN STREET	2
BEACON STREET	2
BEAVER STREET	1
BETHANY ROAD	2
BRIDGES STREET EXTENSION	2
CAPRI DRIVE	2
COCHITUATE ROAD	2
DEBRA LANE	2
EDGELL ROAD	1
ELM STREET	1
FENTON STREET	2
HAMILTON STREET	2
HARDY STREET	1
KELLOGG STREET	2
NEWBURY STREET	1
NORMANDY ROAD	1
OAK CREST DRIVE	1
OLD CONNECTICUT PATH	14
OLD WORCESTER ROAD	1
PARKING LOT	1
PINECREST ROAD	2
PLEASANT STREET	1
POTTER ROAD	2
RANDY ROAD	2
ROSE KENNEDY LANE	1
SCHOOL STREET	1
SEALTEST DRIVE	2
SPEEN STREET	3
WATER STREET	3
WINTER STREET	1
WINTHROP STREET	1
Total:	**62**

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals - By Street With Inspection Data

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
AUBURN STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
323.1	Yes	No	Good	Concrete	No	None
323.2	Yes	No	Good	Concrete	No	None
BEACON STREET		**2 Ramps**				
At FAIRBANKS STREET		2 Ramps				
296.1	Yes	No	Good	Concrete	No	None
296.2	Yes	Yes	Good	Concrete	No	None
BEAVER STREET		**1 Ramps**				
At BLANDIN AVENUE		1 Ramps				
499.3	Yes	Yes	Good	Concrete	No	None
BETHANY ROAD		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
553.5	Yes	No	Good	Concrete	No	None
553.6	Yes	No	Good	Concrete	No	None
BRIDGES STREET EXTENSION		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
555.1	Yes	No	Good	Concrete	No	None
555.2	Yes	No	Good	Concrete	No	None
CAPRI DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
209.1	No	No	Fair	Concrete	No	None
209.2	No	No	Fair	Concrete	No	None
COCHITUATE ROAD		**2 Ramps**				
At SPEEN STREET		2 Ramps				
252.2	Yes	No	Good	Concrete	No	None
252.3	Yes	No	Good	Concrete	Yes	Curbing
DEBRA LANE		**2 Ramps**				
At HARDY STREET		2 Ramps				
231.1	Yes	No	Good	Concrete	No	None
231.2	Yes	No	Good	Concrete	No	None
EDGELL ROAD		**1 Ramps**				
At WATER STREET		1 Ramps				
121.2	Yes	No	Good	Concrete	No	None
ELM STREET		**1 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At POTTER ROAD		1 Ramps				
175.2	Yes	No	Good	Concrete	No	None
FENTON STREET		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
206.1	No	No	Good	Concrete	No	None
206.2	No	No	Good	Concrete	No	None
HAMILTON STREET		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
208.3	No	No	Fair	Concrete	No	None
208.4	No	No	Fair	Concrete	Yes	Curbing
HARDY STREET		**1 Ramps**				
At DEBRA LANE		1 Ramps				
231.4	Yes	No	Good	Concrete	No	None
KELLOGG STREET		**2 Ramps**				
At CENTRAL STREET		2 Ramps				
309.1	No	No	Fair	Concrete	No	None
309.4	No	No	Poor	Concrete	No	None
NEWBURY STREET		**1 Ramps**				
At SPEEN STREET		1 Ramps				
251.1	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**1 Ramps**				
At ARSENAL ROAD		1 Ramps				
517.1	Yes	No	Good	Concrete	No	None
OAK CREST DRIVE		**1 Ramps**				
At OLD WORCESTER ROAD		1 Ramps				
346.1	Yes	No	Good	Concrete	Yes	Curbing
OLD CONNECTICUT PATH		**14 Ramps**				
At BROSSI CIRCLE		1 Ramps				
198.2	Yes	No	Good	Concrete	No	None
At BROWNLEA ROAD		1 Ramps				
210.4	No	No	Fair	Concrete	No	None
At CHAPPELLWOOD ROAD		1 Ramps				
205.1	No	No	Good	Concrete	No	None
At HAMILTON STREET		2 Ramps				
208.1	No	No	Fair	Concrete	Yes	Curbing
208.2	No	No	Fair	Concrete	No	None
At HARDY STREET		1 Ramps				
229.2	Yes	No	Good	Concrete	No	None
At LAKE ROAD		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
202.1	No	No	Good	Concrete	No	None
At LOVERING AVENUE		2 Ramps				
207.4	No	No	Fair	Concrete	No	None
207.5	No	No	Fair	Concrete	No	None
At PINECREST ROAD		1 Ramps				
207.3	No	No	Fair	Concrete	No	None
At SAXONY TERRACE		2 Ramps				
203.1	No	No	Good	Concrete	No	None
203.2	No	No	Good	Concrete	Yes	Curbing
At SPEEN STREET		2 Ramps				
223.1	Yes	No	Good	Concrete	No	None
223.2	Yes	No	Good	Concrete	Yes	Utility Access
OLD WORCESTER ROAD		**1 Ramps**				
At TEMPLE STREET		1 Ramps				
341.1	Yes	No	Good	Concrete	Yes	Utillity Pole
PARKING LOT		**1 Ramps**				
At OLD CONNECTICUT PATH		1 Ramps				
223.7	Yes	No	Good	Concrete	No	None
PINECREST ROAD		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
207.1	No	No	Fair	Concrete	No	None
207.2	No	No	Fair	Concrete	No	None
PLEASANT STREET		**1 Ramps**				
At ARNOLD ROAD		1 Ramps				
329.1	Yes	No	Good	Concrete	Yes	Utillity Pole
POTTER ROAD		**2 Ramps**				
At SCHOOL ENTRANCE		1 Ramps				
162.3	Yes	No	Fair	Concrete	No	None
At WATER STREET		1 Ramps				
115.2	Yes	No	Good	Concrete	No	None
RANDY ROAD		**2 Ramps**				
At HARDY STREET		2 Ramps				
232.1	Yes	No	Good	Concrete	No	None
232.2	Yes	No	Good	Concrete	No	None
ROSE KENNEDY LANE		**1 Ramps**				
At NORMANDY ROAD EXTENSION		1 Ramps				
516.1	Yes	No	Good	Concrete	No	None
SCHOOL STREET		**1 Ramps**				
At OLD CONNECTICUT PATH		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
204.2	No	No	Good	Concrete	No	None
SEALTEST DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
224.1	Yes	No	Good	Concrete	Yes	Utility Access
224.2	Yes	No	Good	Concrete	Yes	Utility Access
SPEEN STREET		**3 Ramps**				
At COCHITUATE ROAD		1 Ramps				
252.4	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
223.3	Yes	No	Good	Concrete	No	None
223.4	Yes	No	Good	Concrete	No	None
WATER STREET		**3 Ramps**				
At EDGELL ROAD		1 Ramps				
121.3	Yes	No	Good	Concrete	No	None
At LIBRARY ENTRANCE		2 Ramps				
119.2	Yes	No	Good	Concrete	No	None
119.3	Yes	Yes	Good	Concrete	No	None
WINTER STREET		**1 Ramps**				
At WORCESTER ROAD		1 Ramps				
379.1	Yes	No	Good	Concrete	No	None
WINTHROP STREET		**1 Ramps**				
At BETHANY ROAD		1 Ramps				
553.4	Yes	No	Good	Concrete	No	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Total: 10

Ramp Locations With Obstructions

		Obstruction	Obstruction Type	Material
COCHITUATE ROAD	**1 Ramps Total**			
At SPEEN STREET	1 Ramps			
252.3		Yes	Curbing	Concrete
HAMILTON STREET	**1 Ramps Total**			
At OLD CONNECTICUT PATH	1 Ramps			
208.4		Yes	Curbing	Concrete
OAK CREST DRIVE	**1 Ramps Total**			
At OLD WORCESTER ROAD	1 Ramps			
346.1		Yes	Curbing	Concrete
OLD CONNECTICUT PATH	**3 Ramps Total**			
At HAMILTON STREET	1 Ramps			
208.1		Yes	Curbing	Concrete
At SAXONY TERRACE	1 Ramps			
203.2		Yes	Curbing	Concrete
At SPEEN STREET	1 Ramps			
223.2		Yes	Utility Access	Concrete
OLD WORCESTER ROAD	**1 Ramps Total**			
At TEMPLE STREET	1 Ramps			
341.1		Yes	Utillity Pole	Concrete
PLEASANT STREET	**1 Ramps Total**			
At ARNOLD ROAD	1 Ramps			
329.1		Yes	Utillity Pole	Concrete
SEALTEST DRIVE	**2 Ramps Total**			
At OLD CONNECTICUT PATH	2 Ramps			
224.1		Yes	Utility Access	Concrete
224.2		Yes	Utility Access	Concrete

City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	323.1
Street:	**AUBURN STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	323.2
Street:	**AUBURN STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	296.1
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	296.2
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	499.3
Street:	**BEAVER STREET**
Intersecting Street:	BLANDIN AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.5
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.6
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.1
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.2
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	209.1
Street:	**CAPRI DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	209.2
Street:	**CAPRI DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.2
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	252.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	231.1
Street:	**DEBRA LANE**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	231.2
Street:	**DEBRA LANE**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.2
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	175.2
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	206.1
Street:	**FENTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	206.2
Street:	**FENTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	208.3
Street:	**HAMILTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	208.4
Street:	**HAMILTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	231.4
Street:	**HARDY STREET**
Intersecting Street:	DEBRA LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	309.1
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	309.4
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	251.1
Street:	**NEWBURY STREET**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	517.1
Street:	**NORMANDY ROAD**
Intersecting Street:	ARSENAL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	346.1
Street:	**OAK CREST DRIVE**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	198.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROSSI CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	202.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LAKE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	203.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SAXONY TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	203.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SAXONY TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	205.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CHAPPELLWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	207.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PINECREST ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LOVERING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LOVERING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



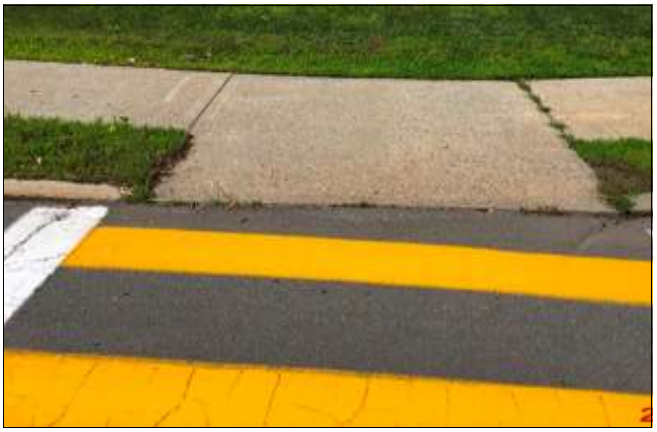
Ramp ID:	208.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	208.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROWNLEA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	223.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	223.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	229.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	341.1
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	223.7
Street:	**PARKING LOT**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	207.1
Street:	**PINECREST ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.2
Street:	**PINECREST ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	329.1
Street:	**PLEASANT STREET**
Intersecting Street:	ARNOLD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	115.2
Street:	**POTTER ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.3
Street:	**POTTER ROAD**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	232.1
Street:	**RANDY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	232.2
Street:	**RANDY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.1
Street:	**ROSE KENNEDY LANE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	204.2
Street:	**SCHOOL STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	224.1
Street:	**SEALTEST DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	224.2
Street:	**SEALTEST DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	223.3
Street:	**SPEEN STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	223.4
Street:	**SPEEN STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	252.4
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.2
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.3
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.3
Street:	**WATER STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	379.1
Street:	**WINTER STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.4
Street:	**WINTHROP STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Compliance - By Street With Inspection Data **Total: 19**

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
AUBURN STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
323.2	Concrete	Good	Yes	No	60	1.7	65	60	5.1	0	0	60	4.1	0	0	None
BETHANY ROAD			***1 Ramps***													
At WINTHROP STREET			1 Ramps													
553.6	Concrete	Good	Yes	No	60	1.1	79	74	3.7	0	0	72	8.3	0	0	None
DEBRA LANE			***1 Ramps***													
At HARDY STREET			1 Ramps													
231.1	Concrete	Good	Yes	No	65	0.4	76	72	6.4	72	60	72	4.1	72	60	None
EDGELL ROAD			***1 Ramps***													
At WATER STREET			1 Ramps													
121.2	Concrete	Good	Yes	No	60	0.7	60	60	8.3	60	60	60	2.4	0	0	None
ELM STREET			***1 Ramps***													
At POTTER ROAD			1 Ramps													
175.2	Concrete	Good	Yes	No	61	1.9	62	0	0	0	0	65	4.3	77	60	None
NEWBURY STREET			***1 Ramps***													
At SPEEN STREET			1 Ramps													
251.1	Concrete	Good	Yes	No	60	1.9	65	0	0	0	0	60	6.5	60	60	None
NORMANDY ROAD			***1 Ramps***													
At ARSENAL ROAD			1 Ramps													
517.1	Concrete	Good	Yes	No	60	2	80	78	6.1	72	60	72	2.5	84	60	None
OLD WORCESTER ROAD			***1 Ramps***													
At TEMPLE STREET			1 Ramps													
341.1	Concrete	Good	Yes	No	75	1.2	68	76	6.1	0	0	80	2.5	0	0	Utillity Pole

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
PARKING LOT			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
223.7	Concrete	Good	Yes	No	60	0.5	60	55	2.8	0	0	0	0	0	0	None
PLEASANT STREET			***1 Ramps***													
At ARNOLD ROAD			1 Ramps													
329.1	Concrete	Good	Yes	No	83	1.1	61	56	2.6	56	60	58	8.3	60	60	Utillity Pole
POTTER ROAD			***2 Ramps***													
At SCHOOL ENTRANCE			1 Ramps													
162.3	Concrete	Fair	Yes	No	60	0.6	54	54	1.9	54	48	0	0	0	0	None
At WATER STREET			1 Ramps													
115.2	Concrete	Good	Yes	No	79	1.2	62	62	5.7	62	60	62	3.8	62	60	None
RANDY ROAD			***1 Ramps***													
At HARDY STREET			1 Ramps													
232.2	Concrete	Good	Yes	No	64	1.1	78	72	5.7	0	0	72	7.2	80	60	None
SPEEN STREET			***2 Ramps***													
At COCHITUATE ROAD			1 Ramps													
252.4	Concrete	Good	Yes	No	64	1.2	60	55	5.9	58	60	56	3.3	38	60	None
At OLD CONNECTICUT PATH			1 Ramps													
223.4	Concrete	Good	Yes	No	62	1.8	66	60	7.1	60	60	0	0	0	0	None
WATER STREET			***2 Ramps***													
At EDGELL ROAD			1 Ramps													
121.3	Concrete	Good	Yes	No	50	0.2	64	62	7.1	60	60	66	1.7	66	48	None
At LIBRARY ENTRANCE			1 Ramps													
119.2	Concrete	Good	Yes	No	312	1.8	60	60	4.7	60	60	70	4.9	72	60	None
WINTER STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
379.1	Concrete	Good	Yes	No	60	0.5	70	60	3.2	0	0	78	5.1	100	60	None
WINTHROP STREET			***1 Ramps***													

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
At BETHANY ROAD			1 Ramps													
553.4	Concrete	Good	Yes	No	60	1	77	70	7.1	70	60	70	3.8	70	60	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Non-Compliance - By Street With Inspection Data Total: 43

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
AUBURN STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
323.1	Concrete	Good	Yes	No	60	2.5	65	60	3.6	60	60	60	3.7	60	60	None
BEACON STREET			***2 Ramps***													
At FAIRBANKS STREET			2 Ramps													
296.1	Concrete	Good	Yes	No	75	1.2	72	60	2.8	60	60	64	4.6	64	24	None
296.2	Concrete	Good	Yes	Yes	75	3.3	80	76	6.8	0	0	75	1.2	75	60	None
BEAVER STREET			***1 Ramps***													
At BLANDIN AVENUE			1 Ramps													
499.3	Concrete	Good	Yes	Yes	60	1.3	74	68	6.3	66	60	70	4.9	66	60	None
BETHANY ROAD			***1 Ramps***													
At WINTHROP STREET			1 Ramps													
553.5	Concrete	Good	Yes	No	60	2.2	77	72	4.8	72	60	70	2.3	70	60	None
BRIDGES STREET EXTENSION			***2 Ramps***													
At WINTHROP STREET			2 Ramps													
555.1	Concrete	Good	Yes	No	58	2.4	77	68	5.7	65	60	78	3.1	57	60	None
555.2	Concrete	Good	Yes	No	60	3.6	75	65	6.1	66	60	68	2.4	66	60	None
CAPRI DRIVE			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
209.1	Concrete	Fair	No	No	52	0.9	55	55	1.6	55	60	58	9.1	0	0	None
209.2	Concrete	Fair	No	No	57	1.6	54	54	1.8	64	60	39	7.8	55	60	None
COCHITUATE ROAD			***2 Ramps***													
At SPEEN STREET			2 Ramps													
252.2	Concrete	Good	Yes	No	60	3.1	67	70	1	70	60	57	7.7	62	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
252.3	Concrete	Good	Yes	No	64	1.9	55	50	4.3	55	60	50	1.1	50	60	Curbing
DEBRA LANE		***1 Ramps***														
At HARDY STREET		1 Ramps														
231.2	Concrete	Good	Yes	No	60	2.5	80	72	4.1	72	60	72	5.8	72	60	None
FENTON STREET		***2 Ramps***														
At OLD CONNECTICUT PATH		2 Ramps														
206.1	Concrete	Good	No	No	48	2.4	82	80	4.6	0	0	86	4.5	96	60	None
206.2	Concrete	Good	No	No	48	1.6	86	82	5.2	82	60	80	7.3	0	0	None
HAMILTON STREET		***2 Ramps***														
At OLD CONNECTICUT PATH		2 Ramps														
208.3	Concrete	Fair	No	No	75	3	69	64	1.7	64	60	57	5.2	80	48	None
208.4	Concrete	Fair	No	No	66	0.1	104	108	3.5	58	60	86	3.3	74	60	Curbing
HARDY STREET		***1 Ramps***														
At DEBRA LANE		1 Ramps														
231.4	Concrete	Good	Yes	No	66	3.5	82	75	3.5	75	60	75	5.2	0	0	None
KELLOGG STREET		***2 Ramps***														
At CENTRAL STREET		2 Ramps														
309.1	Concrete	Fair	No	No	64	3.9	65	64	0.1	64	60	64	6.4	64	60	None
309.4	Concrete	Poor	No	No	60	1.8	64	57	3.7	0	0	58	6.7	62	60	None
OAK CREST DRIVE		***1 Ramps***														
At OLD WORCESTER ROAD		1 Ramps														
346.1	Concrete	Good	Yes	No	60	2.4	64	60	7.8	0	0	0	0	0	0	Curbing
OLD CONNECTICUT PATH		***14 Ramps***														
At BROSSI CIRCLE		1 Ramps														
198.2	Concrete	Good	Yes	No	66	2.9	88	77	5.2	0	0	87	1.5	0	0	None
At BROWNLEA ROAD		1 Ramps														
210.4	Concrete	Fair	No	No	77	0.7	82	50	2.2	50	60	50	7.7	50	60	None
At CHAPPELLWOOD ROAD		1 Ramps														

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
205.1	Concrete	Good	No	No	48	3.1	96	100	7.6	55	60	100	3.9	58	60	None
At HAMILTON STREET			2 Ramps													
208.1	Concrete	Fair	No	No	85	2.3	84	79	8.7	58	60	48	1.7	48	60	Curbing
208.2	Concrete	Fair	No	No	49	2.7	126	117	0.7	117	60	59	2.7	59	60	None
At HARDY STREET			1 Ramps													
229.2	Concrete	Good	Yes	No	48	0.6	82	75	7.4	80	60	78	8.8	78	60	None
At LAKE ROAD			1 Ramps													
202.1	Concrete	Good	No	No	60	2.8	60	65	4.7	65	54	64	3.1	65	60	None
At LOVERING AVENUE			2 Ramps													
207.4	Concrete	Fair	No	No	53	3	80	72	5.8	65	62	76	1.9	76	57	None
207.5	Concrete	Fair	No	No	50	1.1	87	86	5.8	93	60	80	3.5	72	60	None
At PINECREST ROAD			1 Ramps													
207.3	Concrete	Fair	No	No	70	4.3	70	55	3	65	62	68	2.7	68	44	None
At SAXONY TERRACE			2 Ramps													
203.1	Concrete	Good	No	No	46	3.7	76	70	1.3	63	60	82	7.8	0	0	None
203.2	Concrete	Good	No	No	48	1.1	68	66	5.3	60	60	60	3.4	0	0	Curbing
At SPEEN STREET			2 Ramps													
223.1	Concrete	Good	Yes	No	60	2.4	64	48	4.5	60	60	60	7.1	0	0	None
223.2	Concrete	Good	Yes	No	60	1.9	67	60	9.2	0	0	0	0	0	0	Utility Access
PINECREST ROAD			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
207.1	Concrete	Fair	No	No	58	4.6	80	75	3.5	0	0	72	8.7	0	0	None
207.2	Concrete	Fair	No	No	58	3.4	75	67	8.5	0	0	0	0	0	0	None
RANDY ROAD			***1 Ramps***													
At HARDY STREET			1 Ramps													
232.1	Concrete	Good	Yes	No	48	3.9	72	70	5.8	78	60	72	9.5	68	60	None
ROSE KENNEDY LANE			***1 Ramps***													
At NORMANDY ROAD EXTENSION			1 Ramps													
516.1	Concrete	Good	Yes	No	68	4.2	80	70	5.2	0	0	75	3.8	75	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
SCHOOL STREET			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
204.2	Concrete	Good	No	No	48	0.7	70	65	2.2	70	60	62	8.5	0	0	None
SEALTEST DRIVE			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
224.1	Concrete	Good	Yes	No	59	0.3	64	0	0	0	0	60	9.2	60	60	Utility Access
224.2	Concrete	Good	Yes	No	58	2.3	72	66	9.9	66	60	66	6.6	66	60	Utility Access
SPEEN STREET			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
223.3	Concrete	Good	Yes	No	60	2.1	66	60	8.3	0	0	60	4.3	0	0	None
WATER STREET			***1 Ramps***													
At LIBRARY ENTRANCE			1 Ramps													
119.3	Concrete	Good	Yes	Yes	70	1.1	60	60	5.2	60	60	60	4.5	60	60	None

City of Framingham, Massachusetts

Concrete Ramps with no warning panel and/or repairable obstruction

Curb Ramp Inventory & Assessment

Ramp Retrofit - By Street With Inspection Data

Total: 20

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
BEACON STREET			***1 Ramps***													
At FAIRBANKS STREET			1 Ramps													
296.2	Concrete	Good	Yes	Yes	75	3.3	80	76	6.8	0	0	75	1.2	75	60	None
BEAVER STREET			***1 Ramps***													
At BLANDIN AVENUE			1 Ramps													
499.3	Concrete	Good	Yes	Yes	60	1.3	74	68	6.3	66	60	70	4.9	66	60	None
CAPRI DRIVE			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
209.2	Concrete	Fair	No	No	57	1.6	54	54	1.8	64	60	39	7.8	55	60	None
COCHITUATE ROAD			***1 Ramps***													
At SPEEN STREET			1 Ramps													
252.3	Concrete	Good	Yes	No	64	1.9	55	50	4.3	55	60	50	1.1	50	60	Curbing
FENTON STREET			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
206.1	Concrete	Good	No	No	48	2.4	82	80	4.6	0	0	86	4.5	96	60	None
206.2	Concrete	Good	No	No	48	1.6	86	82	5.2	82	60	80	7.3	0	0	None
HAMILTON STREET			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
208.3	Concrete	Fair	No	No	75	3	69	64	1.7	64	60	57	5.2	80	48	None
208.4	Concrete	Fair	No	No	66	0.1	104	108	3.5	58	60	86	3.3	74	60	Curbing
KELLOGG STREET			***2 Ramps***													
At CENTRAL STREET			2 Ramps													
309.1	Concrete	Fair	No	No	64	3.9	65	64	0.1	64	60	64	6.4	64	60	None
309.4	Concrete	Poor	No	No	60	1.8	64	57	3.7	0	0	58	6.7	62	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
OAK CREST DRIVE			***1 Ramps***													
At OLD WORCESTER ROAD			1 Ramps													
346.1	Concrete	Good	Yes	No	60	2.4	64	60	7.8	0	0	0	0	0	0	Curbing
OLD CONNECTICUT PATH			***8 Ramps***													
At BROWNLEA ROAD			1 Ramps													
210.4	Concrete	Fair	No	No	77	0.7	82	50	2.2	50	60	50	7.7	50	60	None
At CHAPPELLWOOD ROAD			1 Ramps													
205.1	Concrete	Good	No	No	48	3.1	96	100	7.6	55	60	100	3.9	58	60	None
At HAMILTON STREET			1 Ramps													
208.2	Concrete	Fair	No	No	49	2.7	126	117	0.7	117	60	59	2.7	59	60	None
At LAKE ROAD			1 Ramps													
202.1	Concrete	Good	No	No	60	2.8	60	65	4.7	65	54	64	3.1	65	60	None
At LOVERING AVENUE			2 Ramps													
207.4	Concrete	Fair	No	No	53	3	80	72	5.8	65	62	76	1.9	76	57	None
207.5	Concrete	Fair	No	No	50	1.1	87	86	5.8	93	60	80	3.5	72	60	None
At PINECREST ROAD			1 Ramps													
207.3	Concrete	Fair	No	No	70	4.3	70	55	3	65	62	68	2.7	68	44	None
At SAXONY TERRACE			1 Ramps													
203.2	Concrete	Good	No	No	48	1.1	68	66	5.3	60	60	60	3.4	0	0	Curbing
WATER STREET			***1 Ramps***													
At LIBRARY ENTRANCE			1 Ramps													
119.3	Concrete	Good	Yes	Yes	70	1.1	60	60	5.2	60	60	60	4.5	60	60	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Intersections With Sidewalks and No Ramps - Summary

	Number of Potential Ramps	Estimated Cost
ANGELA ROAD	2	$7,000.00
ANGELICA DRIVE	10	$35,000.00
ARBETTER DRIVE	1	$3,500.00
BACON ROAD	2	$7,000.00
BADGER ROAD	1	$3,500.00
BALDWIN AVENUE	4	$14,000.00
BEACON STREET	3	$10,500.00
BELKNAP ROAD	1	$3,500.00
BELLWOOD ROAD	1	$3,500.00
BERKELEY ROAD	10	$35,000.00
BETHANY ROAD	1	$3,500.00
BLACKBERRY LANE	4	$14,000.00
BROOK STREET	1	$3,500.00
CENTRAL STREET	2	$7,000.00
CHURCH STREET	1	$3,500.00
CLEARVIEW DRIVE	1	$3,500.00
CROSBY DRIVE	4	$14,000.00
DANA ROAD	1	$3,500.00
DANIELS ROAD	1	$3,500.00
EATON ROAD	1	$3,500.00
EDGELL ROAD	3	$10,500.00
EISENHOWER ROAD	1	$3,500.00
FAIRBANKS ROAD	4	$14,000.00
GRATTAN STREET	2	$7,000.00
GRIFFIN ROAD	2	$7,000.00
GROVE STREET	1	$3,500.00
GRZYBOSKA CIRCLE	1	$3,500.00
HARRISON STREET	2	$7,000.00
HASTINGS STREET	1	$3,500.00
HEMENWAY ROAD	3	$10,500.00
HICKEY DRIVE	5	$17,500.00
JOANNE DRIVE	1	$3,500.00
KELLOGG STREET	2	$7,000.00
KNIGHT ROAD	3	$10,500.00
LANEWOOD AVENUE	6	$21,000.00
LAVELLE LANE	2	$7,000.00
LEDGEWOOD ROAD	7	$24,500.00
MARY AGNES ROAD	2	$7,000.00
MCCARTHY CIRCLE	1	$3,500.00
MILLWOOD STREET	2	$7,000.00
OLD CONNECTICUT PATH	6	$21,000.00
PARMENTER ROAD	1	$3,500.00
PLEASANT STREET	3	$10,500.00
POTTER ROAD	1	$3,500.00
ROYAL MEADOW LANE	1	$3,500.00
RUSSELL ROAD	1	$3,500.00
SALEM END ROAD	10	$35,000.00
SANDRA DRIVE	1	$3,500.00

	Number of Potential Ramps	Estimated Cost
SCHOOL STREET	19	$66,500.00
SUMMER STREET	2	$7,000.00
SUN VALLEY DRIVE	2	$7,000.00
VALLENCOURT DRIVE	6	$21,000.00
WATER STREET	1	$3,500.00
WAVENEY ROAD	1	$3,500.00
WESTGATE ROAD	4	$14,000.00
WILLOW BROOK DRIVE	4	$14,000.00
WINTER STREET	9	$31,500.00
WOODMERE ROAD	4	$14,000.00
Total:	179	Total: $626,500.00

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Intersections With Sidewalks and No Ramps

		Number of Potential Ramps	Cost ($3,500 ea.)
ANGELA ROAD	**1 Locations**		
At ELM STREET			
172		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
ANGELICA DRIVE	**5 Locations**		
At ALAN STREET			
63		2	$7,000.00
At CURRIER DRIVE			
64		2	$7,000.00
At LANEWOOD AVENUE			
60		2	$7,000.00
At STANLEY DRIVE			
62		2	$7,000.00
At WAVENEY WAY			
61		2	$7,000.00
		Estimated Street Total Cost:	**$35,000.00**
ARBETTER DRIVE	**1 Locations**		
At SLOANE DRIVE			
145		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BACON ROAD	**1 Locations**		
At MONTGOMERY DRIVE			
122		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
BADGER ROAD	**1 Locations**		
At LOUIS W. FARLEY DRIVE			
389		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BALDWIN AVENUE	**2 Locations**		
At KAREN ROAD			
137		2	$7,000.00
At NOB HILL ROAD			
138		2	$7,000.00
		Estimated Street Total Cost:	**$14,000.00**
BEACON STREET	**2 Locations**		

		Number of Potential Ramps	Cost ($3,500 ea.)
At CHUBB ROAD			
278		1	$3,500.00
At RIDGEFIELD ROAD			
282		2	$7,000.00
		Estimated Street Total Cost:	**$10,500.00**
BELKNAP ROAD	**1 Locations**		
At WOODMERE ROAD			
32		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BELLWOOD ROAD	**1 Locations**		
At CLEARVIEW DRIVE			
39		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BERKELEY ROAD	**2 Locations**		
At JOANNE DRIVE			
34		4	$14,000.00
At WOODMERE ROAD			
33		6	$21,000.00
		Estimated Street Total Cost:	**$35,000.00**
BETHANY ROAD	**1 Locations**		
At BARBIERI ROAD			
552		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BLACKBERRY LANE	**4 Locations**		
At BANCROFT CIRCLE			
16		1	$3,500.00
At BIRCHMEADOW CIRCLE			
17		1	$3,500.00
At BLUEBERRY CIRCLE			
18		1	$3,500.00
At GROVE STREET			
19		1	$3,500.00
		Estimated Street Total Cost:	**$14,000.00**
BROOK STREET	**1 Locations**		
At BROOKVALE ROAD			
91		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
CENTRAL STREET	**1 Locations**		
At HIGHGATE ROAD			

	Number of Potential Ramps	Cost ($3,500 ea.)
305	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**
CHURCH STREET **1 Locations**		
At STATE STREET		
382	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
CLEARVIEW DRIVE **1 Locations**		
At BERKELEY ROAD		
38	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
CROSBY DRIVE **1 Locations**		
At CAVATORTA DRIVE		
337	4	$14,000.00
	Estimated Street Total Cost:	**$14,000.00**
DANA ROAD **1 Locations**		
At LOCKLAND AVENUE		
292	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
DANIELS ROAD **1 Locations**		
At SLOANE DRIVE		
151	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
EATON ROAD **1 Locations**		
At MARY AGNES ROAD		
158	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
EDGELL ROAD **2 Locations**		
At BAYBERRY LANE		
127	1	$3,500.00
At BELKNAP ROAD		
53	2	$7,000.00
	Estimated Street Total Cost:	**$10,500.00**
EISENHOWER ROAD **1 Locations**		
At CATHERINE ROAD		
155	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
FAIRBANKS ROAD **1 Locations**		
At COCHITUATE ROAD		

		Number of Potential Ramps	Cost ($3,500 ea.)
294		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
GRATTAN STREET	**1 Locations**		
At CAVATORTA DRIVE			
336		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
GRIFFIN ROAD	**2 Locations**		
At ELMFIELD ROAD			
179		1	$3,500.00
At TEMI ROAD			
180		1	$3,500.00
		Estimated Street Total Cost:	**$7,000.00**
GROVE STREET	**1 Locations**		
At LAVELLE LANE			
20		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
GRZYBOSKA CIRCLE	**1 Locations**		
At GRZYBOSKA CIRCLE			
369		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
HARRISON STREET	**1 Locations**		
At DYER STREET			
519		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
HASTINGS STREET	**1 Locations**		
At PITT ROAD			
263		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
HEMENWAY ROAD	**2 Locations**		
At COLONIAL DRIVE			
153		1	$3,500.00
At WHITTEMORE ROAD			
139		2	$7,000.00
		Estimated Street Total Cost:	**$10,500.00**
HICKEY DRIVE	**2 Locations**		
At PLEASANT STREET			
29		1	$3,500.00
At VALLENCOURT DRIVE			

		Number of Potential Ramps	Cost ($3,500 ea.)
25		4	$14,000.00
		Estimated Street Total Cost:	**$17,500.00**
JOANNE DRIVE	**1 Locations**		
At WOODMERE ROAD			
35		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
KELLOGG STREET	**1 Locations**		
At PROSPECT STREET			
308		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
KNIGHT ROAD	**2 Locations**		
At BELKNAP ROAD			
42		2	$7,000.00
At BELLWOOD WAY			
43		1	$3,500.00
		Estimated Street Total Cost:	**$10,500.00**
LANEWOOD AVENUE	**3 Locations**		
At ALAN STREET			
68		2	$7,000.00
At ROLLING DRIVE			
67		2	$7,000.00
At STANLEY DRIVE			
69		2	$7,000.00
		Estimated Street Total Cost:	**$21,000.00**
LAVELLE LANE	**1 Locations**		
At SURRO DRIVE			
21		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
LEDGEWOOD ROAD	**3 Locations**		
At BRIDLE PATH CIRCLE			
72		2	$7,000.00
At CURRIER DRIVE			
70		1	$3,500.00
At ROLLING DRIVE			
71		4	$14,000.00
		Estimated Street Total Cost:	**$24,500.00**
MARY AGNES ROAD	**1 Locations**		
At CATHERINE ROAD			

	Number of Potential Ramps	Cost ($3,500 ea.)
156	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**

MCCARTHY CIRCLE — 1 Locations

At SALEM END ROAD		
394	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

MILLWOOD STREET — 1 Locations

At BLACKBERRY LANE		
15	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**

OLD CONNECTICUT PATH — 3 Locations

At GREENLEAF CIRCLE		
226	4	$14,000.00
At OLD CONNECTICUT PATH		
225	1	$3,500.00
At ROYCE ROAD #2		
257	1	$3,500.00
	Estimated Street Total Cost:	**$21,000.00**

PARMENTER ROAD — 1 Locations

At DARTMOUTH DRIVE		
2	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

PLEASANT STREET — 2 Locations

At ASPEN CIRCLE		
330	1	$3,500.00
At CHURCH GREEN		
326	2	$7,000.00
	Estimated Street Total Cost:	**$10,500.00**

POTTER ROAD — 1 Locations

At LARNIS ROAD		
178	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

ROYAL MEADOW LANE — 1 Locations

At PLEASANT STREET		
28	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

RUSSELL ROAD — 1 Locations

At SALEM END ROAD		

	Number of Potential Ramps	Cost ($3,500 ea.)
372	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
SALEM END ROAD **8 Locations**		
At ADAMS ROAD		
376	2	$7,000.00
At GRZYBOSKA CIRCLE		
363	1	$3,500.00
364	1	$3,500.00
At LANTERN ROAD		
390	1	$3,500.00
At LINWOOD ROAD		
393	1	$3,500.00
At SALEM END WAY		
371	1	$3,500.00
At STALKER LANE		
392	1	$3,500.00
At TEMPLE STREET		
367	2	$7,000.00
	Estimated Street Total Cost:	**$35,000.00**
SANDRA DRIVE **1 Locations**		
At SLOANE DRIVE		
150	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
SCHOOL STREET **7 Locations**		
At COLBY AVENUE		
212	2	$7,000.00
At COTTAGE STREET		
216	4	$14,000.00
At FENTON STREET		
214	1	$3,500.00
At FENWOOD STREET		
213	2	$7,000.00
At MEADOW STREET		
215	2	$7,000.00
At NORTH STREET		
217	4	$14,000.00
At PARKING LOT		
218	4	$14,000.00
	Estimated Street Total Cost:	**$66,500.00**

		Number of Potential Ramps	Cost ($3,500 ea.)
SUMMER STREET	**1 Locations**		
At HIGHGATE ROAD			
304		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
SUN VALLEY DRIVE	**1 Locations**		
At SUN DIAL PLACE			
332		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
VALLENCOURT DRIVE	**2 Locations**		
At FORD LANE			
26		4	$14,000.00
At PLEASANT STREET			
24		2	$7,000.00
		Estimated Street Total Cost:	**$21,000.00**
WATER STREET	**1 Locations**		
At RINER STREET			
112		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
WAVENEY ROAD	**1 Locations**		
At WAVENEY WAY			
58		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
WESTGATE ROAD	**1 Locations**		
At OLD WOOD ROAD			
345		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
WILLOW BROOK DRIVE	**3 Locations**		
At FOOTHILL ROAD			
395		2	$7,000.00
At PARKER ROAD			
396		1	$3,500.00
At SALEM END ROAD			
391		1	$3,500.00
		Estimated Street Total Cost:	**$14,000.00**
WINTER STREET	**5 Locations**		
At CREST ROAD			
397		4	$14,000.00
398		2	$7,000.00

		Number of Potential Ramps	Cost ($3,500 ea.)
At	RUSSELL ROAD EXTENSION		
385		1	$3,500.00
At	WINTER LANE		
383		1	$3,500.00
At	WINTER TERRACE		
384		1	$3,500.00
		Estimated Street Total Cost:	**$31,500.00**

WOODMERE ROAD 1 Locations

At	DOYLE CIRCLE		
36		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
		Total Estimated Cost:	**$626,500.00**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 9

(1) **PROJECT NAME:** Catchment Investigations (MS4 Permit) FY24
PROJECT STATUS:

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This project will provide funds to assist with compliance with the National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) permit requirements. Specifically, this project will provide consultant and contractor services for catchment investigations (i.e. inspections of the drainage system to identify pollution sources and asses infrastructure). The City of Framingham is required to operate its storm sewer system under a permit from the US EPA. The permit requires the City to complete catchment investigations. In addition to water quality benefits, this work will help the City improve asset management of drainage infrastructure. Non-compliance could result in adminstrative orders or fines.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility	230,000					
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	230,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Free Cash**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

City-wide

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
DEPARTMENT OF PUBLIC WORKS

100 Western Avenue
Framingham, MA 01702
www.framinghamma.gov

To:	Mr. William Sedewitz, P.E.; Robert Sheldon, P.E.
From:	Alison L. Eliot, P.E., L.S.P., Senior Stormwater & Environmental Engineer
Cc:	Eric Johnson, P.E.
Date:	October 14, 2022
Re:	FY24 Capital Improvements Project Request – Catchment Investigations

Project Description – This project will provide funds to assist with compliance with the National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) permit requirements. Specifically, this project will provide consultant and contractor services for catchment investigations (i.e. inspections of the drainage system to identify pollution sources and asses infrastructure). The City of Framingham is required to operate its storm sewer system under a permit from the US EPA. The permit requires the City to complete catchment investigations. In addition to water quality benefits, this work will help the City improve asset management of drainage infrastructure. Non-compliance could result in adminstrative orders or fines.

Project Justification – Compliance with the Environmental Protection Agency (EPA)'s NPDES MS4 permit, an unfunded federal mandate, is required to operate the City's drainage system. The focus of this permit is improving water quality from stormwater runoff, which is the primary source of water pollution in Framingham and causes beach closures and other negative impacts to Framingham. The City is required to report annually to the EPA and MassDEP on the status of our compliance with these deadlines. Deferring work and associated funding could result in non-compliance which may result in violations and fines.

Project Budget – The estimated total cost associated with the aforementioned project is **$230,000**.

Operating impact – This investment is needed to continue complying with the NPDES MS4 permit requirements. Without additional operational funding or staff to support compliance requirements, DPW needs to hire consultants to complete the compliance work. Otherwise, DPW Highway and Engineering staff and equipment will need to be diverted from other activities (i.e. cleaning and fixing drains, roadway and sidewalk improvements, etc.) to complete this work. This would result in deferred maintenance which increases the risk of failure of the City's infrastructure.

FY'24 Catchment Investigations	
Total Number of Catchments Citywide All catchments inspections need to be COMPLETED by FY28	491
Estimated number of catchments to be inspected/completed in FY'24	75
Estimate $3,000/ catchment. Catchment sizes and needs will vary affecting the cost per catchment. Catchment investigations require consultant field time, laboratory sampling & equipment, police details, CCTV, and consultant reporting.	$ 225,000.00
Request Amount	**$230,000**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 4

(1) **PROJECT NAME:** Cedar Street area roadway - Construction FY24
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This appropriation will fund roadway, sidewalk and drainage improvements on Avon Street, Cedar Street, Charles Street, Claflin Street, Hayes Street, Highland Street and Pine Street. The locations in this request have been identified for rehabilitation in the City's Pavement Management Program. This work will follow utility upgrades in the area including recently completed gas work and proposed FY23 Water Work.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	2,850,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	2,850,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Cedar Street and general area

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

FY24 Cedar Street Roadway, Sidewalk and Drains

This appropriation will fund roadway, sidewalk and drainage improvements on Avon Street, Cedar Street, Charles Street, Claflin Street, Hayes Street, Highland Street and Pine Street.
The preliminary estimate of $2,819,520 is based upon the current Unit Price Roadway Contract.

See attached photos for existing roadway and sidewalk condition.

Claflin Street at Hayes Street



Pine Street at Cedar Street



Charles Street



CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 2

(1) **PROJECT NAME:** Consolidated Vehicle/Equipment - General Fund FY24
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

Vehicle and equipment per Public Work's vehicle management and replacement schedule. The procurement and upkeep of equipment is a significant factor in providing cost-effective and reliable service for systems operation, maintenance, repair, rehabilitation and replacements. All vehicles and equipment are managed through the Fleet Department and included within a replacement schedule according to specific criteria, such as age, mileage, and major repairs needed for continued reliable service. Industry and Framingham DPW experience indicates that above those thresholds maintenance increases substantially to assure service reliability, as do major repairs, none of which provide a return on investment, and they are not sustainable with the current DPW facility and staffing. In addition to daily service for the various Divisions, nearly all vehicles and equipment are used for the Department's snow and ice management program which is particularly destructive to vehicles.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
X	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction						
e.	Equipment/Vehicles	1,940,000	2,965,000	1,627,000	1,000,000	1,950,000	
f.	Contingency						
g.	Other						
	TOTAL	1,940,000	2,965,000	1,627,000	1,000,000	1,950,000	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Free Cash**
2) **Bond**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

(11) **ASSET TYPE:**

(7a)	**POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**
(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

Public Works - Proposed FY2024 Vehicle & Equipment Capital Requests

GENERAL FUND

Priority	Unit #	Division Assignment	Year	Make	Description	Life (Yrs)	Replacement Due	Replacement Amount
1	517	Sanitation	2015	PETERBILT	72,000 GVW C & C W/SIDE LOADER PACKER & PLOW	8	2023	$410,000.00
2	230	Lighting & Signals	1995	IHC	40' AERIAL LIFT W/SERVICE BODY	15	2010	$320,000.00
3	501	Sanitation	2012	FORD	F150-7,700 GVW 4WD P/U TRK	10	2022	$55,000.00
4	409	Highway	2008	FORD	F550-15,000 GVW 4 WD C&C W/RACK BODY&PLOW	15	2023	$75,000.00
5	410	Highway	2012	FORD	F550-15,000 GVW 4WD C&C W/DUMP BODY&PLOW	12	2024	$75,000.00
6	418	Highway	2012	FORD	F350-11,000 GVW 4 WD C&C W/UTL BODY & PLOW	12	2024	$75,000.00
7	810	Admin.	2010	FORD	TAURUS (PROPOSED - FORD EXPLORER HYBRID)	12	2022	$50,000.00
8	467	S & I Sidewalk	2006	HOLDER	SIDEWALK TRACTOR - WHEELED	15	2021	$180,000.00
9	301	Fleet	2006	FORD	15,000 GVW 4 WD C&C W/UTILITY BODY	15	2021	$140,000.00
10	496	Highway / Specialty Equip	1989	INGERSOL	PORTABLE AIR COMPRESSOR	20	2009	$30,000.00
11	429	Snow & Ice	2001	VOLVO	ACL-65,000 GVW C&C W/SANDER&PLOW	20	2021	$250,000.00
12	48	Highway	2011	FORD	F150-7,700 GVW 4WD P/U TRK	12	2023	$55,000.00
13	520	Sanitation	1999	VOLVO	68,000 GVW C & C W/ROLLOFF FRAME	15	2014	$225,000.00
							General Fund Total	**$1,940,000.00**

SEWER ENTERPRISE FUND

Priority	UNIT #	Division Assignment	YEAR	CURRENT	DESCRIPTION	LIFE YRS	REPLACE DUE	2024
1	71	Sewer	2012	FORD	F150-7,700 GVW 4WD PICKUP TRK	10	2022	$55,000.00
2	704	Sewer	2008	FORD	F350-11,000 GVW 4WD C&C UTL BODY W/PLOW	10	2018	$75,000.00
3	725	Sewer	2008	FORD	F350-11,000 GVW 4 WD C&C UTL BODY & PLOW	10	2018	$75,000.00
4	72	Sewer	2012	FORD	F350-11,000 GVW 4WD C&C UTL BODY W/PLOW	10	2022	$75,000.00
5	797	Sewer / Sm. Specialty	2003	CAT	AC GENERATOR	20	2023	$150,000.00
6	795	Sewer / Sm. Specialty	2003	GODWIN	6" GODWIN PUMP	20	2023	$60,000.00
							Sewer Enterprise Fund Total	**$490,000.00**

WATER ENTERPRISE FUND

Priority	UNIT #	Division Assignment	YEAR	CURRENT	DESCRIPTION	LIFE YRS	REPLACE DUE	2024
1	601	Water	2012	FORD	11,000 GVW 4 WD C&C W/SERVICE BODY & PLOW	10	2022	$75,000.00
2	608	Water	2012	FORD	15,000 GVW 4 WD C&C W/GATE TURNER	10	2022	$250,000.00
3	617	Water	2012	FORD	11,000 GVW 4 WD C&C W/SERVICE BODY & PLOW	10	2022	$75,000.00
4	619	Water	2012	FORD	11,000 GVW 4 WD C&C W/SERVICE BODY & PLOW	10	2022	$75,000.00
5	634	Water	2005	MACK	72,000 GVW C & C W/ DUMP BODY W/PLOW	15	2020	$250,000.00
6	644	Water	2011	FREIGHTLINER	35,000 GVW C & C W/CONSTRUCTION BODY	10	2021	$220,000.00
7	695	Wtr. Sm. Specialty	2003	MGS	6" GODWIN PUMP	20	2023	$100,000.00
8	688	Wtr. Sm. Specialty	2004	MAGNUM	LIGHT TOWER	20	2024	$25,000.00
							Water Enterprise Fund Total	**$1,070,000.00**

CITY OF FRAMINGHAM

DEPARTMENT OF PUBLIC WORKS | ADMINISTRATION

DPW ADMINISTRATION & ENGINEERING BUILDING
110 Western Avenue
Framingham, MA 01702

508-532-5600
dpwgeneral@framinghamma.gov
www.framinghamma.gov

MEMORANDUM

DATE: October 15, 2022

TO: Louise Miller, Chief Financial Officer

FROM: Robert Lewis, Director of Public Works

RE: **FY24 Capital Vehicle Request Pricing Information**

This memo is to summarize the process for which Public Works utilizes when determining the costs to use for the FY24 Capital Budget request for the General Fund, along with the Water, and Wastewater Enterprise Funds consolidated vehicle requests.

Given the nature of the business market, supply chain issues and the like, we are unable to obtain quotes in the Fall of 2022 and get an exact cost for new vehicles intended to be purchased after July 2023. To determine what price to use for capital budget planning, we first start with the known cost in today's dollars. This may be from a recent vehicle purchase that was ordered in our currently approved vehicle budget or, in the case of a specialized piece of equipment, we were able to get a quote for what that vehicle would cost today.

Once we have the cost of the vehicle being replaced in today's dollars, we then add a percentage increase based on what the market trends have shown these vehicles increase in price over the course of a year. Regarding the FY24 budget submission, we utilized a 10% markup from today's costs.

If you have any questions or require any additional information please do not hesitate to let me know.

Cc: Michael Tusino | COO
Bill Sedewitz | Chief Engineer
Jeff Rousseau | Director of Fleet and Facilities

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 4

(1) PROJECT NAME: Drainage System & Surface Water Quality Projects - FY24

PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

Annual Appropriation for DPW capital repairs to the stormwater conveyance system (pipes, culverts, and open channels). Improvements include removal of debris and sedimentation restoration of open channel bottoms. Includes repairs to side walls, banks and channel formed channel bases. Improvements will restore system capacity and mitigate flooding.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) PURPOSE OF PROJECT:

yes	Replace existing infrastructure
yes	Replace existing capital asset
no	Replace existing vehicle
no	Replace equipment
no	New infrastructure
no	New capital asset
no	New vehicle
no	New equipment
yes	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	500,000	500,000	500,000	500,000	500,000	
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	500,000	500,000	500,000	500,000	500,000	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

1) **Bond**
2)
3)

(10) PROJECT OR EQUIPMENT LOCATION:

City-wide - see supporting documentation

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Diane Hayes

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 3

(1) **PROJECT NAME:** Edgell Rd/Central St Intersection, Construction Oversight and Nonparticipating Costs FY24

PROJECT STATUS: In Earlier CIP - Not in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The proposed work will construct safety and traffic improvements for the intersection of Edgell Road and Central Street, including intersection geometric improvements, sidewalks, and installation of a traffic signal via State TIP funding. The funding will cover the construction costs not covered by the TIP funding. The project will reduce traffic congestion and improve pedestrian mobility and safety by providing an exclusive pedestrian phase in the traffic signal, as well as provide crosswalks and ADA/AAB compliant sidewalks along both sides of both roadways. The majority of the construction will be paid by the Federal and State funds, but some specific items like underground City communication conduits are not eligible for the State funding and must be paid by the City.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

This was deferred in FY2023 because the MassDOT bidding schedule was delayed. The current bid advertising date is June 24, 2023.

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	400,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	400,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Edgell Road at Central Street

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

Edgell Road at Central Street Intersection Improvements Project

Community Meeting
Thursday, May 27, 2021





Introductions

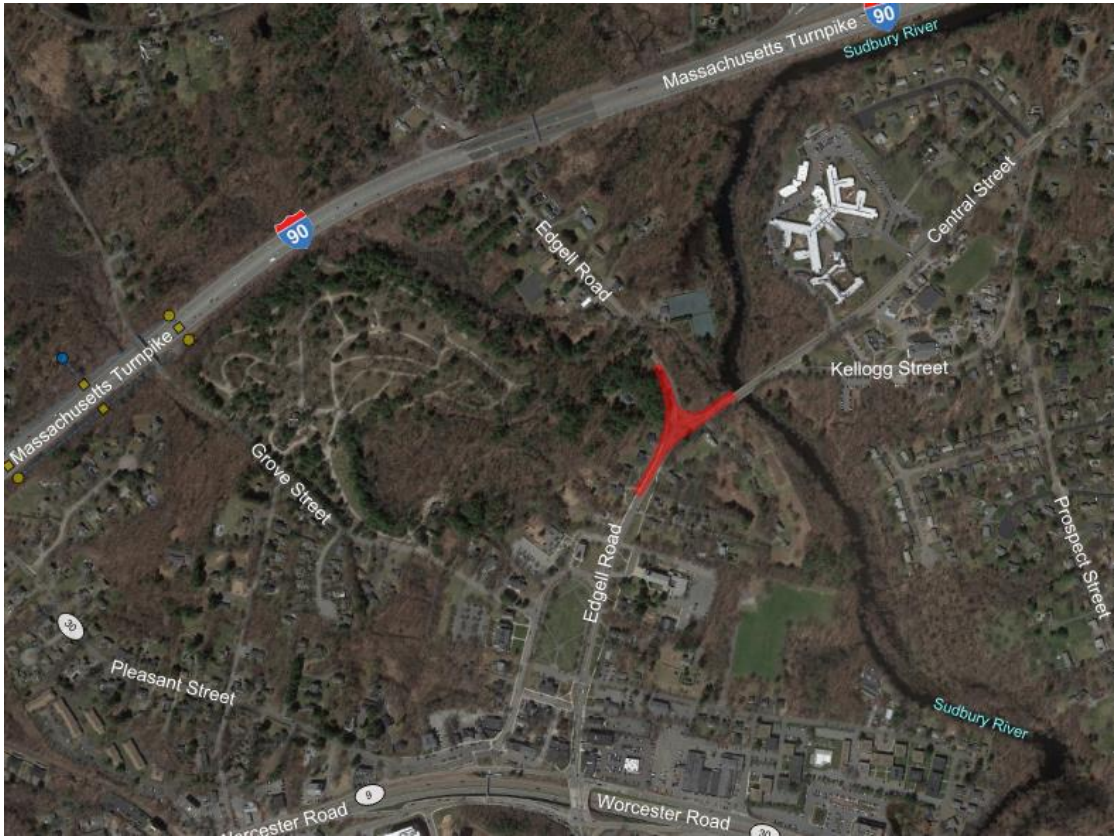
- City of Framingham Department of Public Works
  - Blake Lukis, Public Works Director
  - William Sedewitz, PE, Chief Engineer
  - Eric Johnson, PE, City Engineer
  - Simon Alexandrovich, PE, Director of Transportation
  - Adam Kiel, PE, Senior Traffic and Transportation Engineer
  - Allyssa Jewell, Communications Project Manager
- VHB, Inc. *(City's Consultant)*
  - Josh Cone-Roddy, PE, Senior Project Engineer
  - Erin Thompson, PE, Supervising Traffic Engineer
  - Tracie Lenhardt, PE, Senior Project Manager

Agenda

- Project Overview
- Existing Conditions
- Why Reconstruct the Intersection?
- Alternatives Considered
- Proposed Project Features
- Anticipated Traffic and Pedestrian Impacts
- Next Steps/Schedule
- Questions and Comments



Project Overview – Location and Limits



Existing Conditions

- Difficult Left-Turns
- Long Vehicle Queues
- Non-ADA Compliant Intersection
- No Crosswalks
- Poor Sight Distance
- Increased Crash Occurrences



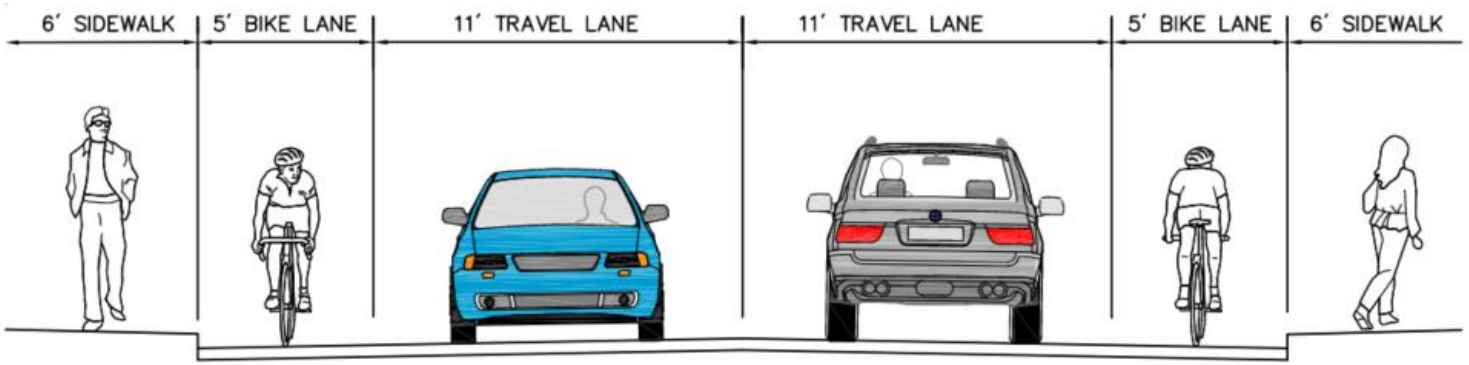
Existing Conditions & Recent Crash Data



Collision Type	2013-2015	2016-2019
Angle	7	17
Head-On	0	4
Rear-End	7	10
Sideswipe (Opposite Direction)	0	1
Sideswipe (Same Direction)	0	1
Single Vehicle	1	2
Total:	15	35
% Injury	27%	31%
MassDOT District 3 Average Crash Rate	0.65	0.61
Calculated Crash Rate	0.58	1.07

Why Reconstruct the Intersection?

- Improve safety and mobility for all users
- Improve sight distance
- Reduce vehicle speeds



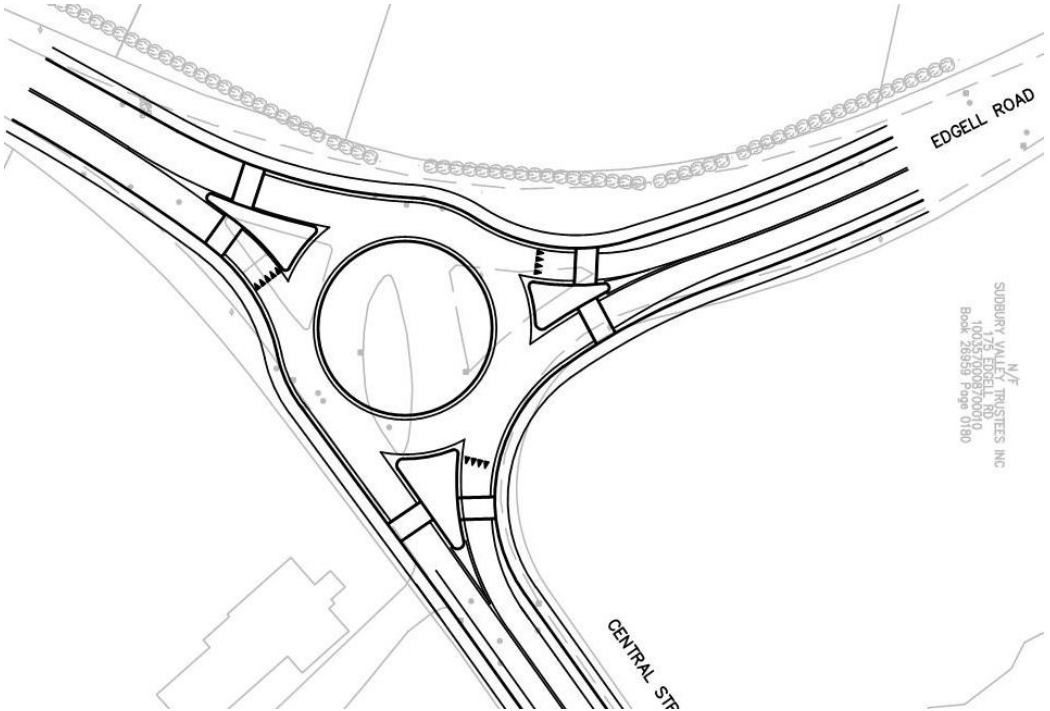
Alternatives Considered - Roundabout

Pros:

- Improved safety with fewer vehicle conflicts
- Short pedestrian crosswalks

Cons:

- Lacks bicycle accommodation
- Single Lane: Significant vehicle queues on Edgell Road
- Double Lane: Significant property impacts



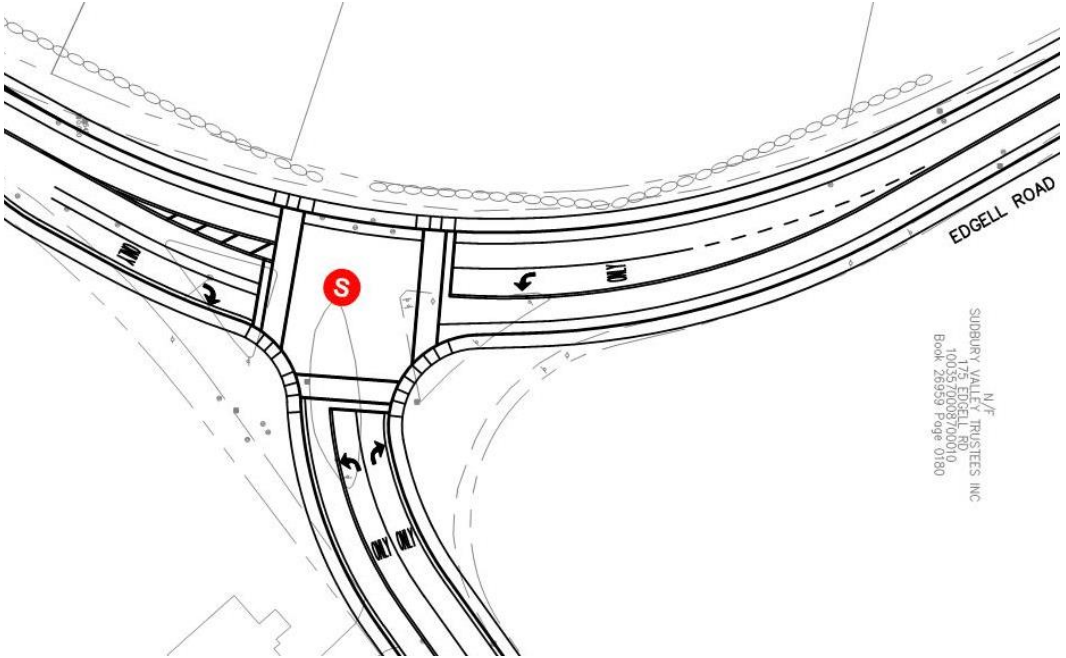
Alternatives Considered – Traffic Signal

Pros:

- Pedestrian crossings
- Bicycle lanes
- Exclusive turn lanes

Cons:

- Larger vehicles not accommodated
- Inadequate storage length on Edgell Road
- Possible historic wall impact



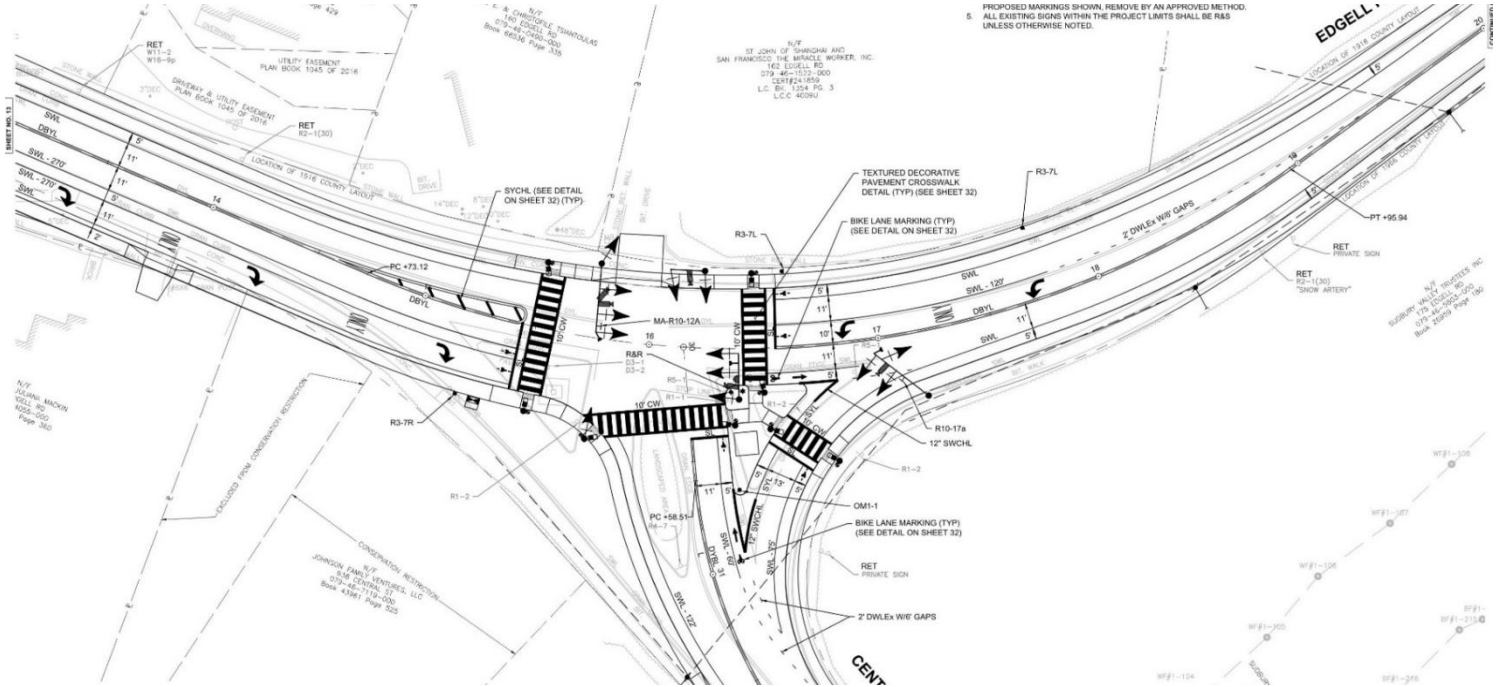
Project Constraints

- Central Street Bridge
- Abutted by Conservation Land
- Scenic Roads – Stone Wall on Edgell Road





25% Design



PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
5. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.
EDGELL
SYCHL (SEE DETAIL ON SHEET 32) (TYP)
TEXTURED DECORATIVE PAVEMENT CROSSWALK DETAIL (TYP) (SEE SHEET 32)
BIKE LANE MARKING (TYP) (SEE DETAIL ON SHEET 32)
R3-7L
R3-7R
PC +73.12
MA-R10-12A
R&R
R10-17a
12" SWCHL
OM1-1
PC +58.51
PT +95.94
RET
PRIVATE SIGN
2' DWLEx W/6' GAPS
10' CW
SWL - 270'
SWL - 120'
DBYL
SWL

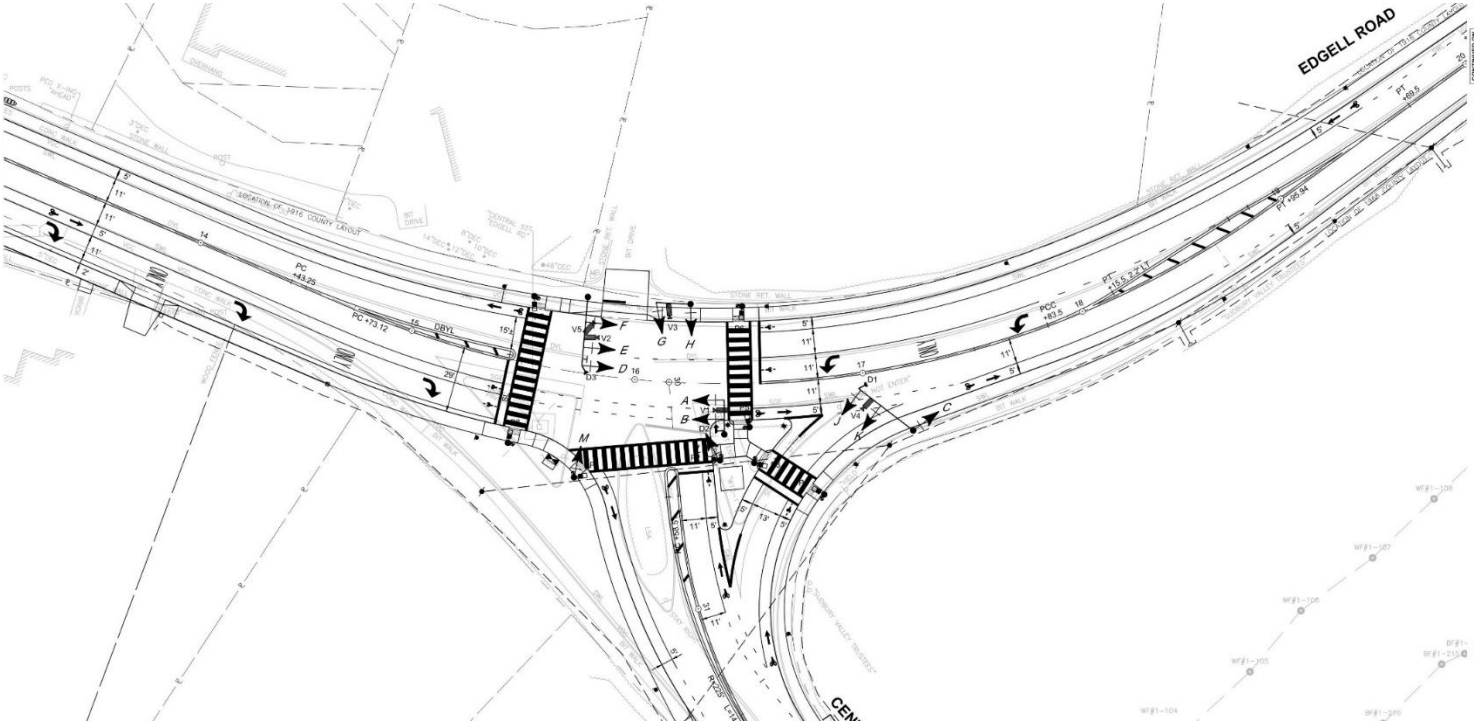
25% Design



Comments Heard at 25% Design Meeting

No need for traffic light here	Widen Central Street on the north side from the bridge to provide two west bound traffic lanes.	Eliminate the sidewalk on the east side of Edgell Road north of Central.	Eliminate the second crosswalk north of Central Street across Edgell Road.
Move the Central Street crosswalks east of the intersection so walkers can cross on a shorter crosswalk.	Eliminate any dedicated roadway for bikers	Synchronize the traffic light with the traffic light at Route 9.	Pleased City and MassDOT working together to address the traffic issues
Thrilled to see plans for bicycle lanes	How will Vernon Street be impacted	Concern for emergency vehicles and school busses with increased congestion/queues	Enforce speeding and remove trees to increase safety

75% Design



75% Design



Proposed Project Features

- Roadway widening for turn lanes
- Pedestrian Improvements:
    - New ADA compliant cement concrete sidewalks with pedestrian access ramps
    - New pedestrian signals
    - Decorative crosswalks with stamped imprinting
- Two crosswalks on Edgell Road with an exclusive signalized pedestrian phase



Proposed Project Features

- Ornamental Traffic Signals
- Accommodation for bicyclists with shoulders – dedicated bicycle lanes





Easements Required Right of Way

- City is required to secure the right of way
- Easements are required for construction, including:
  - 2 permanent
  - 14 temporary
  - 2 permanent utility
  - 2 permanent guardrail easements





Coordination

- Framingham Historic Commission
- Framingham Historic District Commission
- Framingham Conservation Commission
- Parks and Recreation Department



Anticipated Traffic and Pedestrian Impacts

Construction is expected to take two construction seasons



- Hours of Construction:
  - Monday – Friday, 7:00 a.m. to 3:30 p.m.

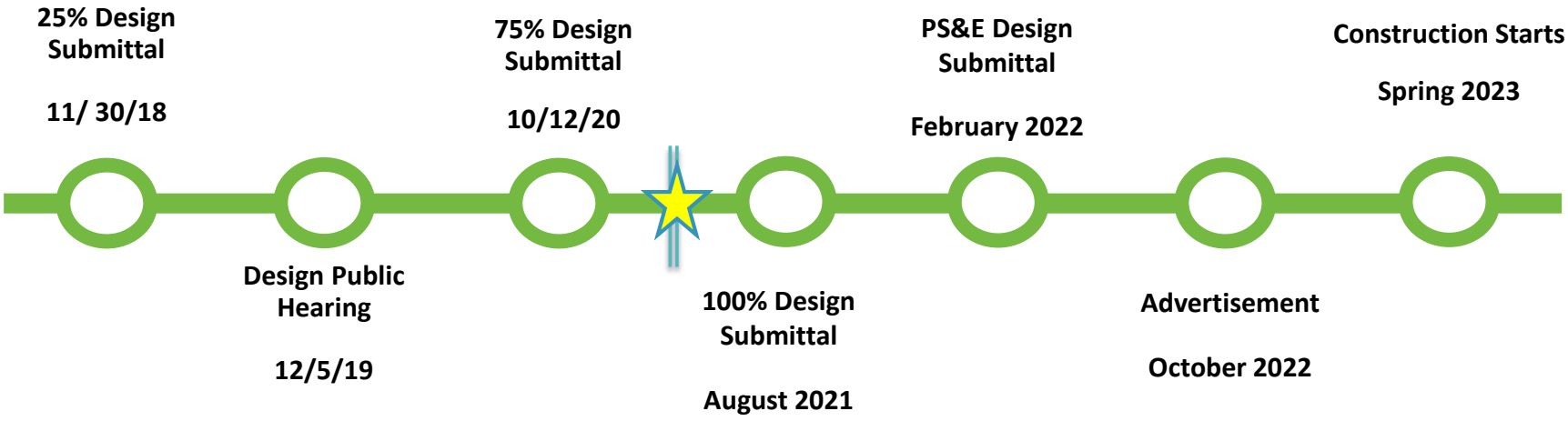
- Daily Traffic Impacts:
  - Lane shifts and alternating traffic
  - A minimum of 1-lane in each direction will be maintained
  - Work is anticipated during the day
  - MassDOT contractor will be selected for the project
  - Detours are not anticipated



- Pedestrian and bicycle access will be maintained

- Police details will be on-site to facilitate vehicular traffic and pedestrians

Next Steps/Project Schedule



Questions Received

Q: How would the signal timing likely affect the large line of cars/school buses trying to get off Vernon onto Edgell during morning commute time (just S of this intersection)?
A: Vernon intersection is approximately 800' south of the Central Street Intersection. The Edgell Road weekday morning NB Through movement has a 50% queue of approximately 175' and 95% queue of approximately 500'. It is not anticipated that this signal with have a significant impact on the Vernon Street intersection, although it may provide more gaps at that intersection.

Q: Is there a potential for two established lanes on Central Street?
A: VHB and the City are looking at all options to widen and stripe Central Street with two dedicated turn lanes while still minimizing impacts to Environmentally sensitive areas as well as private Sudbury Valley Trustees property.

FOR FUTURE PROJECT UPDATES AND TO STAY CONNECTED WITH FRAMINGHAM PUBLIC WORKS, PLEASE VISIT:



Online:
www.BuildingFramingham.com
Sign up for Notify Me
Public Works & Building Framingham Notices
to receive weekly traffic alerts

Facebook:
@FraminghamPublicWorks

Twitter:
@DPWFramingham

If you need assistance or have questions about the project, please contact:

Adam Kiel, P.E., Senior Project Manager:
awk@framinghamma.gov

HOW TO PARTICIPATE ON ZOOM



If you are watching the meeting via Zoom on your computer, mobile device, or tablet and wish to speak, please raise your digital hand.

Please do not use the chat function.



Dial by phone:
+1-301-715-8592 or +1-312-626-6799 or
+1-646-558-8656 or +1-253-215-8782 or
+1-346-248-7799 or +1-669-900-9128

Webinar ID# 962 6948 0687

Press *9 to speak

PUBLIC PARTICIPATION GROUND RULES

- Questions submitted prior to the meeting will be discussed first.
- You will have 3 minutes to speak.
- Participants will not be able to speak more than once until everyone has had an opportunity for their voice to be heard.
- Inappropriate language and/or offensive comments will NOT be tolerated.
- For follow-up/additional questions that cannot be answered tonight, we will post a Q&A sheet on the City website 10 business days after the meeting. Additional questions can be sent to: DPWProjects@FraminghamMA.gov

Questions/Comments

www.vhb.com

September 2, 2021

Ref: 13484.07

Adam Kiel, P.E.
Senior Traffic and Transportation Engineer
110 Western Avenue
Framingham, MA 01702

Re: FY-2023 Capital Improvements
Edgell Road at Central Street Intersection Improvement

Dear Mr. Kiel,

VHB has prepared this letter to provide a description and cost estimate for the design and construction oversight efforts required for the roadway improvements for the Edgell Road at Central Street intersection.

In 2017, the City applied for state and federal funding under the State Transportation Improvement Program (STIP). The funding was approved, and the project has been programmed for the 2023 STIP year. On behalf of the City, VHB is preparing to submit the 100% Design package to MassDOT at the beginning of September 2021. The project is scheduled for advertisement by MassDOT in October 2022 and it is anticipated that construction will begin in April 2023 and be completed by October 2024.

The remaining design includes the preparation of the PS&E Design, Right -of -Way Plans and part-time construction phase services. The total costs associated with the remaining design and part-time construction oversight and preparation of as-built plans of the Edgell Road at Central Street Intersection Improvements is estimated to be $222,000.00. The cost does not include temporary or permanent easement acquisition that will be required for the construction nor any legal fees or overhead costs which are already funded by the City (FY-2022). There are additional costs to the City which include DPW oversight and non-participating construction costs which add to $209,905.00 to the Design costs bringing the total costs to $432,000.00.

If you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,

Vanasse Hangen Brustlin, Inc.

Tracie Lenhardt, P.E.

Senior Project Manager

Engineers | Scientists | Planners | Designers

101 Walnut Street
PO Box 9151
Watertown, Massachusetts 02471
P 617.924.1770
F 617.924.2286

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 13

(1) **PROJECT NAME:** Fountain St/Dudley Rd Intersection - Construction FY24
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This is for the final design, permitting, and easement acquisition portion of the project, prior to construction. This well-traveled intersection is in need of upgrades to improve efficiency and vehicular and pedestrian safety. The traffic signals were intended to only be temporary but have been in place for many years and do not meet current standards. Furthermore, Farm Pond is classified as an Impaired Water Body, and improvements to the drainage system will enhance water quality. Features of the project will be the addition of a right-turn lane onto Dudley Road, improved intersection geometry, increased lengths of existing turning lanes, new pedestrian crossings, new traffic signals, and modifications to drainage to the outfall at Farm Pond. This project will complete the upgrades for Fountain Street and Dudley Road, which have included new water and sewer mains, drainage and roadway improvements, new Fountain Street and Winter Street Bridges, upgrades to Loring Arena, the dog park, the skate park, and the new Dudley Road multi-use path.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
X	New infrastructure
X	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	3,900,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	3,900,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Dudley Road and Fountain Street Intersection

(11) **ASSET TYPE:**

	3)
(7a)	**POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**
(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

ENVIRONMENTAL PARTNERS

September 23, 2020

Mr. Matthew Hayes, P.E., Senior Project Manager
City of Framingham Department of Public Works
110 Western Avenue
Framingham, MA 01702

RE: Fountain Street at Dudley Road Intersection Rehabilitation Project

Dear Mr. Hayes,

As requested, Environmental Partners has prepared this letter confirming the need for funding for the Fountain Street at Dudley Road Intersection Rehabilitation project.

Fountain Street at Dudley Road Intersection Rehabilitation Project

The following funding needs have been identified for the Fountain Street at Dudley Road Intersection Rehabilitation project based on Environmental Partners' initial review of Town-provided plans:

Construction/Police	$ 2.363,000
Engineering Design Review & Assistance	$ 52,834
Final Engineering Design, Bid Document Preparation & Permitting	TBD
Right of Way	TBD
Bid Phase Assistance	$ 4,130
Construction Administration Services	$ 69,920
Resident Project Representative Services	$ 120,170

The project is to consist of intersection/roadway rehabilitation, stormwater improvements and landscaping. Environmental Partners is currently providing Engineering Design Review & Assistance which include:

- Preparation of an order of magnitude construction estimate of the project
- Review of previously prepared traffic back-up
- Review of previously prepared stormwater calculations
- Review of previously prepared plans, specifications, and estimates
- Preparation of conceptual alternatives
- Meetings & coordination

The above budgets are subject to fluctuate depending on the findings of Environmental Partners' review. The engineering budget to prepare the final design and bid documents as well as project permitting is not included above but will be established once the review has been completed and the level of effort is determined.

The project is anticipated to extend approximately 750 feet of Fountain Street and approximately 330 feet of Dudley Road and will provide intersection/roadway reconstruction. This will include the realignment of the intersection, tightening the corner radii to reduce turning travel speeds. Traffic

signal equipment will be updated and will include pedestrian accommodations in the form of Accessible Pedestrian Signals to accommodate pedestrian demand in the area and for the adjacent park. ADA accessible sidewalks and curb ramps will be provided. Stormwater improvements will be provided including outfall replacement near Farm Pond. The project will also include landscaping.

Please do not hesitate to contact me with any further questions or requests.

Respectfully yours,



James D. Fitzgerald, P.E., LEED AP
Director of Transportation / Principal

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2021, AS AMENDED, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

CITY OF FRAMINGHAM, MA

CITY OF FRAMINGHAM
DEPARTMENT OF PUBLIC WORKS
110 WESTERN AVE
FRAMINGHAM, MA 01702

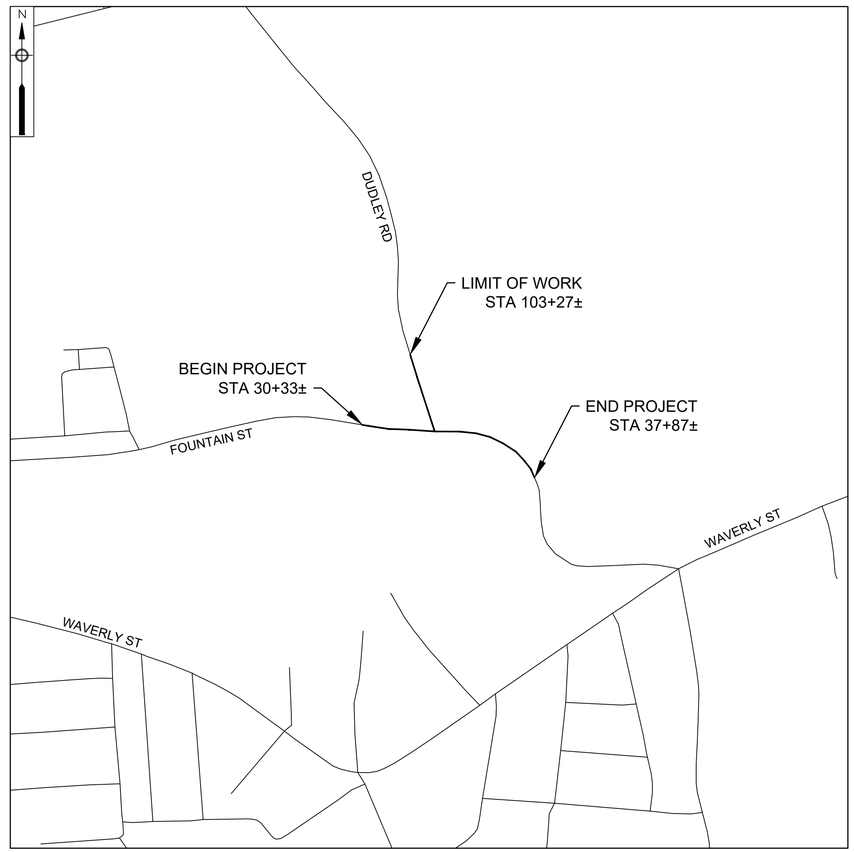
INTERIM SUBMITTAL FOR
RIGHT-OF-WAY AND UTILITY
COORDINATION
AUGUST 2021

INDEX

1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
TBD*	GENERAL NOTES
TBD*	KEY PLAN
TBD*	TYPICAL SECTIONS
TBD*	SURVEY CONTROL PLANS
3-5	CONSTRUCTION PLANS
6-8	PROFILES
9-11	CURB TIE PLANS
12-14	GRADING PLANS
TBD*	TRAFFIC SIGN AND PAVEMENT MARKING PLANS
TBD*	TRAFFIC SIGN SUMMARY
TBD*	TRAFFIC SIGNAL PLANS
TBD*	TEMPORARY TRAFFIC CONTROL PLANS
TBD*	UTILITY PLANS
TBD*	LANDSCAPE PLANS
TBD*	LANDSCAPE DETAILS
TBD*	CONSTRUCTION DETAILS
TBD*	WHEELCHAIR RAMP DETAILS
TBD*	DRIVEWAY DETAILS
TBD*	CROSS SECTIONS

*SHEET NUMBERS TO BE UPDATED FOR FULL PLAN SET SUBMISSION. CURRENT SHEET NUMBERS REFLECT PARTIAL PLAN SET FOR CITY REVIEW.

ENVIRONMENTAL PARTNERS



VICINITY MAP
1"= 300'

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
		GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #		BORING HOLE
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
Ⓒ	Ⓒ	CABLE MANHOLE
Ⓓ	Ⓓ	DRAINAGE MANHOLE
Ⓔ	Ⓔ	ELECTRIC MANHOLE
Ⓖ	Ⓖ	GAS MANHOLE
Ⓜ	Ⓜ	MISC MANHOLE
Ⓢ	Ⓢ	SEWER MANHOLE
Ⓣ	Ⓣ	TELEPHONE MANHOLE
Ⓦ	Ⓦ	WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
20'	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
	20'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE (10' LINE SEGMENT WITH 30' GAPS)
	BYL	BROKEN YELLOW LINE (10' LINE SEGMENT WITH 30' GAPS)
	DWL	DOTTED WHITE LINE (3' LINE SEGMENT WITH 9' GAPS)
	DYL	DOTTED YELLOW LINE (3' LINE SEGMENT WITH 9' GAPS)
	DWLEx	DOTTED WHITE LINE EXTENSION (2' LINE SEGMENT WITH 6' GAPS)
	DYLEx	DOTTED YELLOW LINE EXTENSION (2' LINE SEGMENT WITH 6' GAPS)
	DWREL	12" WIDE DOTTED WHITE ROUNDABOUT ENTRY LINE (2' LINE SEGMENT WITH 2' GAPS)
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE

ABBREVIATIONS - GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BS	BARE STEEL
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
C.I.T.	CHANGE IN TYPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CRW	CONCRETE RETAINING WALL
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DSMH	DEEP SUMP MANHOLE
DW	STEADY DON'T WALK
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
IP	INTERMEDIATE PRESSUE
L	LENGTH OF CURVE
LP	LIGHT POLE
LP	LOW PRESSURE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PBS	PRINT BOTH SIDES
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCR	PEDESTRIAN CURB RAMP
PD	ALDYL "A" PLASTIC
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PKF	PICKET FENCE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PRF	POST AND RAIL FENCE
PROJ	PROJECT

ABBREVIATIONS - GENERAL

PROP	PROPOSED
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
PY	YELLOW PLASTIC
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLDR	SHOULDER
SMH	SEWER MANHOLE
ST	STEEL
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SMRW	STONE MASONRY RETAINING WALL
SRW	STONE RETAINING WALL
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
VCC	VERTICAL CONCRETE CURB
VGC	VERTICAL GRANITE CURB
WG	WATER GATE
WI	WROUGHT IRON
WIF	WROUGHT IRON FENCE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN

ABBREVIATIONS - TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

CITY OF FRAMINGHAM 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

LEGEND & ABBREVIATIONS

Sheet No. 2

Drawing file: I:\Framingham,254\254-2102-Fountain St Intersection Design\02 ACAD\Sheet\FountainSt_Legend.dwg Plot: Date: Aug 09,2021-12:17pm

CONTINUED ON SHEET NO. 5

N

NAD 83

DUDLEY ROAD

FOUNTAIN STREET

MAP 126 BLOCK 46 LOT 9005
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
PARKS DEPARTMENT, 475 UNION AVENUE
FRAMINGHAM, MA 01702
BK N/A PG N/A

PROP TREE TRIMMING AS NEEDED FOR UTILITY WORK (BO) (TYP)

PROP GRAN CURB, TYPE VA-4 (TYP)

PROP LOAM & SEED

PROP 6' CEM CONC WALK

PROP FULL DEPTH PVM'T

PROP TEMP EASEMENT

R&R GRAN CURB

PROP UP (BO)

PROP LINE OF EASEMENT

PROP PUSH BRACE (BO)

RET EXIST CEM CONC WALK & GRAN CURB

RET EXIST HMA DRIVEWAY

SAWCUT; MEET EXIST

SAWCUT; MEET EXIST WALK

R&D EXIST UP (BO)

PROP TS POST (TYP)

TREE PROTECTION FENCE (TYP)

PROP CEM CONC PEDESTRIAN CURB RAMP

PROP GUY (BO)

PROP LINE OF EASEMENT

R&S TRAFFIC SIGNAL EQUIPMENT AND VGC (TYP)

RET EXIST UP

PROP 6' CEM CONC WALK

SAWCUT

PROP LANDSCAPE PLANTER ISLAND

R&D UTILITY POLE (BO)

PROP 10' WIDE CEM CONC PEDESTRIAN CURB RAMP

PROP CURB CORNER TYPE A (TYP)

PROP ACCESS POINT FOR MAINTENANCE VEHICLES

PROP 5.5' CEM CONC WALK

SAWCUT

PROP GUY POLE (BO)

PVM'T MILLING AND OVERLAY

PROP HMA DRIVEWAY (TYP)

R&D TEMP SIGNAL POLE (TYP)

PT +81.76

100+00

PC +84.81

CONST B

R&R HYDRANT

R&D EXIST UP (BO)

PROP LOAM & SEED

MEET EXIST GRAN CURB

PROP MULCH

PROP TEMP EASEMENT

PROP PLANTING BED

PROP UP (BO)

PROP GUYS (BO)

SAWCUT MEET EXIST

REM UP ANCHOR (BO)

APPROX LIMIT OF GRADING

PROP HMA BERM TYPE "A" MODIFIED

LINE OF EASEMENT

PROP PUSH BRACE (BO)

PROP PLANTING BED

PROP HMA BERM TYPE "A" MODIFIED

PROP UP (BO)

PROP LOAM & SEED

LINE OF EASEMENT

PROP HMA BERM TYPE "A" MODIFIED

PROP TEMP EASEMENT

RET EXIST UP

PROP GRAN CURB, TYPE VA-4

BEGIN PROJECT
STA 30+33.32
N 2925551.7405
E 675261.6242

RET TREE

PROP FULL DEPTH PVM'T WIDENING (TYP)

32+84.63 FOUNTAIN STREET=
100+00.00 DUDLEY STREET

PROP CEM CONC PEDESTRIAN CURB RAMP (TYP)

PROP TS POST WITH MAST ARM (TYP)

PROP 6.5' CEM CONC SIDEWALK

REM TREES (4)

R&D TEMP SIGNAL POLE

PROP SPLAYED END

PROP LINE OF EASEMENT

PROP TEMP EASEMENT

PROP PLANTING BED

PROP HMA BERM TYPE "A" MODIFIED

PROP UP (BO)

PROP LOAM & SEED

LINE OF EASEMENT

PROP HMA BERM TYPE "A" MODIFIED

PROP TEMP EASEMENT

RET EXIST UP

R&R GRAN CURB (TYP)

PROP FULL DEPTH PVM'T

REM TREE

REM TREE

PROP GUY POLE (BO)

PROP GRAN CURB, TYPE VA-5 (8" REVEAL MAX)

PROP GUARDRAIL, TL-2 (SINGLE-FACED), DEEP POST

PROP TEMP EASEMENT

PROP LINE OF EASEMENT

PROP GUARDRAIL, TL-2 (SINGLE-FACED)

PROP LOAM & SEED

APPROX LIMIT OF GRADING

STEEL W BEAM TERMINAL SECTION

PROP ACCESS GATE

GRAVEL DRIVE

R&R GRAN CURB

R&D PAVEMENT AND SIDEWALK

PROP UNIT PAVER WALK

PROP CEM CONC PEDESTRIAN CURB RAMP (TYP)

PROP GRAN CURB, TYPE VA-4 (TYP)

PROP 5' GRASS STRIP

PROP 10' HMA SHARED USE PATH

R&R WOODEN GUARDRAIL

TREE PROTECTION FENCE (TYP)

PT +22.14

PC +89.88

CONST B

APPROXIMATE 7/3/1889 COUNTY LAYOUT #3

#299
MAP 471 BLOCK 11 LOT 1.0
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
475 UNION AVENUE, PARKS DEPARTMENT
FRAMINGHAM, MA 01702
BK N/A PG N/A

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

#63
MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

#160
MAP 134 BLOCK 55 LOT 1414
N/F
ROHIT CORPORATION
10 REGENCY RIDGE
ANDOVER, MA 01810
LC BK 1252 PG 172
CERT #224522

#100
MAP 134 BLOCK 55 LOT 6425
N/F
BELCO LLC
100 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 1563 PG 56
CERT. #274265

#80
MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

BENCHMARK: BONNET BOLT
EL=176.77'

15' WIDE SEWER AND DRAINAGE EASEMENT

CONC RETAINING WALL

STONE RETAINING WALL

0 20 50 100

SCALE: 1" = 20'

CONTINUED ON SHEET NO. 4

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

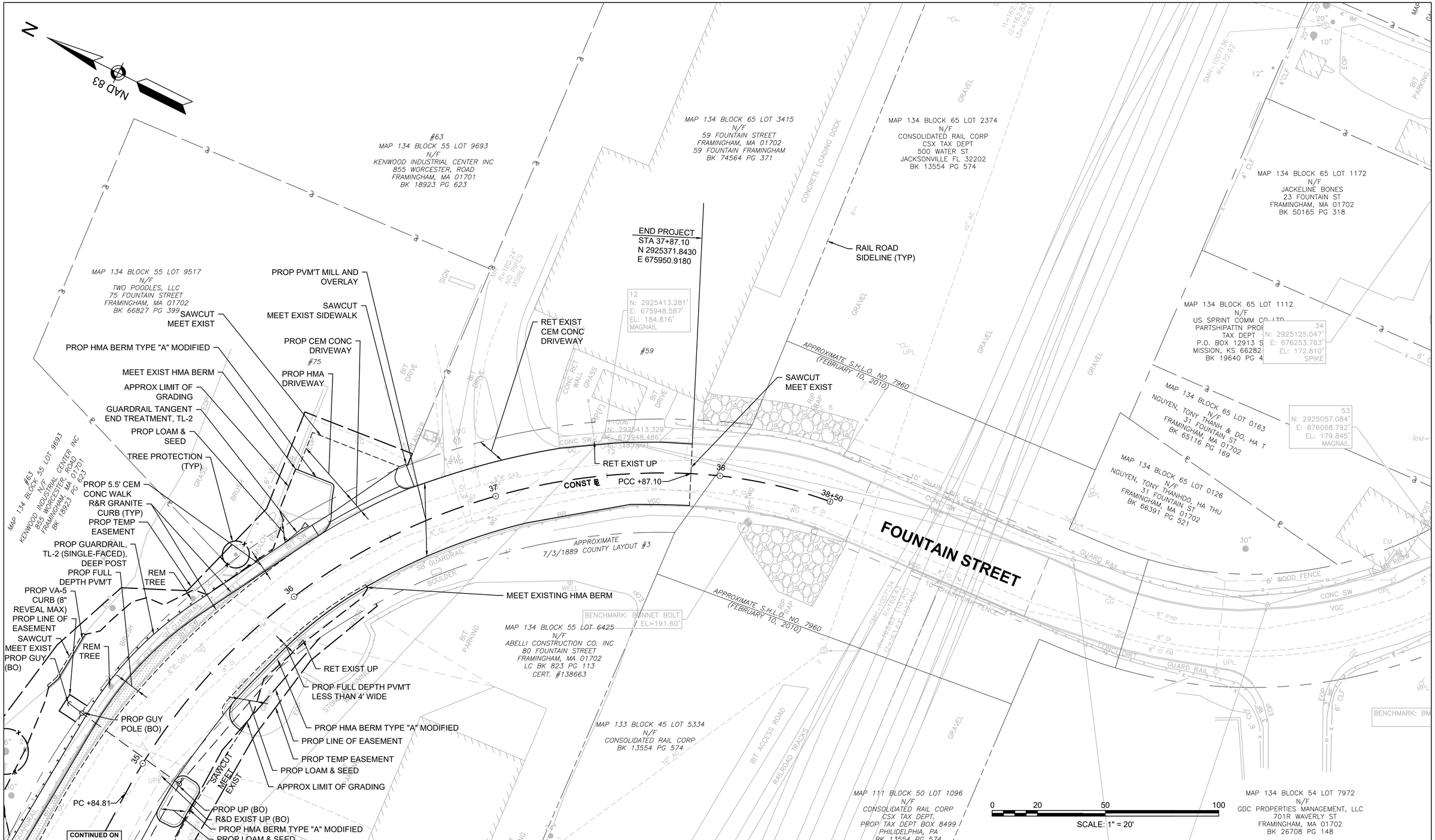
ENVIRONMENTAL PARTNERS

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 01

Sheet No. 3

Drawing file: C:\Users\mes\appdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot Date: Aug 09,2021-5:17pm



			Scale	AS NOTED
			Date	AUGUST 2021
			Job No.	254-2102
			Designed by	RPH
			Drawn by	RPH
			Checked by	MES
MARK	DATE	DESCRIPTION	Approved by	JDF

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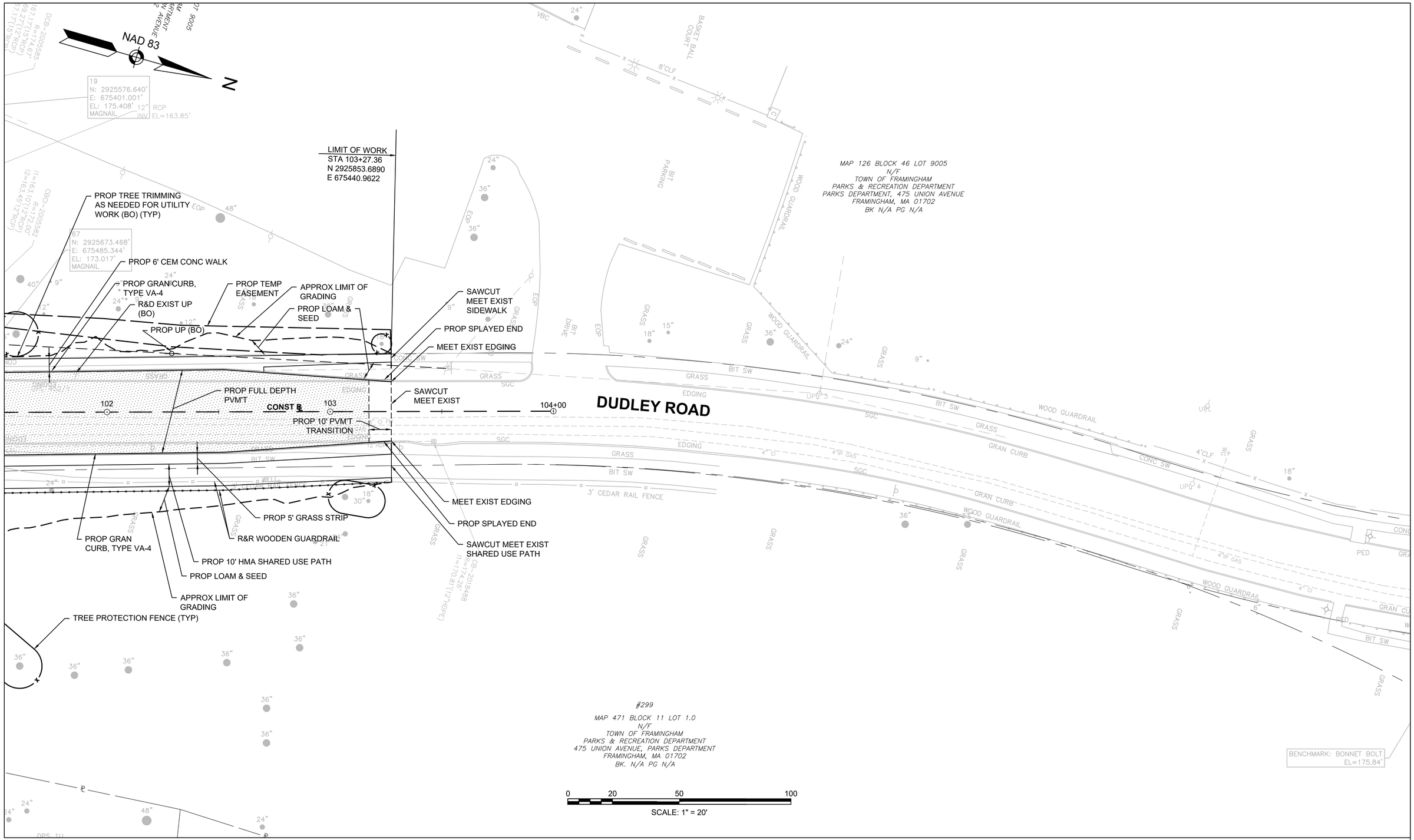
TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 02

Sheet No.
4

Drawing file: C:\Users\mes\appdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot Date: Aug 09,2021-5:17pm



CONTINUED ON SHEET NO. 3

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

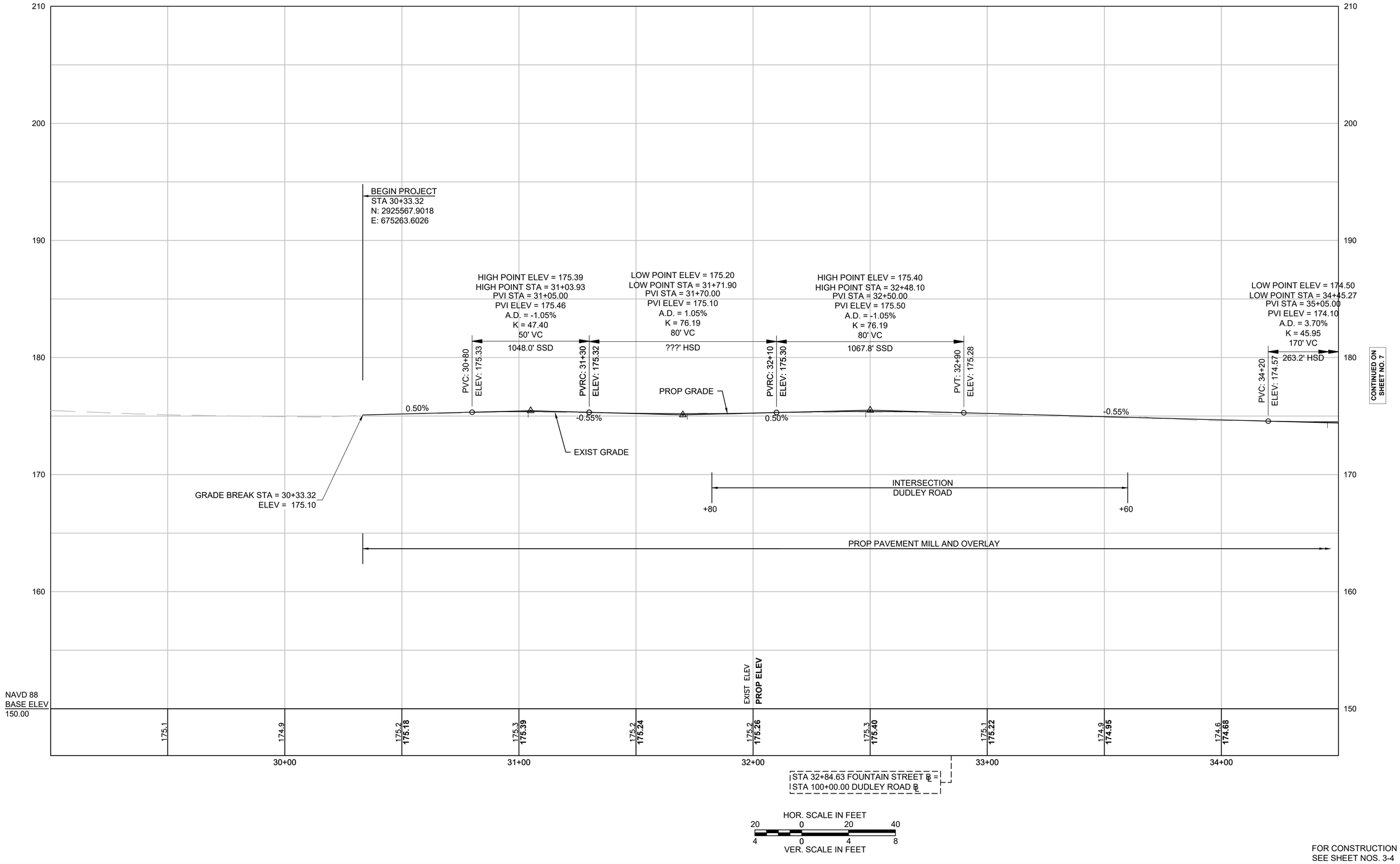
THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 03

Sheet No.
5

Drawing file: C:\Users\mes\appdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot Date: Aug 09,2021-5:17pm



FOR CONSTRUCTION PLANS, SEE SHEET NOS. 3-4

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
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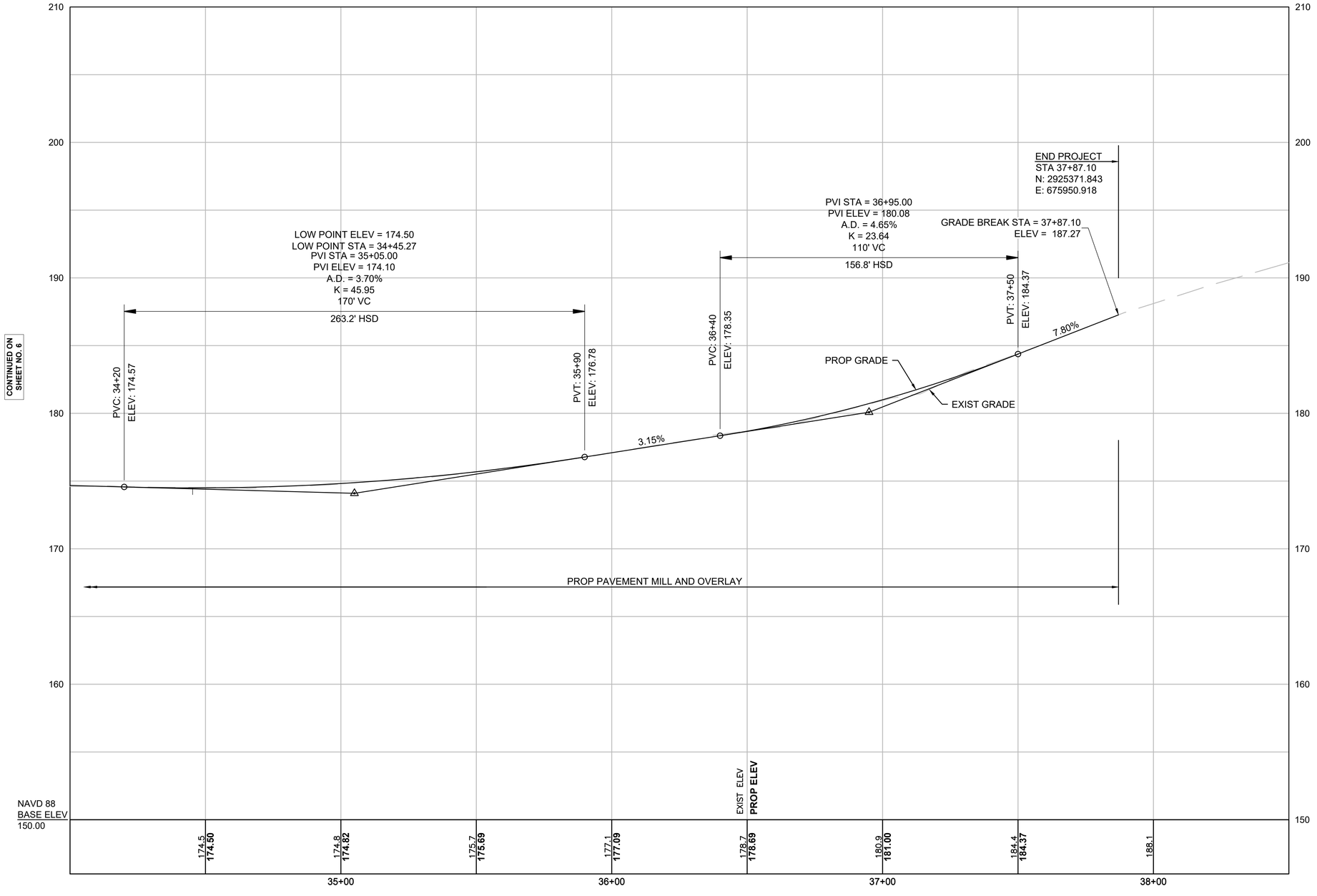
TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

FOUNTAIN STREET PROFILE - 01

Sheet No. 6

Drawing file: I:\Framingham\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\Fountain\St_ProfileSheets.dwg Plot Date: Aug 09,2021-12:18pm



HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

FOR CONSTRUCTION PLANS, SEE SHEET NOS. 3 & 5

CITY OF FRAMINGHAM 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

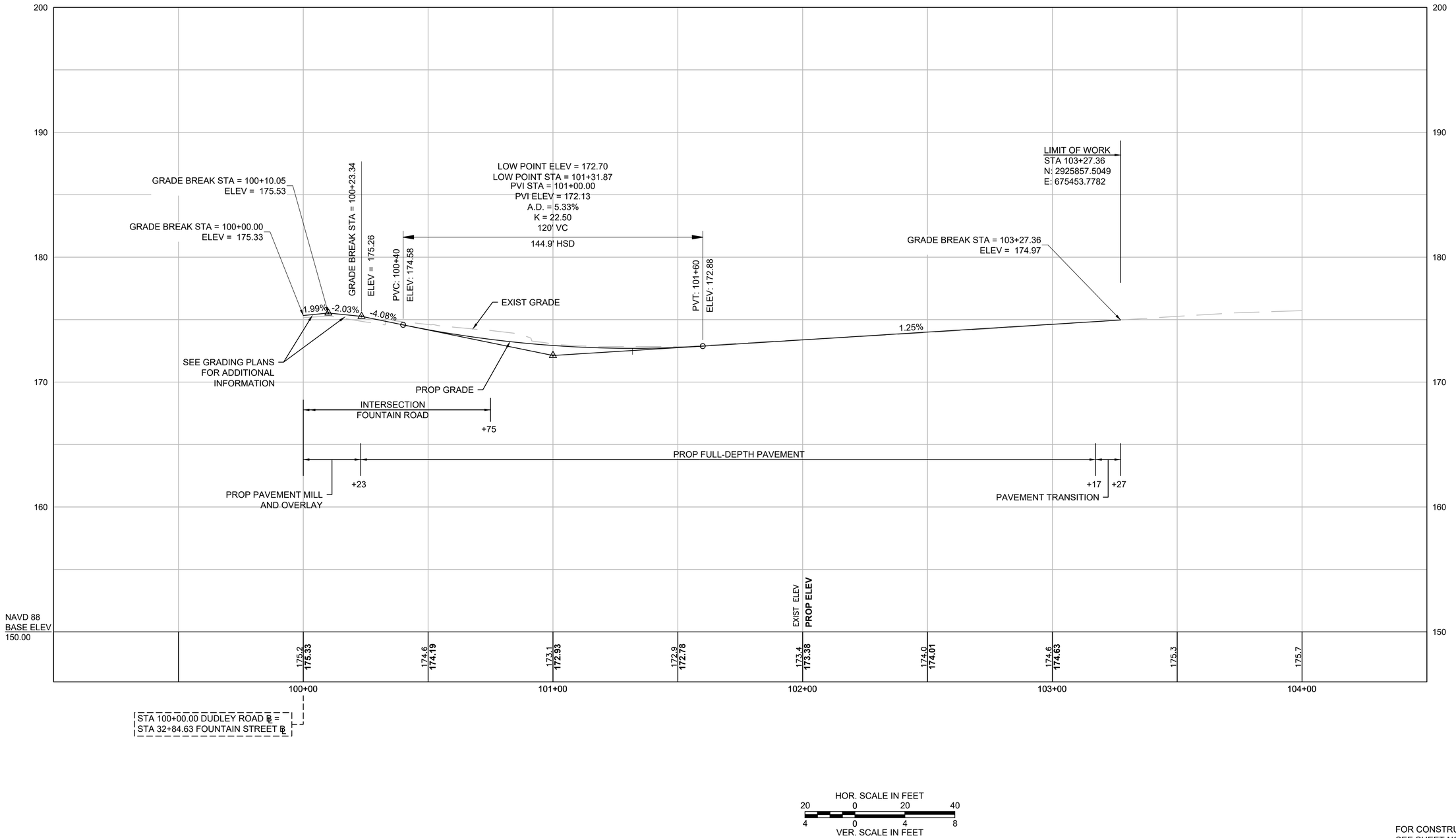
THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

FOUNTAIN STREET PROFILE - 02

Sheet No. 7

Drawing file: I:\Framingham 254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\Fountain\SI_ProfileSheets.dwg Plot Date: Aug 09,2021-12:18pm



HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

FOR CONSTRUCTION PLANS, SEE SHEET NOS. 3-5

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
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TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

DUDLEY ROAD PROFILE - 01

Sheet No. 8

Drawing file: I:\Framingham,254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\Fountain\S_ProfileSheets.dwg Plot Date: Aug 09,2021-12:18pm

CONTINUED ON SHEET NO. 11

N

NAD 83

MAP 126 BLOCK 46 LOT 9005
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
PARKS DEPARTMENT, 475 UNION AVENUE
FRAMINGHAM, MA 01702
BK N/A PG N/A

#299
MAP 471 BLOCK 11 LOT 1.0
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
475 UNION AVENUE, PARKS DEPARTMENT
FRAMINGHAM, MA 01702
BK. N/A PG N/A

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

DUDLEY ROAD

FOUNTAIN STREET

BEGIN PROJECT
STA 30+33.32
N 2925551.7405
E 675261.6242

PT +42.18
17.72' LT

PT +22.14

PCC +95.07
8.07' RT

PC +94.71
2.12' RT

PC +89.88

PC +59.29
37.04' RT

PCC +73.46
27.05' LT

PI +56.11
2.00' RT

PI +56.11
10.01' RT

PI +51.11
9.30' RT

PCC +31.93
72.64' LT

PI +51.11
2.00' RT

PCC +44.12
7.92' RT

32+84.63 FOUNTAIN STREET=
100+00.00 DUDLEY STREET

PC +44.79
2.00' RT

PT +57.59
32.49' LT

PC +03.47
26.93' LT

APPROXIMATE
7/3/1889 COUNTY LAYOUT #3

MEET EXIST
+65±, 23'± LT

PT +64.39
21.39' LT

PT +81.76

PRC +65.84
16.00' RT

100+00

CONST ℄

PC +47.18
16.00' RT

C16 PT +51.17
19.85' RT

PC +84.81

PC +01.31
16.00' RT

C18

PC +90.12
16.00' RT

PT +37.13
16.00' RT

PC +68.24

PC +68.24
16.00' RT

PT +11.55
16.00' RT

PC +07.56
19.60' RT

PC +51.32
23.85' RT

PT +85.23
16.00' RT
C17

PT +05.63
20.03' RT

C2

PT +47.72
16.00' RT

APPROXIMATE
7/3/1889 COUNTY LAYOUT #3

MEET EXIST
+33±, 16'± RT

PT +90.28
19.99' RT

PC +32.14
21.22' RT

PI +50.76
23.10' RT

PC +67.27
25.72' RT

PT +67.80
18.14' RT

PT +65.53
27.56' RT

PI +75.82
41.63' RT

PC +84.63
28.00' RT

PC +80.81
34.79' RT

PT +06.35
33.66' RT

PC +10.34
38.00' RT

PT +77.09
37.99' RT

PT +47.32
28.00' RT

PC +81.20
20.15' RT

PT +81.35
24.15' RT

PT +01.23
28.00' RT

PCC +38.93
24.29' RT

PC +39.20
27.00' RT

PC +05.63
24.03' RT

PC +85.40
28.00' RT

PC +76.50
15.46' RT

C21

C22

#100
MAP 134 BLOCK 55 LOT 6425
N/F
BELCO LLC
100 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 1563 PG 56
CERT. #274265

15' WIDE SEWER AND DRAINAGE EASEMENT

#80

BENCHMARK: BONNET BOLT
EL=176.77'

MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

0 20 50 100
SCALE: 1" = 20'

CONTINUED ON SHEET NO. 10

Curve Table			
Curve #	Delta	Radius	Length
C5	175°29'56"	2.00	6.13
C6	92°33'07"	5.00	8.08
C7	17°02'16"	150.00	44.60
C8	61°50'45"	60.00	64.76
C9	93°59'14"	2.00	3.28
C10	79°56'21"	2.00	2.79
C11	94°55'03"	4.00	6.63
C12	84°21'00"	4.00	5.89
C13	75°39'40"	4.00	5.28
C14	80°13'04"	3.00	4.20
C15	92°02'44"	4.00	6.43
C16	87°51'03"	4.00	6.13
C17	92°13'59"	4.00	6.44
C18	90°55'14"	4.00	6.35
C19	89°03'52"	4.00	6.22

Curve Table			
Curve #	Delta	Radius	Length
C20	87°43'32"	4.00	6.12
C21	93°02'49"	8.00	12.99
C22	16°02'27"	180.00	50.39
C27	68°08'23"	40.00	47.57
C28	166°38'51"	3.00	8.73
C29	25°48'37"	115.00	51.80
C31	35°50'04"	100.00	62.54
C32	7°46'43"	20.00	2.72
C33	25°36'18"	150.00	67.03

CITY OF FRAMINGHAM · 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

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TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CURB TIE PLANS - 01

Sheet No.
9

Drawing file: I:\Framingham 254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\FountainSt_CurbTie.dwg Plot Date: Aug 09,2021-12:19pm

N

NAD 83

#63
MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

MAP 134 BLOCK 65 LOT 3415
N/F
59 FOUNTAIN STREET
FRAMINGHAM, MA 01702
59 FOUNTAIN FRAMINGHAM
BK 74564 PG 371

MAP 134 BLOCK 65 LOT 2374
N/F
CONSOLIDATED RAIL CORP
CSX TAX DEPT
500 WATER ST
JACKSONVILLE FL 32202
BK 13554 PG 574

MAP 134 BLOCK 65 LOT 1172
N/F
JACKELINE BONES
23 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 50165 PG 318

MAP 134 BLOCK 55 LOT 9517
N/F
TWO POODLES, LLC
75 FOUNTAIN STREET
FRAMINGHAM, MA 01702
BK 66827 PG 399

MAP 134 BLOCK 65 LOT 1112
N/F
US SPRINT COMM CO LTD
PARTSHIPATTN PROPTERY
TAX DEPT
P.O. BOX 12913 SHAWNEE
MISSION, KS 66282-2913
BK 19640 PG 408

MAP 134 BLOCK 65 LOT 0163
N/F
NGUYEN, TONY THANH & DO, HA T
31 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 65116 PG 169

MAP 134 BLOCK 65 LOT 0126
N/F
NGUYEN, TONY THANHDO, HA THU
31 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 66391 PG 521

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

#75

#59

END PROJECT
STA 37+87.10
N 2925371.8430
E 675950.9180

APPROXIMATE S.H.L.O. NO. 7960
(FEBRUARY 10, 2010)

PC +62.81
18.51' LT

PT +38.70
33.27' LT

PI +29.57
46.40' LT

PRC +32.43
20.89' LT

MEET EXIST
+68±, 16'± LT

PC +16.31
16.00' LT

PT +66.48
16.02' LT

PRC +38.70
30.68' LT

PCC +24.52
16.00' LT

PCC +87.10

38+50

APPROXIMATE
7/3/1889 COUNTY LAYOUT #3

PT +64.39
21.39' LT

MEET EXIST
+30±, 14'± RT

PC +03.47
26.93' LT

PT +47.72
16.00' RT

PC +76.50
15.46' RT

BENCHMARK: BONNET BOLT
EL=191.60'

MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

APPROXIMATE S.H.L.O. NO. 7960
(FEBRUARY 10, 2010)

PT +05.63
20.03' RT

PCC +38.93
24.29' RT

PC +01.31
16.00' RT

PT +05.63
24.03' RT

PC +39.20
27.00' RT

PC +84.81

PT +85.23
16.00' RT

PC +01.23
28.00' RT

PT +85.40
28.00' RT

PC +81.20
20.15' RT

PC +81.35
24.15' RT

PT +51.32
23.85' RT

PC +47.18
16.00' RT

PC +47.32
28.00' RT

MAP 133 BLOCK 45 LOT 5334
N/F
CONSOLIDATED RAIL CORP
BK 13554 PG 574

MAP 111 BLOCK 50 LOT 1096
N/F
CONSOLIDATED RAIL CORP
CSX TAX DEPT.
PROP TAX DEPT BOX 8499
PHILIDELPHIA, PA
BK 13554 PG 574

CONTINUED ON
SHEET NO. 9

0 20 50 100
SCALE: 1" = 20'

Curve Table			
Curve #	Delta	Radius	Length
C15	92°02'44"	4.00	6.43
C16	87°51'03"	4.00	6.13
C18	90°55'14"	4.00	6.35
C19	89°03'52"	4.00	6.22
C20	87°43'32"	4.00	6.12
C21	93°02'49"	8.00	12.99
C22	16°02'27"	180.00	50.39
C23	55°15'47"	5.00	4.82
C24	58°24'59"	10.00	10.20
C25	11°27'39"	60.00	12.00
C26	79°35'02"	2.00	2.78
C32	7°46'43"	20.00	2.72
C33	25°36'18"	150.00	67.03

CITY OF FRAMINGHAM 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

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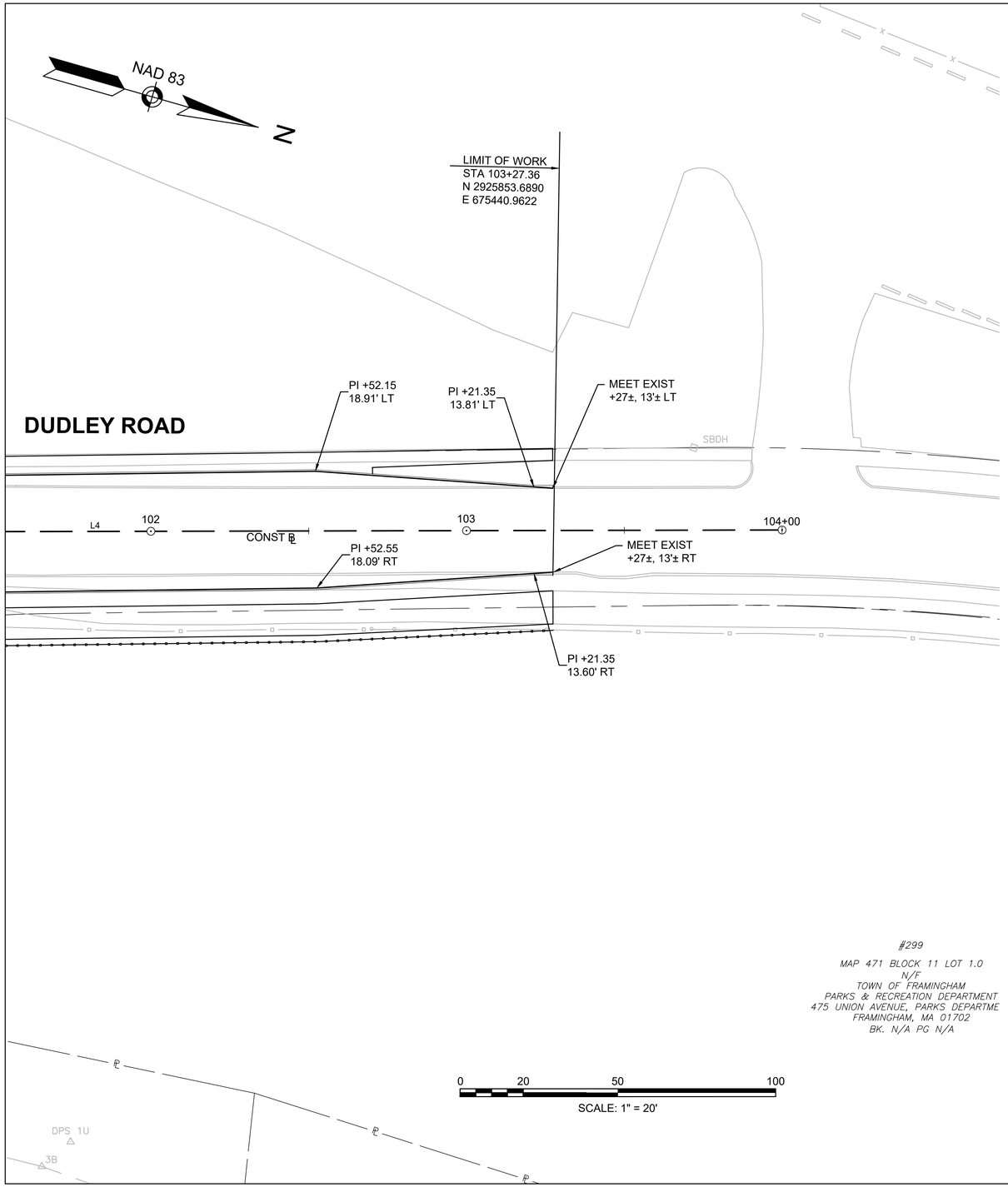
TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CURB TIE PLANS - 02

Sheet No.
10

Drawing file: I:\Framingham\254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\FountainStL_CurbTie.dwg Plot Date: Aug 09,2021-12:19pm



FOUNTAIN STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	30+00.00	2925573.919	675231.159		S81°37'02"E 168.24'	31+68.24	2925549.393	675397.596
C1	31+68.24	2925549.393	675397.596	R=1003.00' Δ=6°29'06" L=113.53' T=56.82'		32+81.76	2925539.227	675510.604
L2	32+81.76	2925539.227	675510.604		S88°06'08"E 203.05'	34+84.81	2925532.503	675713.543
C2	34+84.81	2925532.503	675713.543	R=269.00' Δ=64°23'10" L=302.29' T=169.35'		37+87.10	2925371.843	675950.918
C3	37+87.10	2925371.843	675950.918	R=207.76' Δ=17°20'45" L=62.90' T=31.69'		38+50.00	2925311.334	675967.180

DUDLEY STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L3	100+00.00	2925539.132	675513.468		N1°53'52"E 89.88'	100+89.88	2925628.968	675516.444
C4	100+89.88	2925628.968	675516.444	R=100.00' Δ=18°28'42" L=32.25' T=16.27'		101+22.14	2925660.816	675512.341
L4	101+22.14	2925660.816	675512.341		N16°34'50"W 277.86'	104+00.00	2925927.126	675433.049

ENVIRONMENTAL PARTNERS

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Drawn by	RPH
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TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CURB TIE PLANS - 03

Sheet No. 11

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CONTINUED ON SHEET NO. 14

N

NAD 83

MAP 126 BLOCK 46 LOT 9005
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
PARKS DEPARTMENT, 475 UNION AVENUE
FRAMINGHAM, MA 01702
BK N/A PG N/A

#299
MAP 471 BLOCK 11 LOT 1.0
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
475 UNION AVENUE, PARKS DEPARTMENT
FRAMINGHAM, MA 01702
BK N/A PG N/A

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

DUDLEY ROAD

DUDLEY ROAD CROWN LINE

APPROX LIMIT OF GRADING

BEGIN PROJECT
STA 30+33.32
N 2925551.7405
E 675261.6242

FOUNTAIN STREET CROWN LINE

COUNTY LAYOUT LINE

PC +22.14

PC +89.88

PC +68.24

PT +81.76

PC +84.81

CONST ℄

FOUNTAIN STREET

32+84.63 FOUNTAIN STREET=
100+00.00 DUDLEY STREET

#160

MAP 134 BLOCK 55 LOT 1414
N/F
ROHIT CORPORATION
10 REGENCY RIDGE
ANDOVER, MA 01810
LC BK 1252 PG 172
CERT #224522

#100

MAP 134 BLOCK 55 LOT 6425
N/F
BELCO LLC
100 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 1563 PG 56
CERT. #274265

15' WIDE SEWER AND DRAINAGE EASEMENT

#80

BENCHMARK: BONNET BOLT
EL=176.77'

MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

0 20 50 100
SCALE: 1" = 20'

CONTINUED ON SHEET NO. 13

Drawing file: I:\Framingham 254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\FountainSt_GradingPlans.dwg Plot Date: Aug 09,2021-12:19pm

CITY OF FRAMINGHAM · 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

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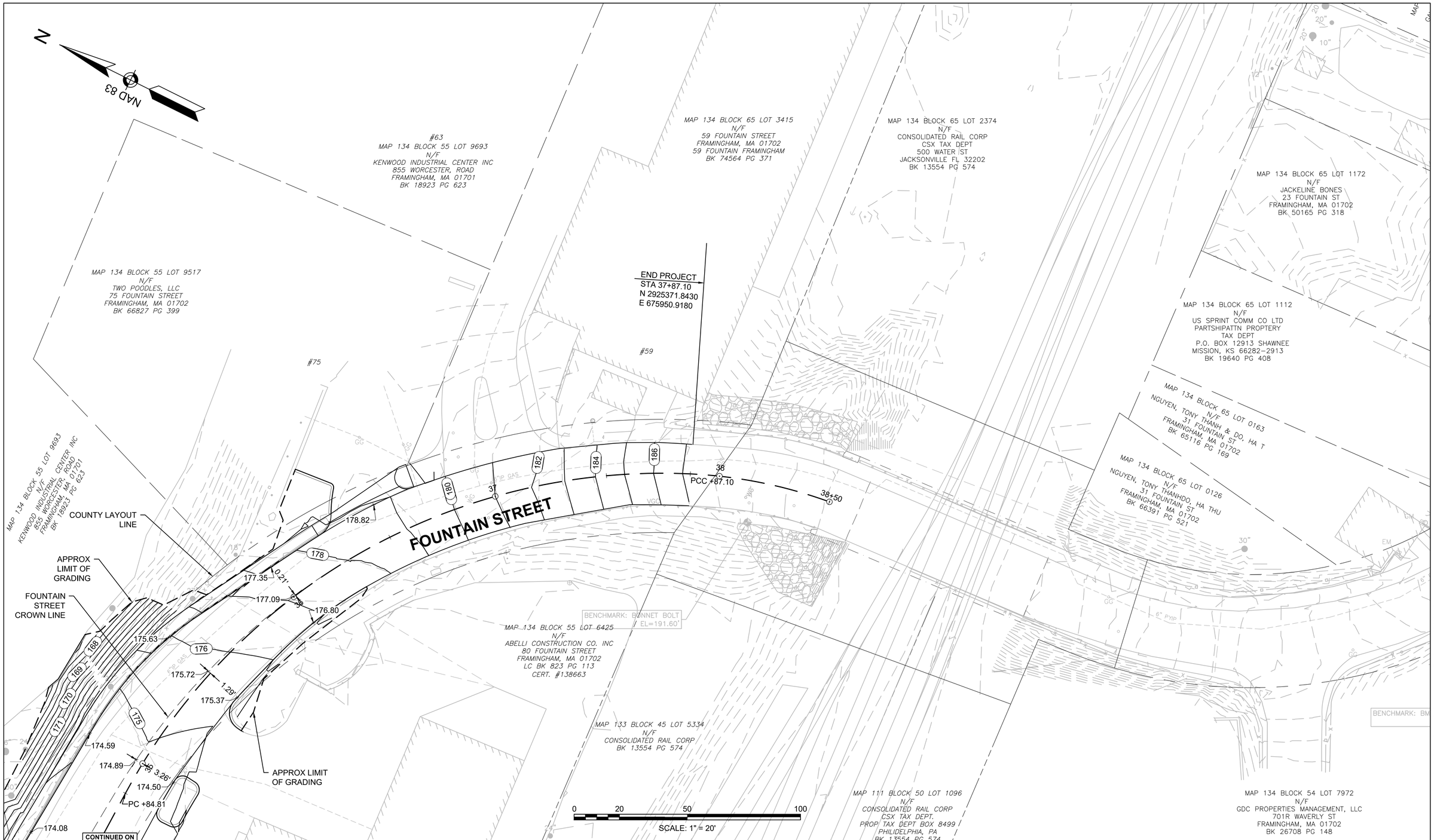
TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

GRADING PLANS - 01

Sheet No.
12



CONTINUED ON SHEET NO. 12

CITY OF FRAMINGHAM 1662 · 1700 · 2018

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
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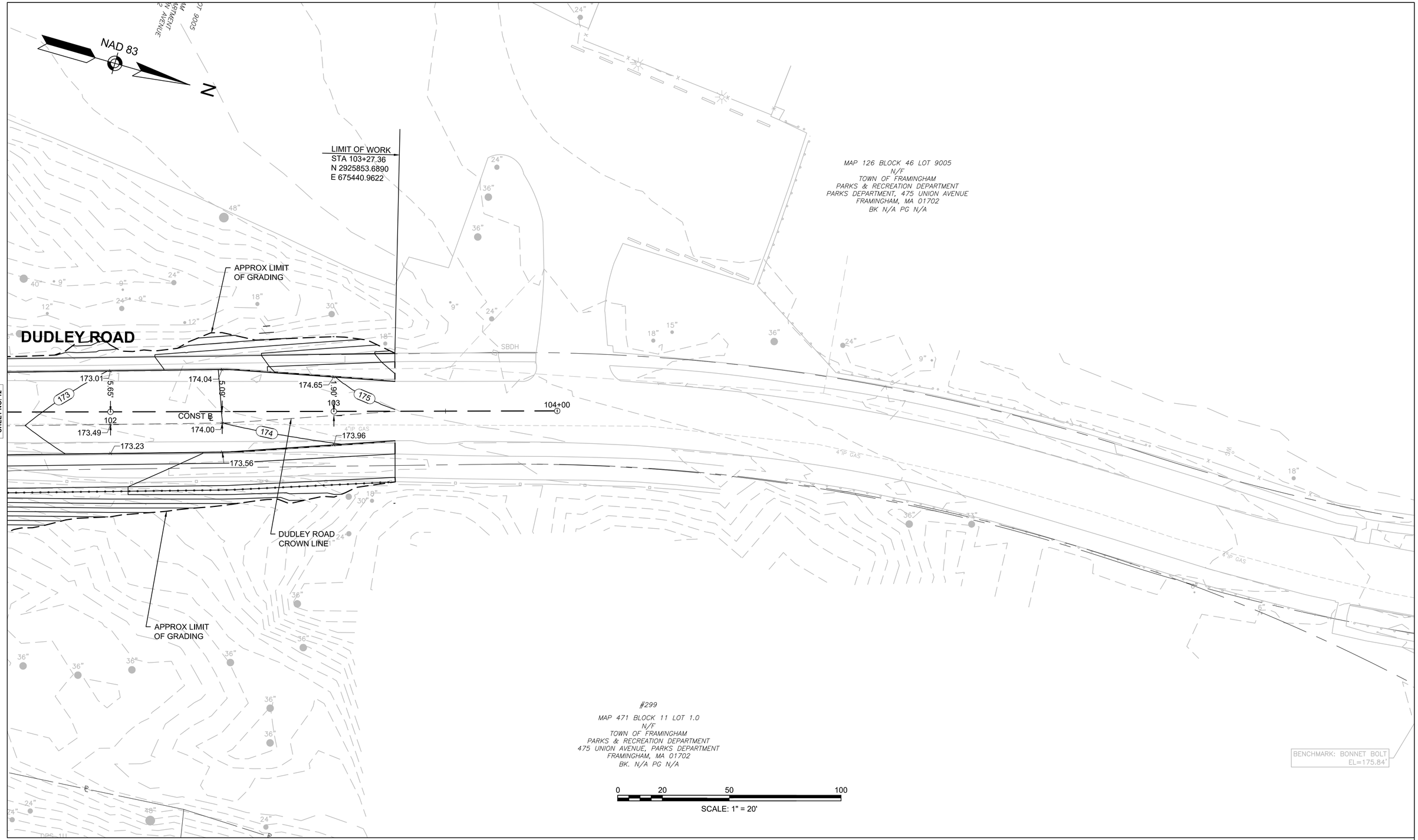
TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

GRADING PLANS - 02

Sheet No.
13

Drawing file: I:\Framingham.254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\FountainSt_GradingPlans.dwg Plot Date: Aug 09,2021-1:25pm



CONTINUED ON SHEET NO. 12

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
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TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

GRADING PLANS - 03

Sheet No.
14

Drawing file: I:\Framingham.254\254-2102 Fountain St Intersection Design\02 ACAD\Sheet\FountainSt_GradingPlans.dwg Plot Date: Aug 09,2021-12:20pm

CITY OF FRAMINGHAM

DEPARTMENT OF PUBLIC WORKS | CAPITAL PROJECTS

Blake D. Lukis
Director
Diane M. Conner
Deputy Director of Administration
William R. Sedewitz, P.E.
Chief Engineer

508-532-6040
dpwprojects@framinghamma.gov
www.framinghamma.gov

CAPITAL BUILDING
110 Western Avenue
Framingham, MA 01702

M E M O R A N D U M

DATE: September 23, 2020

TO: William Sedewitz, PE Chief Engineer

CC: Simon Alexandrovich, PE, Director of Transportation Engineering

FROM: Matthew Hayes, PE, Senior Project Manager *MJH*

RE: Fountain Street / Dudley Road Intersection Improvements – Design & Construct FY22 Capital Funding Request

The purpose of this memorandum is to provide a project description and estimate for the improvements at the Fountain Street at Dudley Road Intersection.

The Fountain Street at Dudley Road Intersection is a three way intersection with a fourth signalized approach from a commercial driveway. The intersection was signalized during the replacement of the Fountain Street bridge in 2011. The existing traffic signal was installed as, and meant to be, a temporary signal for the bridge project. The intersection is the final portion of the Fountain Street corridor proposed to be upgraded. Several previous projects have been completed within the corridor, including: the Fountain Street bridge replacement (MassDOT 2011); the Winter Street bridge replacement and Intersection improvements (MassDOT 2017); water main replacement and sewer improvements (CoF 2018); and Fountain Street roadway and sidewalk improvements (CoF 2019).

The proposed Intersection Improvement Project includes the installation of a new permanent traffic signal; ADA compliant sidewalks, ramps and pedestrian signals; improved intersection geometry, including longer turning lanes and a new turning lane on Dudley Road; and drainage enhancements to improve water quality in Farm Pond, which is currently listed as an Impaired Waterbody.

The Project is in the final stages of design. The Opinion of Probable Cost for this project, including Final Design, Permitting and Construction is $2,600,000.

CONTINUED ON SHEET NO. 5

N

NAD 83

DUDLEY ROAD

FOUNTAIN STREET

MAP 126 BLOCK 46 LOT 9005
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
PARKS DEPARTMENT, 475 UNION AVENUE
FRAMINGHAM, MA 01702
BK N/A PG N/A

PROP TREE TRIMMING AS NEEDED FOR UTILITY WORK (BO) (TYP)

PROP GRAN CURB, TYPE VA-4 (TYP)

PROP LOAM & SEED

PROP 6' CEM CONC WALK

PROP FULL DEPTH PVM'T

PROP TEMP EASEMENT

R&R GRAN CURB

PROP UP (BO)

PROP LINE OF EASEMENT

PROP PUSH BRACE (BO)

RET EXIST CEM CONC WALK & GRAN CURB

RET EXIST HMA DRIVEWAY

SAWCUT; MEET EXIST

R&D EXIST UP (BO)

PROP TS POST (TYP)

TREE PROTECTION FENCE (TYP)

PROP CEM CONC PEDESTRIAN CURB RAMP

PROP GUY (BO)

R&S TRAFFIC SIGNAL EQUIPMENT AND VGC (TYP)

PROP LINE OF EASEMENT

RET EXIST UP

PROP 6' CEM CONC WALK

SAWCUT

PROP LANDSCAPE PLANTER ISLAND

R&D UTILITY POLE (BO)

PROP 10' WIDE CEM CONC PEDESTRIAN CURB RAMP

PROP CURB CORNER TYPE A (TYP)

PROP ACCESS POINT FOR MAINTENANCE VEHICLES

PROP GRAN CURB, TYPE VA-4 (TYP)

PROP 5' GRASS STRIP

PROP 10' HMA SHARED USE PATH

R&R WOODEN GUARDRAIL

TREE PROTECTION FENCE (TYP)

#299
MAP 471 BLOCK 11 LOT 1.0
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
475 UNION AVENUE, PARKS DEPARTMENT
FRAMINGHAM, MA 01702
BK N/A PG N/A

MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

R&R GRAN CURB

PROP ACCESS GATE

GRAVEL DRIVE

STEEL W BEAM TERMINAL SECTION

APPROX LIMIT OF GRADING

PROP LOAM & SEED

PROP GUARDRAIL, TL-2 (SINGLE-FACED)

R&D PAVEMENT AND SIDEWALK

PROP UNIT PAVER WALK

PROP CEM CONC PEDESTRIAN CURB RAMP (TYP)

APPROXIMATE 7/3/1889 COUNTY LAYOUT #3

PROP LINE OF EASEMENT

#63
MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

PROP TEMP EASEMENT

PROP GRAN CURB, TYPE VA-5 (8" REVEAL MAX)

PROP GUARDRAIL, TL-2 (SINGLE-FACED), DEEP POST

PROP GUY (BO)

PROP FULL DEPTH PVM'T

REM TREE

R&R GRAN CURB (TYP)

PROP 5.5' CEM CONC WALK

SAWCUT

PROP GUY POLE (BO)

PVM'T MILLING AND OVERLAY

PROP HMA DRIVEWAY (TYP)

PC +68.24

R&D TEMP SIGNAL POLE (TYP)

PT +81.76

100+00

R&R HYDRANT

R&D EXIST UP (BO)

CONST B

PC +84.81

PROP LOAM & SEED

MEET EXIST GRAN CURB

PROP MULCH

PROP TEMP EASEMENT

PROP GRAN CURB, TYPE VA-4

BEGIN PROJECT
STA 30+33.32
N 2925551.7405
E 675261.6242

REM UP ANCHOR (BO)

APPROX LIMIT OF GRADING

RET TREE

PROP PLANTING BED

PROP UP (BO)

PROP GUYS (BO)

SAWCUT MEET EXIST

PROP HMA BERM TYPE "A" MODIFIED

LINE OF EASEMENT

32+84.63 FOUNTAIN STREET=
100+00.00 DUDLEY STREET

PROP FULL DEPTH PVM'T WIDENING (TYP)

PROP CEM CONC PEDESTRIAN CURB RAMP (TYP)

PROP TS POLE WITH MAST ARM (TYP)

PROP 6.5' CEM CONC SIDEWALK

REM TREES (4)

R&D TEMP SIGNAL POLE

PROP SPLAYED END

PROP UP (BO)

PROP PUSH BRACE (BO)

PROP PLANTING BED

PROP HMA BERM TYPE "A" MODIFIED

PROP LINE OF EASEMENT

PROP TEMP EASEMENT

SAWCUT; MEET EXIST

R&D EXIST UP (BO)

PROP UP (BO)

PROP LOAM & SEED

LINE OF EASEMENT

PROP HMA BERM TYPE "A" MODIFIED

PROP TEMP EASEMENT

RET EXIST UP

MAP 134 BLOCK 55 LOT 1414
N/F
ROHIT CORPORATION
10 REGENCY RIDGE
ANDOVER, MA 01810
LC BK 1252 PG 172
CERT #224522

MAP 134 BLOCK 55 LOT 6425
N/F
BELCO LLC
100 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 1563 PG 56
CERT. #274265

MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

BENCHMARK: BONNET BOLT
EL=176.77'

15' WIDE SEWER AND DRAINAGE EASEMENT

TEMP (6 total)

PERM (5 total)

0 20 50 100

SCALE: 1" = 20'

CONTINUED ON SHEET NO. 4

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

ENVIRONMENTAL PARTNERS

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 01

Sheet No. 3

Drawing file: C:\Users\mes\appdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot Date: Aug 09,2021-5:17pm

NAD 83

#63
MAP 134 BLOCK 55 LOT 9693
N/F
KENWOOD INDUSTRIAL CENTER INC
855 WORCESTER, ROAD
FRAMINGHAM, MA 01701
BK 18923 PG 623

MAP 134 BLOCK 65 LOT 3415
N/F
59 FOUNTAIN STREET
FRAMINGHAM, MA 01702
59 FOUNTAIN FRAMINGHAM
BK 74564 PG 371

MAP 134 BLOCK 65 LOT 2374
N/F
CONSOLIDATED RAIL CORP
CSX TAX DEPT
500 WATER ST
JACKSONVILLE FL 32202
BK 13554 PG 574

MAP 134 BLOCK 65 LOT 1172
N/F
JACKELINE BONES
23 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 50165 PG 318

MAP 134 BLOCK 65 LOT 1112
N/F
US SPRINT COMM CO. LTD
PARTSHIPATTN PROP
TAX DEPT
P.O. BOX 12913 S
MISSION, KS 66282
BK 19640 PG 4

MAP 134 BLOCK 65 LOT 0163
N/F
NGUYEN, TONY THANH & DO. HA T
31 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 65116 PG 169

MAP 134 BLOCK 65 LOT 0126
N/F
NGUYEN, TONY THANHDO, HA THU
31 FOUNTAIN ST
FRAMINGHAM, MA 01702
BK 66391 PG 521

MAP 134 BLOCK 55 LOT 9517
N/F
TWO POODLES, LLC
75 FOUNTAIN STREET
FRAMINGHAM, MA 01702
BK 66827 PG 399

MAP 134 BLOCK 55 LOT 6425
N/F
ABELLI CONSTRUCTION CO. INC
80 FOUNTAIN STREET
FRAMINGHAM, MA 01702
LC BK 823 PG 113
CERT. #138663

MAP 133 BLOCK 45 LOT 5334
N/F
CONSOLIDATED RAIL CORP
BK 13554 PG 574

MAP 111 BLOCK 50 LOT 1096
N/F
CONSOLIDATED RAIL CORP
CSX TAX DEPT.
PROP TAX DEPT BOX 8499
PHILIDELPHIA, PA
BK 13554 PG 574

MAP 134 BLOCK 54 LOT 7972
N/F
GDC PROPERTIES MANAGEMENT, LLC
701R WAVERLY ST
FRAMINGHAM, MA 01702
BK 26708 PG 148

END PROJECT
STA 37+87.10
N 2925371.8430
E 675950.9180

RAIL ROAD
SIDELINE (TYP)

RET EXIST
CEM CONC
DRIVEWAY

PROP PVM'T MILL AND
OVERLAY

SAWCUT
MEET EXIST SIDEWALK

PROP CEM CONC
DRIVEWAY

PROP HMA
DRIVEWAY

SAWCUT
MEET EXIST

PROP HMA BERM TYPE "A" MODIFIED

MEET EXIST HMA BERM

APPROX LIMIT OF
GRADING

GUARDRAIL TANGENT
END TREATMENT, TL-2

PROP LOAM &
SEED

TREE PROTECTION
(TYP)

PROP 5.5' CEM
CONC WALK

R&R GRANITE
CURB (TYP)

PROP TEMP
EASEMENT

PROP GUARDRAIL,
TL-2 (SINGLE-FACED),
DEEP POST

PROP FULL
DEPTH PVM'T

REM
TREE

PROP VA-5
CURB (8"
REVEAL MAX)

PROP LINE OF
EASEMENT

SAWCUT
MEET EXIST
PROP GUY
(BO)

REM
TREE

PROP GUY
POLE (BO)

PC +84.81

CONTINUED ON
SHEET NO. 3

RET EXIST UP

PCC +87.10

CONST ℄

MEET EXISTING HMA BERM

RET EXIST UP

PROP FULL DEPTH PVM'T
LESS THAN 4' WIDE

PROP HMA BERM TYPE "A" MODIFIED

PROP LINE OF EASEMENT

PROP TEMP EASEMENT

PROP LOAM & SEED

APPROX LIMIT OF GRADING

SAWCUT
MEET EXIST

PROP UP (BO)

R&D EXIST UP (BO)

PROP HMA BERM TYPE "A" MODIFIED

PROP LOAM & SEED

SAWCUT
MEET EXIST

APPROXIMATE S.H.L.O. NO. 7960
(FEBRUARY 10, 2010)

APPROXIMATE
7/3/1889 COUNTY LAYOUT #3

FOUNTAIN STREET

BENCHMARK: BONNET BOLT
EL=191.60'

BENCHMARK: BM

TEMP (6 total)

PERM (5 total)

SCALE: 1" = 20'

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

ENVIRONMENTAL PARTNERS

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 02

Sheet No. 4

Drawing file: C:\Users\mesiappdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot: Date: Aug 09,2021-5:17pm

NAD 83

N

19
N: 2925576.640'
E: 675401.001'
EL: 175.408'
MAGNAIL

12" RCP
INV EL=163.85'

67
N: 2925673.468'
E: 675485.344'
EL: 173.017'
MAGNAIL

LIMIT OF WORK
STA 103+27.36
N 2925853.6890
E 675440.9622

PROP TREE TRIMMING AS NEEDED FOR UTILITY WORK (BO) (TYP)

PROP 6' CEM CONC WALK

PROP GRAN CURB, TYPE VA-4

R&D EXIST UP (BO)

PROP TEMP EASEMENT

APPROX LIMIT OF GRADING

PROP LOAM & SEED

PROP UP (BO)

SAWCUT MEET EXIST SIDEWALK

PROP SPLAYED END

MEET EXIST EDGING

4

5

PROP FULL DEPTH PVM'T

CONST B

SAWCUT MEET EXIST

102

103

104+00

PROP 10' PVM'T TRANSITION

DUDLEY ROAD

MEET EXIST EDGING

PROP 5' GRASS STRIP

PROP SPLAYED END

R&R WOODEN GUARDRAIL

SAWCUT MEET EXIST SHARED USE PATH

PROP GRAN CURB, TYPE VA-4

PROP 10' HMA SHARED USE PATH

PROP LOAM & SEED

APPROX LIMIT OF GRADING

TREE PROTECTION FENCE (TYP)

MAP 126 BLOCK 46 LOT 9005
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
PARKS DEPARTMENT, 475 UNION AVENUE
FRAMINGHAM, MA 01702
BK N/A PG N/A

#299

MAP 471 BLOCK 11 LOT 1.0
N/F
TOWN OF FRAMINGHAM
PARKS & RECREATION DEPARTMENT
475 UNION AVENUE, PARKS DEPARTMENT
FRAMINGHAM, MA 01702
BK. N/A PG N/A

TEMP (6 total)

PERM (5 total)

0 20 50 100

SCALE: 1" = 20'

BENCHMARK: BONNET BOLT
EL=175.84'

CONTINUED ON SHEET NO. 3

ENVIRONMENTAL PARTNERS

MARK	DATE	DESCRIPTION

Scale	AS NOTED
Date	AUGUST 2021
Job No.	254-2102
Designed by	RPH
Drawn by	RPH
Checked by	MES
Approved by	JDF

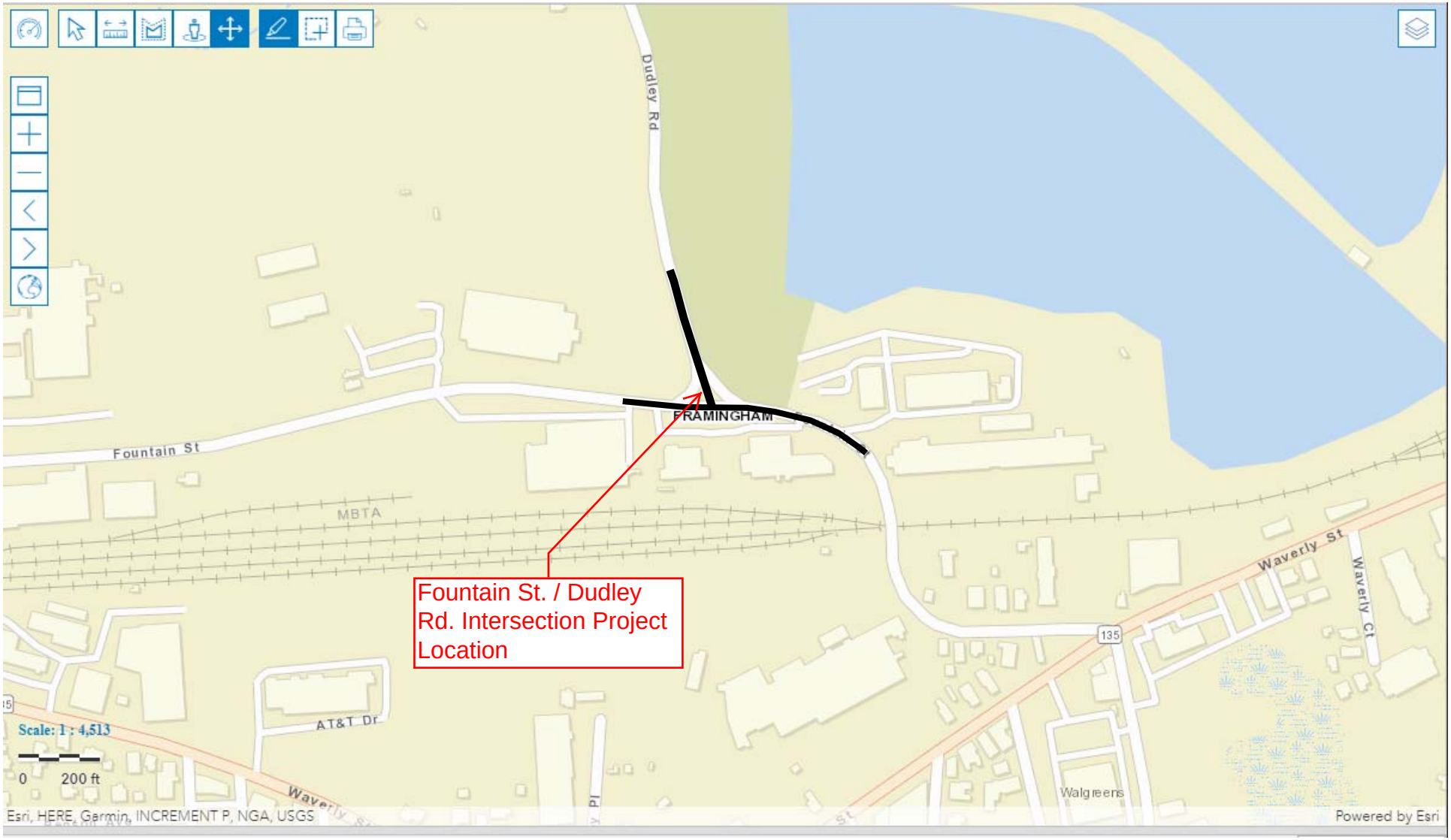
THIS LINE IS ONE INCH LONG WHEN PLOTTED AT FULL SCALE ON A 22" X 34" DRAWING

TRANSPORTATION IMPROVEMENT PROJECT
FOUNTAIN STREET AT DUDLEY ROAD
FRAMINGHAM, MA

CONSTRUCTION PLANS - 03

Sheet No. 5

Drawing file: C:\Users\mes\appdata\local\temp\AcPublish_11044\FountainSt_ConPlans.dwg Plot Date: Aug 09,2021-5:17pm



Fountain St / Dudley Rd Intersection

Fountain Street/Dudley Road Intersection Construction – FY24 Capital Project Submission – Department of Public Works

Existing Intersection Conditions











Culvert Assessment and Prioritization Report

Framingham, MA

PREPARED FOR

City of Framingham
Department of Public Works
110 Western Avenue
Framingham, MA, 01702
508.532.5600

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
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MARCH 2021

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Executive Summary

The City of Framingham (the City) contracted VHB to perform an assessment of city-owned culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. The project was deemed necessary because culvert failures have the potential to significantly impact traffic, public safety, and cause property damage. In addition, many culverts throughout the City do not meet the latest environmental standards for stream crossing, resulting in poor aquatic passage and environmental health, as well as insufficient hydraulic capacity which can cause flooding impacts. While there are privately-owned culverts and culverts owned by other government agencies within the city's boundary, the project evaluated only city-owned culverts, as the City of Framingham is responsible for their maintenance as well as impacts associated with culvert failures.

VHB performed the field assessments of city-owned culverts from January 2020 through March 2021 evaluating various culvert criteria. The City created electronic work orders for each culvert, via the VUEworks asset management software and VHB performed field assessments and desktop review at each culvert location. All assessment data and pictures were collected electronically using the City's work order system. As part of the field and office review, VHB identified specific culverts that were difficult to evaluate due to poor visibility. These poor visibility culverts were then revisited and evaluated using CCTV in order to collect additional assessment data.

VHB and the City created a scoring matrix to assist in the prioritization of culverts. This scoring matrix created a "Risk Score" for each culvert assessed that incorporated the data collected as well as additional criteria including roadway classification and watershed area. High-level cost estimates were then developed for the ten (10) culverts which received the highest risk score.

- In summary, VHB evaluated a total of 98 culverts and gave them overall ratings of "adequate", "poor," or "critical" based on the conditions of individual culvert components and the potential impact of culvert failure at each location. The ratings generally were defined as:
  - Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.
  - Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
  - Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

› As previously stated, the evaluation included 98 city-owned culverts. Of the evaluated culverts, the following results were found:

Condition	Number of Culverts
Critical	9
Poor	33
Adequate*	56
Total (City-owned Culverts)	98

*Millwood Street culvert (Asset ID 2511576) was recently replaced and is assumed to be adequate.

Culverts rated poor and critical have the potential to impact adjacent infrastructure or property. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway.

- Culvert conditions, risk scores and locations are viewable in an ArcGIS Online dashboard (https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a) and Figure 7 in the report.

› Culverts were evaluated for actions that require immediate action including debris and vegetation blockage, critical scour and erosion, and unstable structures. The following results were found:

Immediate Action Item	Number of Culverts
Debris/Vegetation Blockage*	22
Critical Scour/Erosion	0
Unstable Structure	8

*There were 5 culverts where blockage was the only issue

› The conditions of the culvert and the culvert parts, such as footings, joints and seams, and headwalls, were used to develop a risk score for all evaluated culverts to determine culverts with the highest risk of failure. High-level cost estimates, which can be seen in Appendix 4, were then developed for the ten (10) culverts which received the highest risk score. The ten culverts which received the highest risk scores were the 9 critical culverts and the Fountain St (Asset ID:2506913) culvert, which was rated poor.

› The highest scored culverts and their associated cost estimates are:

High Risk Culverts and Cost Estimates

Risk Score	Asset ID	Approximate Location	Summary of Condition	Approximate Replacement Cost and Resolution	
83.0	2505652	172 Hartford St	Collapsed stone culvert causing blockage	$755,000	Concrete culvert
77.0	2511942	82 Herbert St	Collapsed stone culvert and sediment causing blockage	$285,000	Concrete culvert
76.2	2515114	65 Bates Rd	Severe deterioration and crushing of corrugated metal pipes	$1,067,000 $273,000	20’ Bridge or Open Channel
75.1	2506907	15 Gates St	Severe deterioration of corrugated metal pipe and outlet control structure	$988,000	Concrete culvert
74.3	2511788	38 Wayside Inn Rd	Unstable stone structure and embankment erosion	$303,000	Concrete culvert
71.3	2511831	704 Salem End Rd	Unstable stone structure with partial roof collapse	$964,000	Concrete culvert
71.1	2511778	93 Parmenter Rd	Collapsed stone culvert causing blockage	$244,000	Concrete culvert
69.2	2506912	14 Badger Rd	Severe blockage caused by collapsed stone headwalls	$449,000	Concrete culvert
61.5	2506913	250 Fountain St	Significant debris blockage and unstable headwall	$412,000	Concrete culvert
60.3	2511728	43 Garvey Rd	Displaced outlet control structure	$228,000	Outlet control structure only

› Flooding occurs in areas throughout the City:

- Several culverts and channels need routine maintenance. This includes channel clearing, dredging and blockage removal. These maintenance items are likely contributing to flooding issues.
- In other areas flooding is complex and likely requires further evaluation and study to evaluate alternatives for improvements

› VHB provides the following recommendations:

- The City should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- The City should develop a city-specific inspection frequency of culverts; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City’s Department of Public Works should address “immediate actions” flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity.
- For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

1

Introduction

The City of Framingham (the City) contracted VHB to perform an assessment of culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. The project's goals are to identify culverts with poor structural integrity, create a scoring matrix to identify risk of each culvert, prioritize culverts for improvements, and develop cost estimates for high priority culverts.

In summary this report will:

- Describe background information including the City's GIS database, culvert evaluation methodology, data collection methods, and CCTV evaluation,
- Present data from field evaluations,
- Identify locations with known flooding issues,
- Provide a prioritization of improvements of culverts based on their risk score, and
- Provide cost estimates to perform repairs and replacements for high risk culverts.

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2

Background Information

A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. For the purposes of this assessment, a stream crossing was considered a culvert if the span of the crossing was less than 10 feet in width. Crossings with spans of 10 feet or greater are considered bridges by the Massachusetts Chapter 85 regulations and are subject to additional regulations and require certified bridge inspectors. Bridges were not included in this report.

This section details the City's existing GIS data, the culvert evaluation criteria, and field collection processes used for the culvert assessments.

City of Framingham GIS Database

The City of Framingham's culvert and stormwater drainage data is currently stored electronically in a Geographic Information Systems (GIS) geodatabase. The City's geodatabase stores the culvert and drainage data geospatially, based on their location. Each culvert, catch basin, pipe, manhole and outlet are stored as unique assets in the geodatabase. Each unique asset has attributes associated with it, providing details on the structure's characteristics such as length, shape, material, year installed, and a unique identifier. VHB found that some culverts are further broken up into separate assets depending on length, layout, or material changes in the culverted segment. An example is a culvert that is stone at the upstream opening and concrete in the downstream section. Such a culvert may be in GIS as two separate assets, one for the upstream segment, with the material described as "Stone" and one for the downstream segment, with the material as

"Concrete". For culvert evaluations at a location with multiple assets, this report names the asset whose AssetID was populated in the associated work order. VHB did a high-level review of the culvert data confirming no duplicate work orders, culverts were city-owned, and assets were associated with each work order, though VHB relied on the accuracy of culvert asset attributes provided by the City to complete the culvert assessments.

The data is accessible to VHB through the City's VUEWorks web application and the VUEWorks MobileVue mobile application. VHB was assigned 98 work orders by the City in VUEWorks to evaluate 155 of the City's culvert assets. Each work order has an associated culvert asset or assets, depending on potential segmentation in the GIS data, as described above. For example, one work order may have 3 culvert assets associated with it because the culvert is composed of 3 segments with different materials and there is a separate asset for each material segment. Because the three assets compose one culvert crossing, they are included in the same work order. The work order evaluation considers the condition of each asset that composes the total culvert and bases the overall culvert condition on the condition of the multiple parts of the culvert. The notes section of the work order was used to describe conditions of the individual assets if the conditions varied significantly. While the culvert asset includes attributes to describe constant characteristics, the work orders are where the field assessment data is recorded. The work order data records condition information at the time of the field visit. Fifteen assessment locations were initially included in the assigned work orders but were found to be previously included in the 2013 Bridge Master Plan. Prior to learning the locations were bridges and were included in the Bridge Master Plan, VHB completed field inspections on 9 of the locations. These locations were not included in the findings of this report as they have been previously evaluated. VHB also did not include a potentially collapsed culvert (Asset ID 2511576) on Millwood Street, directly south of Callahan State Park South Entrance. This culvert was evaluated by the developer of a nearby development and has been replaced as of September 29, 2020.

Culvert Evaluation Methodology

Prior to the start of VHB's culvert assessments, the City of Framingham had completed 37 culvert assessments within the City. The City's assessments and their workorder template were based upon the "Culvert Condition Assessment Manual"[1] 2017 Edition. Since the development of this 2017 Assessment Manual, subsequent culvert assessment guidance has been developed by Massachusetts Department of Transportation (MassDOT) and the recently released (August 2020) American Association of State Highway and Transportation Officials (AASHTO) Culvert and Storm Drain System Inspection Guide[2]. VHB and the City of Framingham project manager and stormwater engineer worked with the City's GIS group to update the previously used rating system to incorporate the applicable evaluation criteria

1 The Center for Agriculture, Food, and the Environment, North Atlantic Aquatic Connectivity Collaborative, The Nature Conservancy, and UMass Amherst Transportation Center. "Culvert Condition Assessment Manual". https://streamcontinuity.org/sites/streamcontinuity.org/files/pdf-doc-ppt/CulvertManual_2019_082919.pdf

2 AASHTO, Culvert and Storm Drain System Inspection Guide, 1st Edition, 2020. https://aashtojournal.org/2020/08/14/aashto-releases-culvert-storm-drain-inspection-guide/

from the new MassDOT and initial AASHTO guidance into a new work order template. The fields that were added to the new work order template include:

Features

- Channel Width Upstream
- Channel Width Downstream
- Depth to Roadway

Condition

- Evidence of flooding
- Embankment erosion

Immediate Action Items

- Debris/Vegetation Blockage
- Structure Unstable
- Critical Scour/Erosion

The new work order template was created in VUEWorks (Appendix 5) to balance the need to efficiently evaluate nearly one hundred culverts while obtaining sufficient condition information in order to properly prioritize culvert repairs. VHB reevaluated the 37 previously evaluated culverts as part of the city-wide assessments using the updated assessment criteria to create consistency across all evaluated culverts and allow for a consistent ranking methodology. VHB evaluated the following criteria of each culvert:

General Criteria

- **Channel Width Downstream/Upstream:** These fields document the average width of the stream channel, in feet, upstream and downstream of the culvert.
- **Culvert Shape:** The shape of the culvert
- **Culvert Size:** Size of the culvert. For circular culverts, the width field was used to document the diameter, in inches. For rectangular or ellipse culverts, height and width were documented in the appropriate field
- **Culvert Material:** Material the length of culvert is composed of.
- **Number of Culvert Crossings:** Number of culvert pipes at the crossing location.
- **Depth to Roadway:** Depth from the top of the culvert opening to the roadway surface above.
- **Inlet Grade:** Describes if the upstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Outlet Grade:** Describes if the downstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Inlet Type:** Describes the type of structure present at the upstream end of the culvert.

- **Outlet Type:** Describes the type of structure present at the downstream end of the culvert.
- **Roadway Condition:** Describes the condition of the roadway directly above the culvert through visual evaluation of cracking or sinking.
- **Overall Culvert Condition:** Overall condition of the culvert considering the condition of all individual parts of the culvert evaluated

Structural Criteria

- **Headwall/Wingwall:** Condition of the headwall/wingwall, if present, structure depending on visual evidence of cracking, spalling, exposed rebar, and settlement of structure.
- **Footings:** Condition of the culvert footing, if present.
- **Invert Deterioration:** Condition of the culvert's bottom material, if not an open bottom culvert. Condition assessment considers evidence of corrosion, perforations, spalling, etc. depending on visual evidence of cracking, weathering, settlement or undermining.
- **Buoyancy or Crushing:** Degree to which the culvert has been deformed by the weight of the pipe, weight of the fill material above the pipe or the weight of the water in the pipe.
- **Cross-Section Deformation:** Degree to which the culvert is deformed or distorted resulting in flattening of the invert and/or crown of the pipe.
- **Structural Integrity of Barrel:** Condition of the culvert barrel depending on the presence of cracking and deterioration around bolts and seam or tearing of material.
- **Level of Blockage:** Degree of debris, sediment, or vegetation blockage of the interior of the culvert.
- **Utility Encroachment:** If other utilities are within or adjacent to the culvert crossing that would require additional coordination if work was to be performed on the culvert.
- **Joints and Seams:** Condition of the joints and seams, if present, based on visual evidence of separation of joints and seams.

Hydrology/Hydraulic Criteria

- **Longitudinal Alignment:** the angle measured from the upstream channel to the centerline of the culvert barrel at the culvert opening.
- **Embankment Erosion:** If there is evidence of erosion from the ground material surrounding the culvert.
- **Embankment Piping:** If there is presence of water seeping through the culvert barrel into the surrounding embankment material
- **Evidence of Flooding:** If there is evidence the stream bank has flooded, including debris lines or discoloration on trees.
- **Apron/Scour Protection:** Condition of the apron or scour protection, if present, based on evidence of undermining of culvert, deterioration of joint between apron and headwall, and presence of a scour hole downstream of the apron.

- **Armoring:** This field was used in the field evaluation to document the presence of scour at the culvert.

Immediate Maintenance Items

Evidence of the following are noted to require immediate action:

- **Critical Scour/Erosion:** Presence of scour or erosion that creates an immediate hazard.
- **Debris/Vegetation Blockage:** Presence of vegetation or debris that blocks the culvert opening, creating an immediate flooding hazard.
- **Structure Unstable:** If the structure's condition is unstable and could cause an immediate collapse of the culvert.

Culvert shape, size, and material fields required text or numerical descriptions for their responses. All other criteria above utilized set domains for responses with either a check box for a "yes" or "no" domain or a domain of "adequate", "poor", "critical", and "N/A" to describe the culvert criteria's condition. To create consistency across all culvert assessments and with varying team members performing the assessments, VHB followed the Culvert Assessment Manual Methodology to assign ranking to each criteria included in the field assessments.

Collection Methods

The City of Framingham created and assigned work orders for each assessment location using the City's VUEWorks account. VHB collected data in the field using the VUEWorks MobileVue mobile application (Figure 1). Utilizing the mobile application allowed for streamlined data management, with data, both evaluations and photographs, being loaded directly from the mobile application into the City's geodatabase and associated with the culvert assets.

All culvert assessments were evaluated by two-person teams consisting of one water resource engineer and one structural engineer to evaluate the culverts for performance and functionality from both the hydrologic and structural perspectives. Culvert assessments were completed between January 2020 and March 2021. VHB's field teams provided details about criteria rated poor or critical in the "notes" field of the culvert's assessment and included additional pictures to show the poor or critical feature.

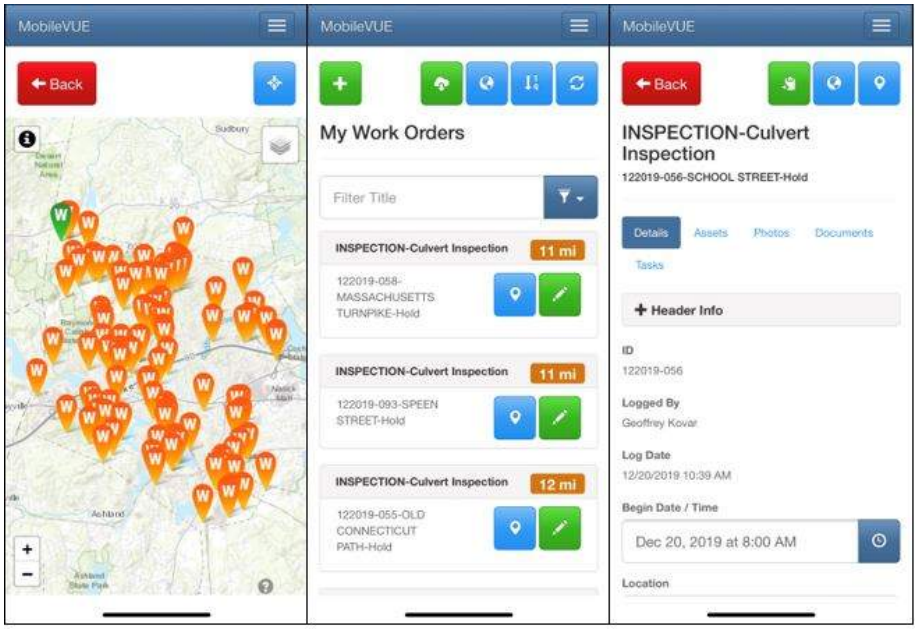


Figure 1 Screenshots of the VUEWorks MobileVUE application

In addition to the above criteria evaluated in the field, VHB also found the watershed area to each culvert using U.S. Geological Survey (USGS) StreamStats[3] web application for available streams and the roadway functional classification at each culvert using the MassDOT Roadway Inventory[4] web application. Both the criteria collected in the field and the criteria supplemented through the above web applications were used in ranking the risk of failure for each culvert.

At the completion of each field assessment, VHB's field staff updated the culvert's work order status from "Open" to "Hold" to signify the field evaluation was completed and allow VHB's office staff to perform a quality review of the data collected. The quality reviewers utilized the photos attached to the culvert assessment in the VUEWorks web application to determine if the assigned criteria aligned with what was visible in the photos. Once final review was complete, the work order statuses were set to "Closed". In the VUEWorks web application, users can access the work orders by selecting "Find / Manage / Report" under "Work Orders" in the left pane of the map viewer. Once the "Manage Work Order" pop-up appears, the user can filter by setting Department to be "Engineering", Program to "Inspection", Activity Description to "Culvert Inspection" and Status to "Closed". Once the filter is applied, the list of work orders is shown under the "Table View" tab. When a work order is selected in the "Table View" tab the details of the work order are viewable under the "Form View" tab, photos are saved under the "Documents" subtab. A specific asset can also be viewed by selecting "Find/Manage/Report" under "GIS Assets" in the left pane of the map viewer. Once the "GIS Assets" pop-up appears populated the field "Table / Layer" with "Drain Pipe", set "Field" to "ASSETID", "Operator" to "Equal To" and type the culvert's Asset ID

3 U.S. Geological Survey (USGS). StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water Resource Applications. https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects

4 Massachusetts Department of Transportation. Roadway Inventory Web Application. https://gis.massdot.state.ma.us/roadinventory/

referenced in this report into the fourth box and "Apply Filter". The reviewers noted if additional data or photos were needed from the field. If additional information was needed, VHB's field staff revisited the culvert location and updated the evaluation form with the additional information. In addition to revisiting structures for additional information, all critical structures were revisited with a senior engineer and utility engineer to review potential constructability issues.

CCTV Evaluation

Through field culvert evaluations and office review, VHB identified culvert locations where the inside of the culvert couldn't be fully evaluated due to length, alignment, or high-water levels. These culverts were identified as locations to perform video evaluations using closed circuit television (CCTV) cameras to record the inside of the culvert where the structure's condition was not visible in the field. Twenty-one culverts were identified to have a CCTV evaluation be performed (Table 1). Nine (9) of the culverts were identified as having high-water levels that would require dewatering of the culvert prior to performing the CCTV evaluation.

Table 1 Culvert Locations for CCTV Evaluation

Culvert Work Order	Asset ID	Nearby Address	Dewatering Needed
122019-087	2511831	704 Salem End Road	No
122019-088	2511840	635 Salem End Road	No
122019-054	2508317	121 A Street	No
122019-045	2517849	45 Leland Street	Yes
122019-078	2511681	132 Millwood Street	No
122019-080	2511778	68 Parmenter Road	No
122019-060	2506913	250 Fountain Street	No
122019-052	2508663	118 Howe Street	Yes
122019-051	2508218	183 Wilson Street	Yes
122019-113	2511638	3 Chicatawbut Road.	No
122019-032	2501693	106 Dudley Road	Yes
122019-102	2511205	7 Sloane Drive	Yes
122019-070	2511187	20 Knight Road	Yes
122019-077	2511660	33 Grove Street	Yes
122019-120	2511130	4 Frost Street	Yes
122019-119	2511122	10 Scott Drive	No
122019-083	2511788	689 Edmands Road	No
122019-095	2511577	155 Millwood Street	No
122019-114	2520964	6 Lyman Way	No
122019-124	2508880	26 Hickory Hill Lane	No
122019-027	2505652	172 Hartford Street	Yes
		Total # of Culverts =	21

VHB coordinated with the City of Framingham Conservation Commission and was administratively approved for CCTV evaluations to be performed within jurisdictional areas. VHB subcontracted Truax Corporation to complete the CCTV evaluations. All CCTV evaluation were completed between July and September 2020 by Truax with a VHB engineer present. Once CCTV video was collected in the field, Truax provided VHB with the culvert videos and summary of the evaluations. The CCTV evaluations resulted in some minor updates to culvert dimensions and material as well as providing additional information about the culvert condition that allowed VHB to more accurately evaluate the culvert. The final condition ratings and risk scores for culverts which received CCTV incorporate the conditions found during CCTV.

3

Culvert Evaluation Summary

VHB completed the field assessments of culverts at 98 locations in the City from January 2020 to March 2021. The data collected during the field evaluations was reviewed in the office by VHB to confirm completeness of the evaluation and accuracy of the conditions assigned to each culvert and its parts. CCTV video evaluation was performed on culverts which were not able to be fully evaluated during the initial field evaluation due to inability to see the interior condition of the culvert.

Findings of Assessment

Upon review of the collected data, 56 culverts were rated and received overall culvert conditions of "Adequate", 33 culverts were rated as "Poor", and 9 culverts were rated as "Critical" (Figure 2). As noted above, the Millwood Street culvert (Asset ID 2511576) has been replaced as of September 2020. The new culvert is assumed to be in adequate condition. For the individual parts of the culvert that were evaluated, the differences between adequate, poor, and critical were defined in the NAACC Culvert Condition Assessment Manual. The overall condition ratings used for the field assessments were determined based on the condition of the individual parts and engineering judgment. The overall condition ratings are defined as:

- Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.

- Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
- Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

All culverts and their evaluation results are detailed in the following graphics and are also available in to view interactively via the ArcGIS Online Dashboard at https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a. The online Dashboard allows the data to be shown geospatially, allowing the user to see where the culvert is located within the city. The Dashboard also symbolizes culverts by their overall condition and allows you to click on the culvert to view the complete results from the field evaluation as well as their final risk scores.

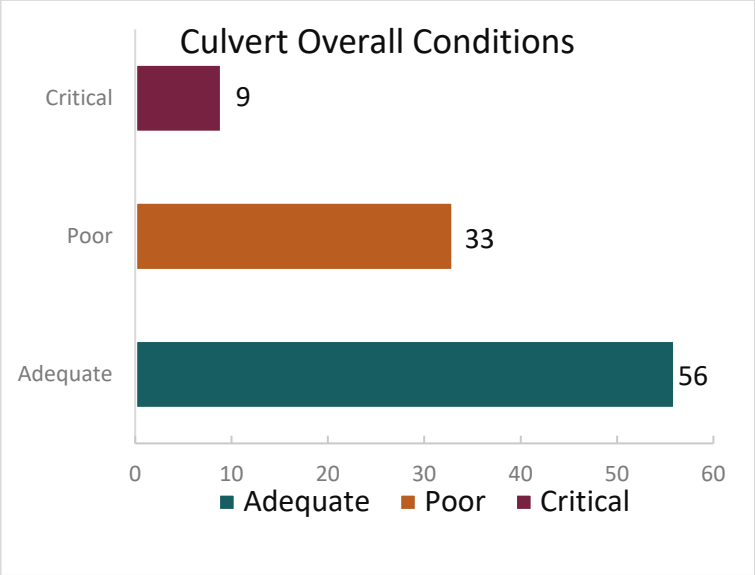


Figure 2 Culvert Overall Conditions

In addition to culverts receiving an overall condition rating, the culverts were evaluated for condition of 12 individual parts of each culvert, if applicable to the culvert. Overall, the City's culverts were found to be mostly in adequate condition. Condition ratings for "Headwall/Wingwalls" and "Level of Blockage" had the most poor and critical conditions of the culvert parts. Debris and vegetation blockage was also found to be the most needed immediate action item.

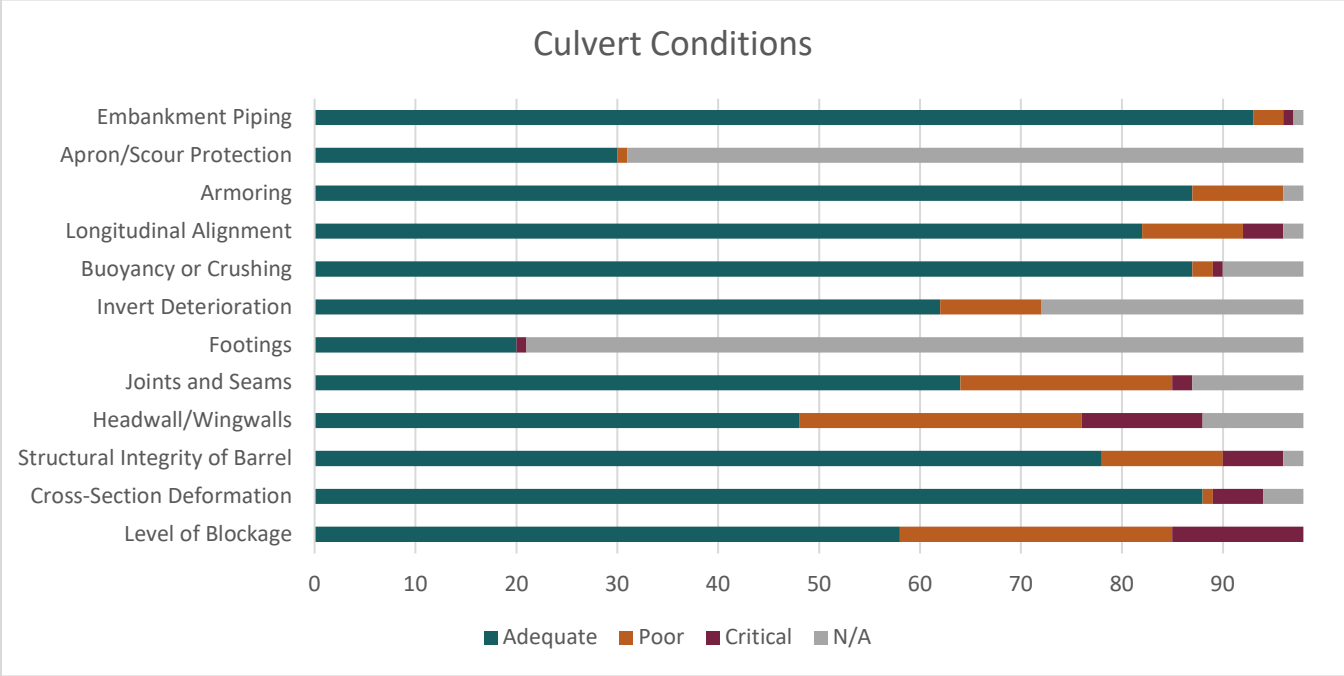


Figure 3 Culvert Conditions

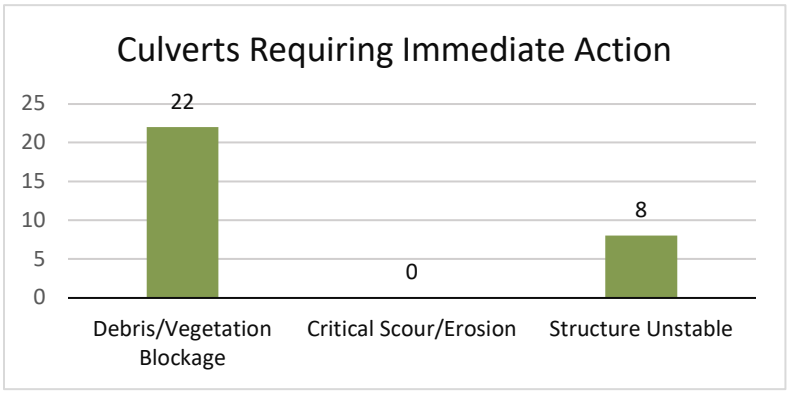


Figure 4 Culverts Requiring Immediate Action

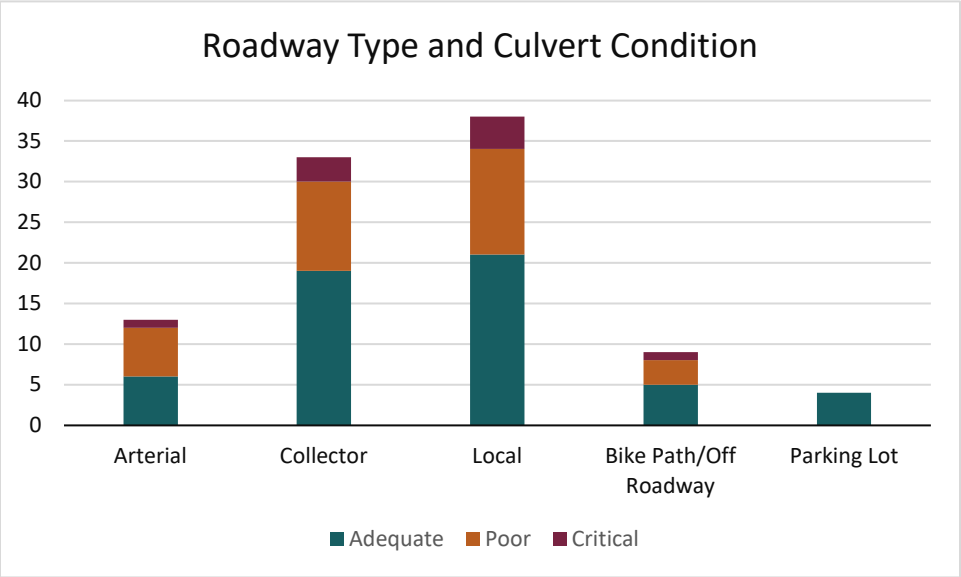


Figure 5 Culvert Condition by Roadway Type

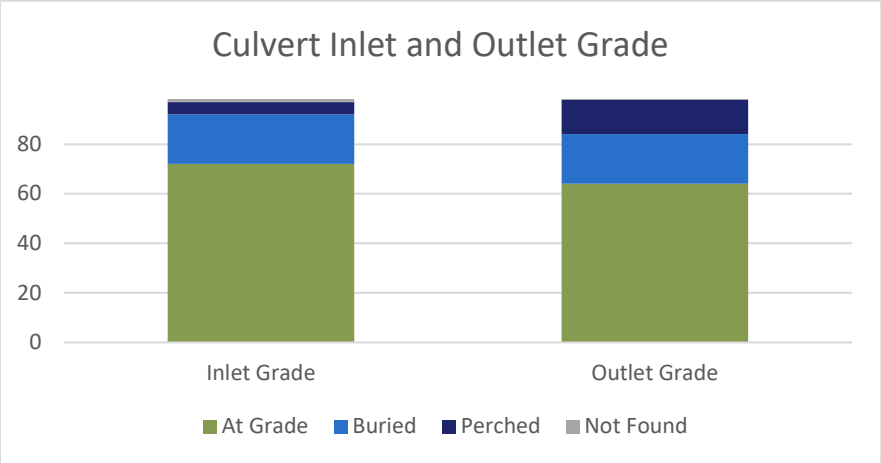
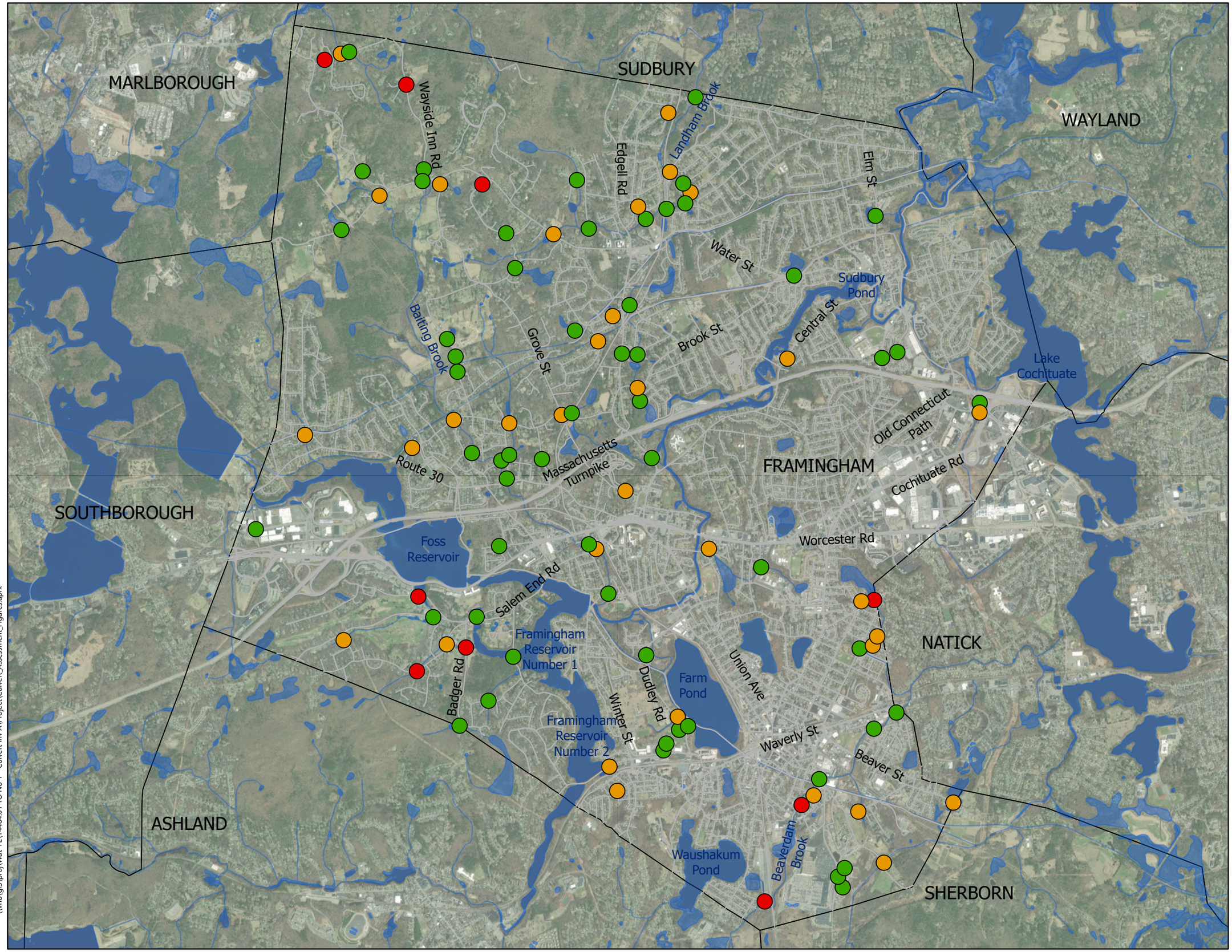


Figure 6 Culvert Inlet and Outlet Grades

FIGURE 1



Culvert Condition

- Adequate
- Poor
- Critical
- Municipal Boundary
- Roadways
- Waterbodies

N

0 1,500 3,000 6,000 Feet

City-Owned Culvert Assessment
Culvert Condition Ratings

Framingham, MA

March 18, 2021

Source: City of Framingham VueWorks Culvert Work Order Data

\\vhbgis\proj\Wat-TE\14484.01 TO No 1 - Culvert Inv A\Project\Culvert_Assessment_Figures.aprx

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Locations with Known Flooding Issues

Part of the culvert evaluations included assessing if there was visible evidence of flooding. VHB's field team spoke with Framingham residents who lived near some of the culvert locations to learn if the residents were aware of any flooding issues at the culverts. These conversations with residents helped provide experiential knowledge of the culvert over time. VHB documented these occasions of resident-reported flooding, as well as visual evidence, in the comments section of the associated work order. Visual flooding evidence was documented with photos, if possible. The cause of flooding at culverts is often complex, with multiple factors influencing the flooding. Further study of the locations noted below is needed before mitigation methods can be recommended. The following culvert locations were noted to have flooding issues by resident's anecdote. While this list includes culverts where residents noted flooding during the field evaluation, this list is not comprehensive of all culverts with flooding issues throughout the City.

Asset ID: 2515114 - CC Beaver Dam Brook

Flooding reported by neighbor when culvert is not maintained. Flooding is likely the result of culvert blockage and failure.

Asset ID: 2511184 - Knight Road

Flooding reported by neighbor. Neighbor routinely clears debris from culvert. Poor alignment upstream. Stagnant water is present downstream of the culvert indicate downstream backwater conditions which is likely resulting in flooding.

Asset ID: 2511840 - Salem End Road

Flooding on roadway at catch basin reported by neighbor. Based on a preliminary desktop review, this catch basin is not connected to the culvert. Further evaluation is required to determine the cause of flooding at this location.

Asset ID:2508898 - Willowbrook Road

Resident says upstream area does not drain well and backs up into the yards. Upstream channel is littered with tree debris. Based on field evaluation, flooding may be result of low point in the area. Further evaluation is required to determine the cause of flooding.

Neighborhood Flooding – Tributary to Beaverdam Brook

Asset ID: 2508218 - Wilson Street and Asset ID: 2508663 - Howe Street

Stagnant water is present at both culvert locations, likely due to backwater conditions. Downstream channel is overgrown and filled with sediment.

Neighborhood Flooding – Landham Brook

Asset ID: 2511207 Gregory Road and Asset ID: 2511205 - Sloane Drive

Flooding along this segment of Landham Brook was noted in discussion with the City's Conservation Agent. Additional discussion with the Conservation Agent is recommended to further identify the flooding source and potential fixes.

In addition to the culvert location listed above, which had experiential knowledge of flooding, there were other culverts where VHB's field staff noted potential evidence of flooding. These locations are noted in the completed work orders by "Flooding Evidence" being marked "Yes". The work order notes and pictures also help document potential evidence of flooding. Further evaluation is needed for these culverts to better understand the flooding risk of the culvert locations and potential mitigation.

4

Prioritization of Culvert Improvements

VHB developed a method for assigning a risk score to each culvert based on the various culvert characteristics. The risk score of culverts based on various conditions allows the City to evaluate and prioritize improvements for culverts with the highest risk score. The following sections describe the process used to develop the risk score methodology and subsequent findings.

Risk Score Methodology

After completion of all field culvert assessments, VHB compiled the results in order to compare the culvert conditions and develop a methodology for scoring the risk of the culverts to assist the City in future capital planning efforts. To develop the scores, VHB took the raw data exported from the VUEWorks assessment forms and simplified it to only the fields using the condition rating domain of Adequate, Poor, Critical, and N/A and inlet and outlet grade which used the domain of Perched, At Grade, and Buried. Each field received a certain weight to determine the influence the criteria would have on the overall score of the culvert. In addition to the weight allotted to each field, each individual condition rating was designated a percentage to determine what percent of the criteria weight the culvert would receive. A criteria which received a condition rating of "Critical" receives the highest percentage of weight possible for the criteria, "Poor" and "Adequate" each received an increasingly smaller percentage. A criteria that received a rating of "N/A" or was left blank did not received any percentage of weight for that criteria and the total possible weight was removed from the total potential risk score for that asset. Removing the N/A or blank fields from the overall total potential weight for the asset helped more accurately show how the applicable criteria effects the culvert's overall condition.

The City reviewed and commented on the proposed risk score points prior to their finalization. The final risk score points used were updated based on the discussion with the City.

In addition to the fields which use the condition domain, the risk scoring considered roadway functional classification, and drainage area to the culvert. Roadway functional classification was determined by VHB using the MassDOT Roadway Inventory web application. The roadways were broken into the classes of: Freeway, Major Collector, Minor Arterial, Local, Parking Lot, and Bike Path. No culverts evaluated were on freeways, but the classification was kept in the possible domain for consistency with the MassDOT Roadway layer and to be adaptable if the risk scoring methodology is used in the future. The scoring shows freeways receiving the highest percentage of weight due to the high traffic of the roadway, followed by collectors, and each classification after receiving a smaller percentage of weight as they receive less traffic. Drainage area to each culvert was determined for available streams using USGS Stream Stats web application. For condition weight percentage groupings, the drainage areas were broken into thirds, with culverts in the top third, with the largest drainage area, receiving the highest percentage of the weight. Larger drainage areas were given a higher percentage of weight because a culvert failure could potentially cause more damage than for a culvert with a smaller drainage area.

The final weights for each criteria and percentages of weight associated with each condition are as follows:

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Overall Culvert Condition	40	Critical – 100% Poor – 70% Adequate – 0 N/A – 0
Roadway Classification	10	Freeway – 100% Arterial – 80% Collector – 60% Local – 40% Parking Lot – 20% Bike Path – 20%
Structural Integrity of Barrel	10	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Watershed Area	5	Largest 1/3 of watershed areas – 100% Middle 1/3 of watershed areas – 50% Smallest 1/3 of watershed areas - 0
Blockage	5	Critical – 100 % Poor – 50% Adequate – 0 N/A – 0
Headwalls	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Footings	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Cross Section Deformation	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Joints and Seems	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Invert Deterioration	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Buoyancy or Crushing	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Armoring (Scour)	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Embankment Piping	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Longitudinal Alignment	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Apron/Scour Protection	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Inlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Outlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Total Possible Risk Score	**100.00**	

The final culvert risk scores were found by dividing total score of the asset by the total potential score, removing the weight for any criteria rated N/A or blank. The culvert risk scores can range from zero to 100. The risk scoring methodology used gives culverts with the highest risk the highest score. The lower the score, the better condition the culvert, and the less risk associated with it. For example, a culvert with a risk score of 100 implies the highest potential risk, while a culvert with a risk score of 0 implies the lowest potential risk.

Risk Scoring Results

While the available range of risk is from zero to 100, the risk scores for the evaluated culverts ranged from 0.0 to 83.0.

In accordance with the scope of work VHB performed a detailed review of the 10 culverts with the highest risk scores. The following list provides notable details about the ratings of these culverts and includes cost estimates. Construction cost estimates are conceptual and generally include culvert/headwall replacement and incidental costs. See Appendix 4 for construction cost estimate breakdowns.

1. **Hartford Street, Asset ID: 2505652, Associated Work Order: 122019-027**

- Total Risk Score: 83.0
- Cost Estimate for Construction: $755,000

  Assumptions for Cost Estimate: Replacement of culvert with a 6′ x 3′ concrete box culvert, replacement of headwalls, dredging adjacent property
- Roadway Classification: Arterial
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Buoyancy or Crushing
- Summary of Culvert Condition: The culvert is half stone and half reinforced concrete. CCTV indicates a collapse in center of the stone culvert blocking flow though the culvert (Photo 1). Downstream headwall and wingwall have loose stones and are leaning outward.



Photo 1 Hartford Street culvert, interior collapse

2. **Herbert Street, Asset ID: 2511942, Associated Work Order: 122019-034**

- Total Risk Score: 77.0
- Cost Estimate for Construction: $285,000

  Assumptions for Cost Estimate: Replacement of culvert with 42″ x 24″ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: Stone collapse within culvert blocking flow through the culvert (Photo 2). The upstream invert is completely buried causing stagnant water at the upstream headwall (Photo 3).



Photo 2 Herbert Street culvert, interior collapse



Photo 3 Herbert Street culvert, upstream blockage

3. **Bates Road Extension, Asset ID: 2515114, Associated Work Order: 122019-030**

- Total Risk Score: 76.2
- Cost Estimate for Construction: $1,067,000 (Bridge) or $273,000 (Removal of crossing, restoration of Waushakum Brook)

  Cost Estimate Assumptions: Costs were estimated for 2 scenarios- replacement of the culvert with a 20' Bridge or removal of crossing and restoration of Waushakum Brook with a rip rap lined open channel. Both estimates include FEMA no-rise certificate permitting.
- Roadway Classification: Bike Path/Off Roadway
- Criteria Rated Critical: Level of Blockage, Cross-section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: The culvert is composed of four (4) corrugated metal pipes (CMP). The culvert, second from left, is partially deformed, reducing hydraulic capacity (Photo 4). The upstream left-most pipe is completely collapsed and filled with sediment and debris (Photo 5). All CMP is significantly rusted, and there is cracking in the downstream headwall. Residents have noted flooding.
- Additional Notes:
  - It is our understanding, an 8" insulated ductile iron water main is present above the culverts. Replacement or removal of the culvert will require reconstruction of the water main.
  - According to City officials, the upstream Washakum Pond ecosystem supports a rare form of sedge that requires controlled water levels in the pond. Updates to the culvert will need to include water level control measures to maintain the sedge species.
  - The open channel cost estimate is provided for reference if the City identifies another access route for the adjacent sewer system.



Photo 4 Waushakum Brook, deformation, second from left culvert



Photo 5 Waushakum Brook, interior collapse in left culvert

4. **Gates Street, Asset ID: 2506907, Associated Work Order: 122019-059**

- Total Risk Score: 75.1
- Cost Estimate for Construction: $988,000

  Assumptions for Cost Estimate: Replacement of culvert with 12′ x 6′ concrete box culvert, replacement of headwalls, replacement of outlet control, hydraulic study and flood analysis
- Roadway Classification: Collector
- Criteria Rated Critical: Structural Integrity of Barrel
- Summary of Culvert Condition: The CMP culvert has significant rusting throughout entire barrel (Photo 6). The upstream headwall includes an outlet control structure (OCS) with gate and a 6″ opening at the bottom of gate (Photo 7). The gate opening tracks are significantly deteriorated. Some exposed rebar is visible on the structure. On the downstream side, the top of projecting CMP is completely deteriorated. The downstream end of culvert is submerged in stagnant water. The Massachusetts Water Resources Authority (MWRA) operates the downstream reservoir, so upgrades to this culvert may require MWRA approval.



Photo 6 Gates Street culvert, interior deterioration



Photo 7 Gates Street culvert, rusted OCS gate

5. **Wayside Inn Road, Asset ID: 2511788, Associated Work Order: 122019-083**

- Total Risk Score: 74.3
- Cost Estimate for Construction: $303,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of upstream headwall
- Roadway Classification: Collector
- Criteria Rated Critical: Footings
- Summary of Culvert Condition: Many stones in the culvert have fallen out of place (Photo 8). Although the culvert is currently functioning, the fallen stones have left voids in the wall which reduces the structural stability of the stone culvert. Embankment erosion is present along downstream headwall (Photo 9).



Photo 8 Wayside Inn Road culvert, fallen interior stones



Photo 9 Wayside Inn Road culvert, downstream embankment erosion

6. **Salem End Road, Asset ID: 2511831, Associated Work Order: 122019-087**

- Total Risk Score: 71.3
- Cost Estimate for Construction: $964,000

  Assumptions for Cost Estimate: Replacement of culvert is 12′ x 6′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The stone culvert is lined with a concrete pipe in the upstream section. There is a failure near the downstream end of the culvert, where there is a collapse of the roof of the stone culvert (appears to be located on private property) (Photo 10). A hole, approximately a foot in diameter, can be seen at the surface (Photo 11). The downstream stone headwall has portions of loose mortar.



Photo 10 Salem End Road culvert, interior stone roof collapse



Photo 11 Salem End Road culvert, exterior hole in culvert roof

7. **Parmenter Road, Asset ID: 2511778, Associated Work Order: 122019-080**

- Total Risk Score: 71.1
- Cost Estimate for Construction: $244,000

  Assumptions for Cost Estimate: Replacement of culvert with 7′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The upstream headwall is composed of wood being held in place by a steel post. The downstream headwall is stone that shows beginning signs of settlement. CCTV indicates the stone culvert is beginning to collapse internally (Photo 12). The small hydraulic opening creates high potential for blockage to occur.

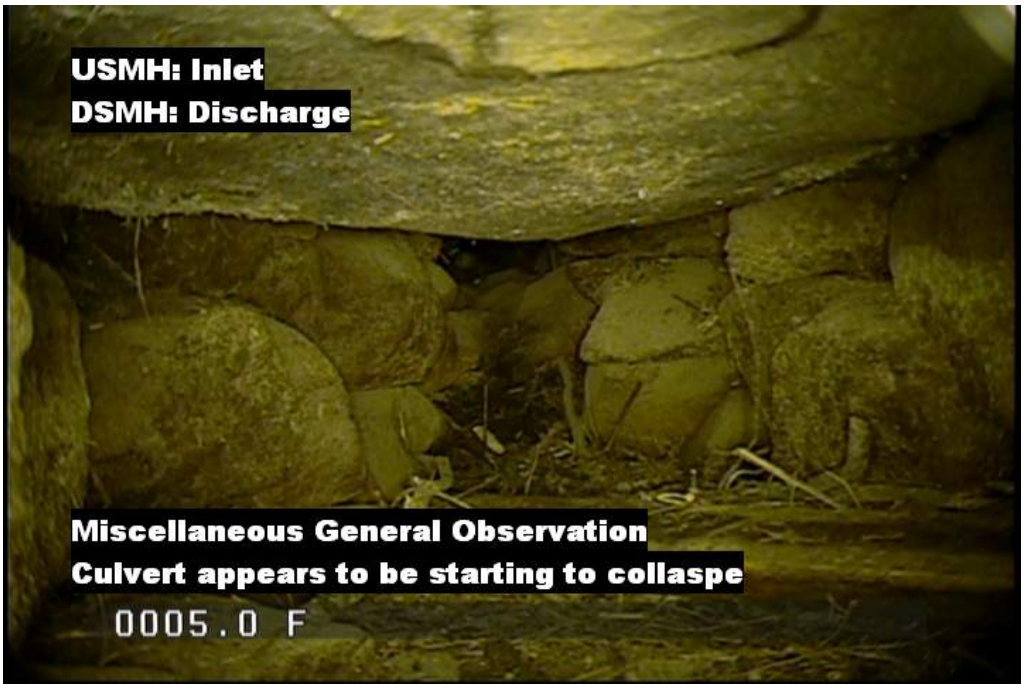

Photo 12 Parmenter Road culvert, interior collapse (CCTV)

8. **Badger Road, Asset ID: 2506912, Associated Work Order: 122019-094**

- Total Risk Score: 69.2
- Cost Estimate for Construction: $449,000

  Assumptions for Cost Estimate: Replacement of culvert with 9′ x 5′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage and Headwall/Wingwalls
- Summary of Culvert Condition: The upstream stone headwall is collapsed, causing a small hydraulic opening. Erosion is present from the roadway at the upstream headwall (Photo 13). The stream runs parallel to the roadway before entering the stone culvert and flowing perpendicular under the roadway. The downstream stone headwall has a major failure (Photo 14).



Photo 13 Badger Road culvert, upstream headwall collapse and erosion



Photo 14 Badger Road culvert, downstream headwall collapse

9. **Fountain Street, Asset ID: 2506913, Associated Work Order: 122019-060**

- Total Risk Score: 61.5
- Cost Estimate for Construction: $412,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage, Headwall/Wingwalls
- Summary of Culvert Condition: The upstream invert of the stone culvert is buried. The upstream channel is dry and filled with debris (Photo 15). The downstream invert has backwater from the downstream lake. The downstream headwall has loose stones. The downstream wingwall has missing stones which have fallen into the channel.



Photo 15 Fountain Street culvert, upstream headwall

10. **Garvey Road, Asset ID: 2511728, Associated Work Order: 122019-115**

- Total Risk Score: 60.3
- Cost Estimate for Construction: $228,000

  Assumptions for Cost Estimate: Replacement of outlet control structure
- Roadway Classification: Local
- Criteria Rated Critical: Headwall/Wingwall
- Summary of Culvert Condition: The outlet control structure at the inlet superstructure has dislodged outward, approximately one foot from the substructure with minimal headwall backfill (Photo 16). It is our understanding that proposed nearby roadway improvements or pump station project can be coupled with the culvert repair, which would likely reduce the cost of replacement.



Photo 16 Garvey Road culvert, inlet dislodged OCS superstructure

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5

Recommendations and Conclusions

VHB completed field and desktop evaluations of 98 culverts owned by the City of Framingham. VHB worked with the City to develop a methodology for scoring the risk of each culvert. The findings of the evaluations and the associated risk scores can help the City develop a better understanding of the condition and functionality of their culverts. The evaluation results and risk scores identify culverts with the highest potential of failure. The following section provides conclusions reached from the culvert evaluation and risk scoring and VHB's recommendations for the City moving forward.

The evaluation findings show that majority of the City's culverts (55 culverts out of 98 evaluated) are in overall adequate condition. Thirty-three culverts were deemed to be in poor condition and nine (9) were rated as critical, requiring maintenance or reconstruction to prevent failure.

The field evaluations considered the condition of various individual parts of the culvert in determining the culverts overall condition (Figure 3). The criteria that received the most poor and critical ratings was "Level of Blockage", with 13 culverts rating critical in this category and 27 rating poor. Culverts which have high levels of blockages have a reduced hydraulic capacity which can cause flooding during major storm events. The criteria that receive the second-most poor and critical ratings was "Headwall/Wingwalls" with 12 culverts rating critical and 28 culverts rating poor. Failing headwalls and wingwalls has the potential to block the culvert's openings, creating a risk of flooding. Collapsed headwalls and wingwalls also creates the potential for significant erosion and potentially undermining the roadway above.

VHB developed risk scores for each evaluated culvert, factoring in the overall condition of culvert, individual parts of the culvert, drainage area and roadway classification. This risk

scoring identified the culverts with the greatest risk associated with them. VHB further evaluated the ten culverts with the highest risk scores, scores of 60.3 to 83.0, to determine the estimated cost associated with the replacement of the culverts or the culvert parts. In total, the estimated costs for the top 10 culverts is $5,695,000.

To address the conditions and risk identified during the culvert evaluations, VHB provides the following recommendations:

- The city should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- Culverts that are rated poor or critical require continued monitoring to evaluate further degradation of the culvert. The City should develop a city-specific inspection frequency of culverts, especially those rated poor or critical that are not upgraded; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City's Department of Public Works should address "immediate actions" flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity. For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

Implementation of these recommendations can assist the City with improving culverts that are currently high risk and allow the city to maintain all culverts to reduce the deterioration of the infrastructure in the future. While there are upfront costs associated with the recommendations, improving culvert maintenance can help reduce likelihood of expensive culvert repairs and replacements in the future.

Appendices

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Appendix 1 – List of Risk Scores

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-027*	2505652	CC HARTFORD STREET	03 - Critical	83.0
122019-034	2511942	HERBERT STREET	03 - Critical	77.0
122019-030	2515114	CC BEAVER DAM BROOK	03 - Critical	76.2
122019-059	2506907	GATES STREET	03 - Critical	75.1
122019-083	2511788	WAYSIDE INN ROAD	03 - Critical	74.3
122019-087*	2511831	SALEM END ROAD	03 - Critical	71.3
122019-080*	2511778	PARMENTER ROAD	03 - Critical	71.1
122019-094	2506912	BADGER ROAD	03 - Critical	69.2
122019-060*	2506913	FOUNTAIN STREET	02 - Poor	61.5
122019-115	2511728	GARVEY ROAD	03 - Critical	60.3
122019-040	2511895	KENDALL AVENUE	02 - Poor	56.8
122019-072	2511192	BELKNAP ROAD	02 - Poor	55.9
122019-052*	2508663	HOWE STREET	02 - Poor	54.5
122019-081	2511783	PARMENTER ROAD	02 - Poor	54.5
122019-099	2511613	CC RUTHELLEN ROAD	02 - Poor	52.7
122019-106	2511214	HEMENWAY SCH FT PATH	02 - Poor	52.7
022421-025	2512189	MAIN STREET	02 - Poor	52.3
122019-074	2511558	GROVE STREET	02 - Poor	52.3
122019-028	2506893	BELKNAP ROAD	02 - Poor	51.8
122019-127	2508334	CENTRAL STREET	02 - Poor	51.8
122019-045*	2517849	LELAND STREET	02 - Poor	51.0
122019-118	2511120	BROOK STREET	02 - Poor	50.3
122019-041	2506936	MERCHANT ROAD	02 - Poor	50.1
122019-053	2506896	WAVENEY ROAD	02 - Poor	50.1
122019-033	2511947	HERBERT STREET	02 - Poor	49.4
122019-067	2511171	BELKNAP ROAD	02 - Poor	49.0
122019-075	2511569	GROVE STREET	02 - Poor	48.9
122019-051*	2508218	CC WILSON DRIVE	02 - Poor	48.7
122019-107	2511486	HEMENWAY ROAD	02 - Poor	48.2
122019-079	2511735	EDMANDS ROAD	02 - Poor	47.7
122019-093	2508594	SPEEN STREET	02 - Poor	47.7
042320-027	2508898	WILLOWBROOK ROAD	02 - Poor	47.5
122019-049	2508225	UNDERWOOD AVENUE	02 - Poor	47.4
122019-097	2509452	LYMAN ROAD	02 - Poor	47.4
122019-077*	2511660	GROVE STREET	02 - Poor	46.2
122019-101	2511055	EDMANDS ROAD	02 - Poor	45.7
122019-032*	2501693	CC DUDLEY ROAD	02 - Poor	45.7
122019-086	2511811	SALEM END ROAD	02 - Poor	45.6
122019-102*	2511205	SLOANE DRIVE	02 - Poor	44.7

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-061	2508141	VICTORY STREET	02 - Poor	44.3
122019-098	2511200	NOB HILL DRIVE	02 - Poor	44.0
122019-088*	2511840	SALEM END ROAD	02 - Poor	38.9
122019-121	2511139	EDGELL ROAD	01 - Adequate	26.2
122019-078*	2511681	MILLWOOD STREET	01 - Adequate	25.5
122019-125	2511816	WINTER STREET	01 - Adequate	21.9
122019-065	2510409	EDGELL ROAD	01 - Adequate	21.0
122019-084	2511798	NIXON ROAD	01 - Adequate	21.0
122019-124*	2508880	HICKORY HILL LANE	01 - Adequate	20.8
122019-120*	2511130	FROST STREET	01 - Adequate	19.5
122019-071	2511190	BERKELEY ROAD	01 - Adequate	18.8
122019-026	2502862	DUDLEY ROAD	01 - Adequate	18.2
122019-031	2512689	DUDLEY ROAD	01 - Adequate	17.8
122019-048	2508221	BISHOP STREET	01 - Adequate	16.8
122019-073	2511557	EDMANDS ROAD	01 - Adequate	16.8
122019-047	2518282	CC FRASER ROAD	01 - Adequate	16.7
122019-029	2509026	WAYSIDE INN ROAD	01 - Adequate	16.2
122019-085	2511802	EDMANDS ROAD	01 - Adequate	16.2
122019-057	2506849	ELM STREET	01 - Adequate	15.8
122019-090	2511887	SINGLETARY LANE	01 - Adequate	15.4
122019-054*	2508317	CC A STREET	01 - Adequate	14.9
122019-066	2511169	MILL STREET	01 - Adequate	14.9
122019-104	2511209	HEMENWAY ROAD	01 - Adequate	14.8
122019-070*	2511187	KNIGHT ROAD	01 - Adequate	14.7
122019-063	2508339	WATER STREET	01 - Adequate	14.2
122019-095*	2511577	MILLWOOD STREET	01 - Adequate	14.1
122019-062	2508274	OLD WORCESTER ROAD	01 - Adequate	14.0
122019-082	2511788	PARMENTER ROAD	01 - Adequate	14.0
122019-089	2511864	BADGER ROAD	01 - Adequate	14.0
122019-112	2511560	WINCH STREET	01 - Adequate	13.4
122019-116	2511729	GARVEY ROAD	01 - Adequate	13.4
122019-096	2521199	CONCORD STREET	01 - Adequate	13.0
122019-100	2508280	NEW YORK AVENUE	01 - Adequate	12.6
122019-103	2511207	GREGORY ROAD	01 - Adequate	12.6
122019-043	2515102	IRVING STREET	01 - Adequate	12.4
122019-039	2514070	SECOND STREET	01 - Adequate	12.3
122019-123	2506908	SALEM END ROAD	01 - Adequate	12.2
122019-092	2511669	MAPLE STREET	01 - Adequate	11.9
122019-119*	2511122	SCOTT DRIVE	01 - Adequate	11.5
122019-111	2511546	JUNIPER LANE	01 - Adequate	11.3
122019-069	2511186	LITTLE TREE LANE	01 - Adequate	11.2
122019-064	2508881	PARKER ROAD	01 - Adequate	11.0
122019-114*	2520964	LYMAN WAY	01 - Adequate	10.8

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-068	2511184	KNIGHT ROAD	01 - Adequate	10.5
122019-036	2515315	CC DUDLEY ROAD	01 - Adequate	10.4
122019-105	2511212	CC APPLEDO'R ROAD	01 - Adequate	10.4
122019-109	2511495	GREGORY ROAD	01 - Adequate	10.1
122019-108	2511488	COLONIAL DRIVE	01 - Adequate	9.9
122019-042	2515095	TARALLI TERRACE	01 - Adequate	9.6
122019-113*	2511638	CHICATAWBUT ROAD	01 - Adequate	9.5
122019-117	2511116	MCLEAN DRIVE	01 - Adequate	9.5
122019-091	2511571	CC GROVE STREET	01 - Adequate	8.1
042320-028	2522006	CC FOUNTAIN STREET	01 - Adequate	8.0
042320-029	2522007	CC FOUNTAIN STREET	01 - Adequate	7.8
122019-058	2506853	MASSACHUSETTS TURNPIKE	01 - Adequate	7.5
122019-122	2521337	CC WESTERN AVENUE	01 - Adequate	7.4
122019-038	2517767	CC WESTERN AVENUE	01 - Adequate	0.0
122019-046	2518019	CC WESTERN AVENUE	01 - Adequate	0.0

* Asterisks next to the work order ID notes that the culvert received CCTV evaluation

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Appendix 2 – Inspection Results Table

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WorkOrderID	ASSETID	Culvert Condition	Roadway Classification	Drainage Area (sq mi)	Level of Blockage	Cross-Section Deformation	Structural Integrity of Barrel	Headwall/Wingwalls	Joints and Seams	Footings	Invert Deterioration	Buoyancy or Crushing	Longitudinal Alignment	Armoring	Apron/Scour Protection	Embankment Piping	Inlet Grade	Outlet Grade	Location
031821-042	2512189	02 - Poor	Collector	0.75	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	1 - Perched	2 - At Grade	MAIN STREET
122019-026	2502862	01 - Adequate	Collector		03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	DUDLEY ROAD
122019-027*	2505652	03 - Critical	Arterial	0.04	03 - Critical	03 - Critical	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC HARTFORD STREET
122019-028	2506893	02 - Poor	Arterial	0.14	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-029	2509026	01 - Adequate	Collector	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	WAYSIDE INN ROAD
122019-030	2515114	03 - Critical	Bike Path	1.73	03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC BEAVER DAM BROOK
122019-031	2512689	01 - Adequate	Collector	0.082	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	DUDLEY ROAD
122019-032*	2501693	02 - Poor	0	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC DUDLEY ROAD
122019-033	2511947	02 - Poor	Local	0	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	HERBERT STREET
122019-034	2511942	03 - Critical	Local		03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HERBERT STREET
122019-036	2515315	01 - Adequate	Parking Lot		02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC DUDLEY ROAD
122019-038	2517767	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC WESTERN AVENUE
122019-039	2514070	01 - Adequate	Local	5.66	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SECOND STREET
122019-040	2511895	02 - Poor	Arterial	0.076	03 - Critical	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	KENDALL AVENUE
122019-041	2506936	02 - Poor	Local	1.42	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MERCHANT ROAD
122019-042	2515095	01 - Adequate	Local	5.51	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	TARALLI TERRACE
122019-043	2515102	01 - Adequate	Collector	4.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	IRVING STREET
122019-045*	2517849	02 - Poor	Collector	0.053	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LELAND STREET
122019-046	2518019	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-047	2518282	01 - Adequate	Local	0.51	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC FRASER ROAD
122019-048	2508221	01 - Adequate	Collector	0.25	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BISHOP STREET
122019-049	2508225	02 - Poor	Local		02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	UNDERWOOD AVENUE
122019-051*	2508218	02 - Poor	Local	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	0	0	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	CC WILSON DRIVE
122019-052*	2508663	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	04 - N/A	0	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	HOWE STREET
122019-053	2506896	02 - Poor	Local	1.46	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	WAVENEY ROAD
122019-054*	2508317	01 - Adequate	Collector		01 - Adequate	0	0	01 - Adequate	0	04 - N/A	0	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC A STREET
122019-057	2506849	01 - Adequate	Arterial	0.08	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	ELM STREET
122019-058	2506853	01 - Adequate	Bike Path	1.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MASSACHUSETTS TURNPIKE
122019-059	2506907	03 - Critical	Collector	0.45	02 - Poor	01 - Adequate	03 - Critical	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GATES STREET
122019-060*	2506913	02 - Poor	Collector	0.19	03 - Critical	01 - Adequate	0	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	FOUNTAIN STREET
122019-061	2508141	02 - Poor	Local	0.12	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	VICTORY STREET
122019-062	2508274	01 - Adequate	Local	0.13	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	OLD WORCESTER ROAD
122019-063	2508339	01 - Adequate	Arterial	0.53	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WATER STREET
122019-064	2508881	01 - Adequate	Collector	0.41	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARKER ROAD
122019-065	2510409	01 - Adequate	Arterial	0.76	02 - Poor	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	EDGELL ROAD
122019-066	2511169	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	2 - At Grade	1 - Perched	MILL STREET
122019-067	2511171	02 - Poor	Arterial	0.63	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-068	2511184	01 - Adequate	Local	2.94	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	KNIGHT ROAD
122019-069	2511186	01 - Adequate	Local	2.92	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LITTLE TREE LANE
122019-070*	2511187	01 - Adequate	Local	0.69	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	KNIGHT ROAD
122019-071	2511190	01 - Adequate	Local	2.1	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BERKELEY ROAD
122019-072	2511192	02 - Poor	Arterial	2.02	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-073	2511557	01 - Adequate	Collector	0.16	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	EDMANDS ROAD
122019-074	2511558	02 - Poor	Collector	0.16	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	1 - Perched	1 - Perched	GROVE STREET
122019-075	2511569	02 - Poor	Collector	0.069	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GROVE STREET
122019-077*	2511660	02 - Poor	Collector	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	GROVE STREET
122019-078*	2511681	01 - Adequate	Collector	0.098	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	2 - At Grade	0	MILLWOOD STREET
122019-079	2511735	02 - Poor	Collector	0.58	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	03 - Critical	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-080*	2511778	03 - Critical	Local	0.085	02 - Poor	03 - Critical	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-081	2511783	02 - Poor	Local	0.065	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-082	2511788	01 - Adequate	Local	0.46	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	PARMENTER ROAD
122019-083	2511788	03 - Critical	Collector	0.12	01 - Adequate	04 - N/A	02 - Poor	04 - N/A	04 - N/A	03 - Critical	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WAYSIDE INN ROAD
122019-084	2511798	01 - Adequate	Collector	0.07	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	1 - Perched	NIXON ROAD
122019-085	2511802	01 - Adequate	Collector	0.11	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-086	2511811	02 - Poor	Collector	3.32	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-087*	2511831	03 - Critical	Local	0.4	01 - Adequate	03 - Critical	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-088*	2511840	02 - Poor	Local	0.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-089	2511864	01 - Adequate	Local	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	BADGER ROAD
122019-090	2511887	01 - Adequate	Collector	0.79	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	SINGLETARY LANE
122019-091	2511571	01 - Adequate	Bike Path	0.069	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC GROVE STREET
122019-092	2511669	01 - Adequate	Collector	3.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MAPLE STREET
122019-093	2508594	02 - Poor	Arterial	1.69	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SPEEN STREET
122019-094	2506912	03 - Critical	Collector	0.57	03 - Critical	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	BADGER ROAD
122019-095*	2511577	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MILLWOOD STREET

122019-096	2521199	01 - Adequate	Arterial		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CONCORD STREET
122019-097	2509452	02 - Poor	Local	0.11	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	LYMAN ROAD
122019-098	2511200	02 - Poor	Local	0.28	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	NOB HILL DRIVE
122019-099	2511613	02 - Poor	Bike Path	0.12	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	CC RUTHELLEN ROAD
122019-100	2508280	01 - Adequate	Local	0.04	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	NEW YORK AVENUE
122019-101	2511055	02 - Poor	Collector	1.5	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	EDMANDS ROAD
122019-102*	2511205	02 - Poor	Local	1.64	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	SLOANE DRIVE
122019-103	2511207	01 - Adequate	Local	1.4	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-104	2511209	01 - Adequate	Collector	1.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-105	2511212	01 - Adequate	Bike Path	1.33	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC APPLEDO'R ROAD
122019-106	2511214	02 - Poor	Bike Path		02 - Poor	02 - Poor	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HEMENWAY SCH FT PATH
122019-107	2511486	02 - Poor	Collector	1.8	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-108	2511488	01 - Adequate	Local	2.32	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	COLONIAL DRIVE
122019-109	2511495	01 - Adequate	Local	1.66	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-111	2511546	01 - Adequate	Local	1.16	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	JUNIPER LANE
122019-112	2511560	01 - Adequate	Collector	0.07	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINCH STREET
122019-113*	2511638	01 - Adequate	Local	0.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CHICATAWBUT ROAD
122019-114*	2520964	01 - Adequate	Local	0.1	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	1 - Perched	LYMAN WAY
122019-115	2511728	03 - Critical	Local		02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	GARVEY ROAD
122019-116	2511729	01 - Adequate	Local	0.06	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	2 - At Grade	GARVEY ROAD
122019-117	2511116	01 - Adequate	Local	0.89	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MCLEAN DRIVE
122019-118	2511120	02 - Poor	Collector	0.87	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	BROOK STREET
122019-119*	2511122	01 - Adequate	Local	0.42	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SCOTT DRIVE
122019-120*	2511130	01 - Adequate	Collector	0.26	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	FROST STREET
122019-121	2511139	01 - Adequate	Arterial	0.38	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	EDGELL ROAD
122019-122	2521337	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-123	2506908	01 - Adequate	Collector	0.086	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-124*	2508880	01 - Adequate	Local	0.47	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HICKORY HILL LANE
122019-125	2511816	01 - Adequate	Arterial	3.29	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINTER STREET
122019-127	2508334	02 - Poor	Arterial	0.064	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CENTRAL STREET
042320-027	2508898	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	3 - Buried	WILLOWBROOK ROAD
042320-028	2522006	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET
042320-029	2522007	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET

Appendix 3 – Immediate Action Culverts

Number of Structures Requiring Immediate Action Type

Debris/Vegetation Blockage	Critical Scour/Erosion	Structure Unstable
22	0	8

Culverts with Debris/Vegetation Blockage

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-030	2515114	CC BEAVER DAM BROOK
122019-032	2501693	CC DUDLEY ROAD
122019-047	2518282	CC FRASER ROAD
122019-027	2505652	CC HARTFORD STREET
122019-051	2508218	CC WILSON DRIVE
122019-026*	2502862	DUDLEY ROAD
122019-031*	2512689	DUDLEY ROAD
122019-060	2506913	FOUNTAIN STREET
122019-106	2511214	HEMENWAY SCH FT PATH
122019-034	2511942	HERBERT STREET
122019-052	2508663	HOWE STREET
122019-040	2511895	KENDALL AVENUE
122019-070	2511187	KNIGHT ROAD
122019-045	2517849	LELAND STREET
122019-076	2511576	MILLWOOD STREET
122019-100*	2508280	NEW YORK AVENUE
122019-039	2514070	SECOND STREET
122019-093*	2508594	SPEEN STREET
122019-049	2508225	UNDERWOOD AVENUE
122019-061*	2508141	VICTORY STREET
122019-029	2509026	WAYSIDE INN ROAD

Culverts in blue appear in both immediate action lists.

*Culverts marked with an asterisk have debris/vegetation blockage as the only issue.

Culverts with Unstable Structure

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-028	2506893	BELKNAP ROAD
122019-027	2505652	CC HARTFORD STREET
122019-099	2511613	CC RUTHELLEN ROAD
122019-034	2511942	HERBERT STREET
122019-097	2509452	LYMAN ROAD
122019-080	2511778	PARMENTER ROAD
122019-087	2511831	SALEM END ROAD

Culverts in blue appear in both immediate action lists.

Appendix 4 – Cost Estimate

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101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020

Project: Hartford St Culvert Replacement

Job Number: 14484.01

Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	400	CY	CLASS A TRENCH EXCAVATION	$45	$18,000.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350.00	$7,000.00
151.	1	CY	GRAVEL BORROW	$45	$45.00
151.1	145	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$7,250.00
151.2	45	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$2,565.00
156.1	120	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$6,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	60	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$180.00
482.3	60	FT	SAWCUTTING ASHALT PAVEMENT	$4	$210.00
580.	20	FT	CURB REMOVED AND RESET	$27	$530.00
631.	20	FT	GUARDRAIL	$30	$600.00
657.	260	FT	TEMPORARY FENCE	$19	$4,940.00
657.5	260	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,900.00
698.1	270	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$1,485.00
701.	1	TON	HMA SIDEWALK	$210	$210.00
767.121	260	FT	SEDIMENT CONTROL BARRIER	$7	$1,778.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	115	TON	RIP RAP	$65	$7,475.00
995.011	1	LS	CULVERT STRUCTURE	$159,000	$159,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$80,000	$80,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00

Subtotal	$344,326
Mobilization (Assumed 5%)	$17,216
Police Detail & Traffic Control (Assumed 10%)	$34,433
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$34,433
Contingency (35%)	$120,514
Subtotal	$550,922
Permitting & Design (Assumed 25%)	$137,730
Construction Observation (Assumed 12%)	$66,111
Total	$754,763
SAY	**$755,000**

Assumptions:

- Replacement of culvert with 6' x 3' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 5.5-feet
- Headwalls to be installed on upstream and downstream ends
- Assume dredgling limits to back of adjacent property (75-feet long) by 1-foot deep by 6-feet wide

101 Walnut Street
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Preliminary Construction Cost Estimate

Date: 8/18/2020
Job Number: 14484.01

Project: Herbert St Culvert Replacement
Location: Framinham, MA
Estimator: JAD
Checked By: MAC

Item No.	Qty	Unit	Description	Unit Price	Amount
101.	0.1	A	CLEARING AND GRUBBING	$34,000	$3,400.00
103.	10	EA	TREE REMOVED - DIAMETER UNDER 24 INCHES	$1,500	$15,000.00
120.1	200	CY	UNCLASSIFIED EXCAVATION	$40	$8,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	100	CY	CLASS A TRENCH EXCAVATION	$45	$4,500.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350	$7,000.00
151.	2	CY	GRAVEL BORROW	$45	$90.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	60	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$5,400.00
415.1	45	SY	PAVEMENT MILLING STANDARD	$8	$337.50
451.	20	TON	HMA FOR PATCHING	$225	$4,536.00
482.01	70	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$210.00
482.3	70	FT	SAWCUTTING ASHALT PAVEMENT	$4	$245.00
580.	30	FT	CURB REMOVED AND RESET	$27	$795.00
631.	30	FT	GUARDRAIL REMOVED AND RESET	$23	$690.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
701.	15	SY	CEMENT CONCRETE SIDEWALK	$61	$915.00
765.	15	SY	SEEDING	$2	$30.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	20	TON	RIP RAP	$65	$1,300.00
995.01	1	LS	CULVERT STRUCTURE	$30,000	$30,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL	$20,000	$20,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
				Subtotal	$129,654
				Mobilization (Assumed 5%)	$6,483
				Police Detail & Traffic Control (Assumed 10%)	$12,965
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$12,965
				Contingency (35%)	$45,379
				Subtotal	$207,446
				Permitting & Design (Assumed 25%)	$51,862
				Construction Observation (Assumed 12%)	$24,894
				Total	$284,201
				SAY	**$285,000**

Assumptions:

- Given existing culvert is clogged and does not carry dry weather flow no control of water costs included
- Culvert size to match existing culvert (42-inch x 24-inch)
- Headwalls to be installed on upstream and downstream ends

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Preliminary Construction Cost Estimate

Option A

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	100	CY	UNCLASSIFIED EXCAVATION	$40	$4,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
151.1	60	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$3,000.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
631.	60	FT	GUARDRAIL	$30	$1,800.00
657.	85	FT	TEMPORARY FENCE	$19	$1,615.00
657.5	85	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,275.00
698.1	95	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$522.50
767.121	85	FT	SEDIMENT CONTROL BARRIER	$7	$581.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	70	TON	RIP RAP	$65	$4,550.00
995.01	1	LS	BRIDGE STRUCTURE (includes walls)	$380,000	$380,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$486,333
				Mobilization (Assumed 5%)	$24,317
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$97,267
				Contingency (35%)	$170,216
				Subtotal	$778,132
				Permitting & Design (Assumed 25%)	$194,533
				Construction Observation (Assumed 12%)	$93,376
				Total	$1,066,041
				SAY	**$1,067,000**

Assumptions:

- Replacement of culvert with 20' Bridge
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 20-feet
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

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Preliminary Construction Cost Estimate

Option B

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	235	CY	UNCLASSIFIED EXCAVATION	$40	$9,400.00
125.	15	CY	TOPSOIL EXCAVATED AND STACKED	$30	$450.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
657.	110	FT	TEMPORARY FENCE	$19	$2,090.00
657.5	110	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,650.00
698.1	110	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$605.00
767.121	140	FT	SEDIMENT CONTROL BARRIER	$7	$957.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	100	TON	RIP RAP	$65	$6,500.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$117,201
				Mobilization (Assumed 5%)	$5,860
				Police Detail & Traffic Control (Assumed 10%)	$11,720
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$23,440
				Contingency (35%)	$41,020
				Subtotal	$199,242
				Permitting & Design (Assumed 25%)	$49,811
				Construction Observation (Assumed 12%)	$23,909
				Total	$272,962
				SAY	**$273,000**

Assumptions:

- Removal of crossing and restoration of Beaver Dam Brook with a rip rap lined open channel
-Control of water is necessary
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Gates St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	420	CY	CLASS A TRENCH EXCAVATION	$45	$18,900.00
151.	170	CY	GRAVEL BORROW	$45	$7,650.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	30	TON	HMA FOR PATCHING	$225	$6,750.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	90	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$495.00
631.	55	FT	GUARDRAIL REMOVED AND RESET	$23	$1,265.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	135	TON	RIP RAP	$65	$8,775.00
995.011	1	LS	CULVERT STRUCTURE	$135,000	$135,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$5,000	$5,000.00
	1	LS	REPLACEMENT OF OUTLET CONTROL	$20,000	$20,000.00
	1	LS	COFFERDAM- CONTROL OF WATER	$50,000	$50,000.00
	1	LS	H&H STUDY	$50,000	$50,000.00
				Subtotal	$423,850
				Mobilization (Assumed 5%)	$21,193
				Police Detail & Traffic Control (Assumed 10%)	$42,385
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$84,770
				Contingency (35%)	$148,348
				Subtotal	$720,546
				Permitting & Design (Assumed 25%)	$180,136
				Construction Observation (Assumed 12%)	$86,465
				Total	$987,147
				SAY	**$988,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet. This assumes need to meet Stream Crossings Standards for grant funding, however proposed culvert could be smaller if Citv-funded.
- Headwalls to be installed on upstream and downstream ends

-The replacement of this culvert will likely require coordination of a hydrologic and hydraulic study and a flood analysis. An approximate cost of $50,000 is carried for this analysis

-Additional contigency was provided for potential utility relocations (Assumed 20% of costs) given the proximity of the sewer force main, water main, and sewer pump station to the culvert

Preliminary Construction Cost Estimate

101 Walnut Street
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Date: 10/13/2020

Job Number: 14484.01

Project: Wayside Inn Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	115	CY	CLASS A TRENCH EXCAVATION	$45	$5,175.00
151.	6	CY	GRAVEL BORROW	$45	$270.00
151.1	55	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,750.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	45	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
631.	15	FT	GUARDRAIL REMOVED AND RESET	$23	$345.00
657.	100	FT	TEMPORARY FENCE	$19	$1,900.00
657.5	100	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,500.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
767.121	100	FT	SEDIMENT CONTROL BARRIER	$7	$684.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	50	TON	RIP RAP	$65	$3,250.00
995.011	1	LS	CULVERT STRUCTURE	$50,000	$50,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$25,000	$25,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$1,500	$1,500.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
				Subtotal	$138,124
				Mobilization (Assumed 5%)	$6,906
				Police Detail & Traffic Control (Assumed 10%)	$13,812
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$13,812
				Contingency (35%)	$48,343
				Subtotal	$220,998
				Permitting & Design (Assumed 25%)	$55,249
				Construction Observation (Assumed 12%)	$26,520
				Total	$302,767
				SAY	**$303,000**

Assumptions:

- Replacement of the culvert with a 8' x 4' concrete box culvert
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream end only

101 Walnut Street
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Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Salem End Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	690	CY	UNCLASSIFIED EXCAVATION	$40	$27,600.00
125.	30	CY	TOPSOIL EXCAVATED AND STACKED	$30	$900.00
151.	15	CY	GRAVEL BORROW	$45	$675.00
151.1	270	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$13,500.00
151.2	80	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$4,560.00
156.1	200	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$10,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	50	TON	HMA FOR PATCHING	$225	$11,250.00
482.01	80	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$240.00
482.3	80	FT	SAWCUTTING ASHALT PAVEMENT	$4	$280.00
657.	290	FT	TEMPORARY FENCE	$19	$5,510.00
657.5	290	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$4,350.00
691.	50	FT	STONE WALL REMOVED AND REBUILT	$150	$7,500.00
698.1	460	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$2,530.00
767.121	290	FT	SEDIMENT CONTROL BARRIER	$7	$1,983.60
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	255	TON	RIP RAP	$65	$16,575.00
995.011	1	LS	CULVERT STRUCTURE	$251,000	$251,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00
			Subtotal		$439,753
			Mobilization (Assumed 5%)		$21,988
			Police Detail & Traffic Control (Assumed 10%)		$43,975
			Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)		$43,975
			Contingency (35%)		$153,914
			Subtotal		$703,605
			Permitting & Design (Assumed 25%)		$175,901
			Construction Observation (Assumed 12%)		$84,433
			Total		$963,939
			SAY		**$964,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet, assumes grant funding. If project is City-funded proposed replacement culvert could be smaller to save cost.

- Headwalls to be installed on upstream and downstream ends
-Pavement restoration assumes road and driveway restoration

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Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Parmenter Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	95	CY	CLASS A TRENCH EXCAVATION	$45	$4,275.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.1	45	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,250.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	35	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$1,750.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	15	TON	HMA FOR PATCHING	$225	$3,375.00
482.01	35	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$105.00
482.3	35	FT	SAWCUTTING ASHALT PAVEMENT	$4	$122.50
657.	90	FT	TEMPORARY FENCE	$19	$1,710.00
657.5	90	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,350.00
698.1	80	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$440.00
767.121	90	FT	SEDIMENT CONTROL BARRIER	$7	$615.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	35	TON	RIP RAP	$65	$2,275.00
995.011	1	LS	CULVERT STRUCTURE	$39,000	$39,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$24,000	$24,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$110,931
				Mobilization (Assumed 5%)	$5,547
				Police Detail & Traffic Control (Assumed 10%)	$11,093
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$11,093
				Contingency (35%)	$38,826
				Subtotal	$177,489
				Permitting & Design (Assumed 25%)	$44,372
				Construction Observation (Assumed 12%)	$21,299
				Total	$243,160
				SAY	**$244,000**

Assumptions:

- Replacement of culvert with 7' x 4' concrete box culvert
- Given existing culvert does not carry dry weather flow no control of water costs included
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 7-feet
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Badger Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	200	CY	CLASS A TRENCH EXCAVATION	$45	$9,000.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	85	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,250.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	65	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
691.	15	FT	STONE WALL REMOVED AND REBUILT	$150	$2,250.00
698.1	150	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$825.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	70	TON	RIP RAP	$65	$4,550.00
995.011	1	LS	CULVERT STRUCTURE	$76,000	$76,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALL	$64,000	$64,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$204,769
				Mobilization (Assumed 5%)	$10,238
				Police Detail & Traffic Control (Assumed 10%)	$20,477
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$20,477
				Contingency (35%)	$71,669
				Subtotal	$327,630
				Permitting & Design (Assumed 25%)	$81,907
				Construction Observation (Assumed 12%)	$39,316
				Total	$448,853
				SAY	**$449,000**

Assumptions:

- Replacement of culvert with 9' x 5' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 9-feet

- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Fountain St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	160	CY	CLASS A TRENCH EXCAVATION	$45	$7,200.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	80	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,000.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	60	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	50	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$150.00
482.3	50	FT	SAWCUTTING ASHALT PAVEMENT	$4	$175.00
631.	25	FT	GUARDRAIL REMOVED AND RESET	$23	$575.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
698.1	140	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$770.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	65	TON	RIP RAP	$65	$4,225.00
995.011	1	LS	CULVERT STRUCTURE	$68,000	$68,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$48,000	$48,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00

Subtotal	$187,637
Mobilization (Assumed 5%)	$9,382
Police Detail & Traffic Control (Assumed 10%)	$18,764
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$18,764
Contingency (35%)	$65,673
Subtotal	$300,219
Permitting & Design (Assumed 25%)	$75,055
Construction Observation (Assumed 12%)	$36,026
Total	$411,300
SAY	**$412,000**

Assumptions:

- Replacement of culvert with 8' x 4'
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Garvey Rd OCS Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	20	CY	UNCLASSIFIED EXCAVATION	$40	$800.00
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.2	2	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$114.00
156.1	5	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
657.	200	FT	TEMPORARY FENCE	$19	$3,800.00
657.5	200	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,000.00
767.121	200	FT	SEDIMENT CONTROL BARRIER	$7	$1,368.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	10	TON	RIP RAP	$65	$650.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
	1	LS	OUTLET CONTROL STRUCTURE	$60,000	$60,000.00
				Subtotal	$103,957
				Mobilization (Assumed 5%)	$5,198
				Police Detail & Traffic Control (Assumed 10%)	$10,396
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$10,396
				Contingency (35%)	$36,385
				Subtotal	$166,330
				Permitting & Design (Assumed 25%)	$41,583
				Construction Observation (Assumed 12%)	$19,960
				Total	$227,873
				SAY	**$228,000**

Assumptions:

- Replacement of outlet control structure
-Control of water is necessary
-Replacement of outlet control structure only, existing 2-foot by 2-foot culvert to remain
-Assume approx. quantity 20 cubic yards of excavation

Appendix 5 – VUEWork MobileVue App

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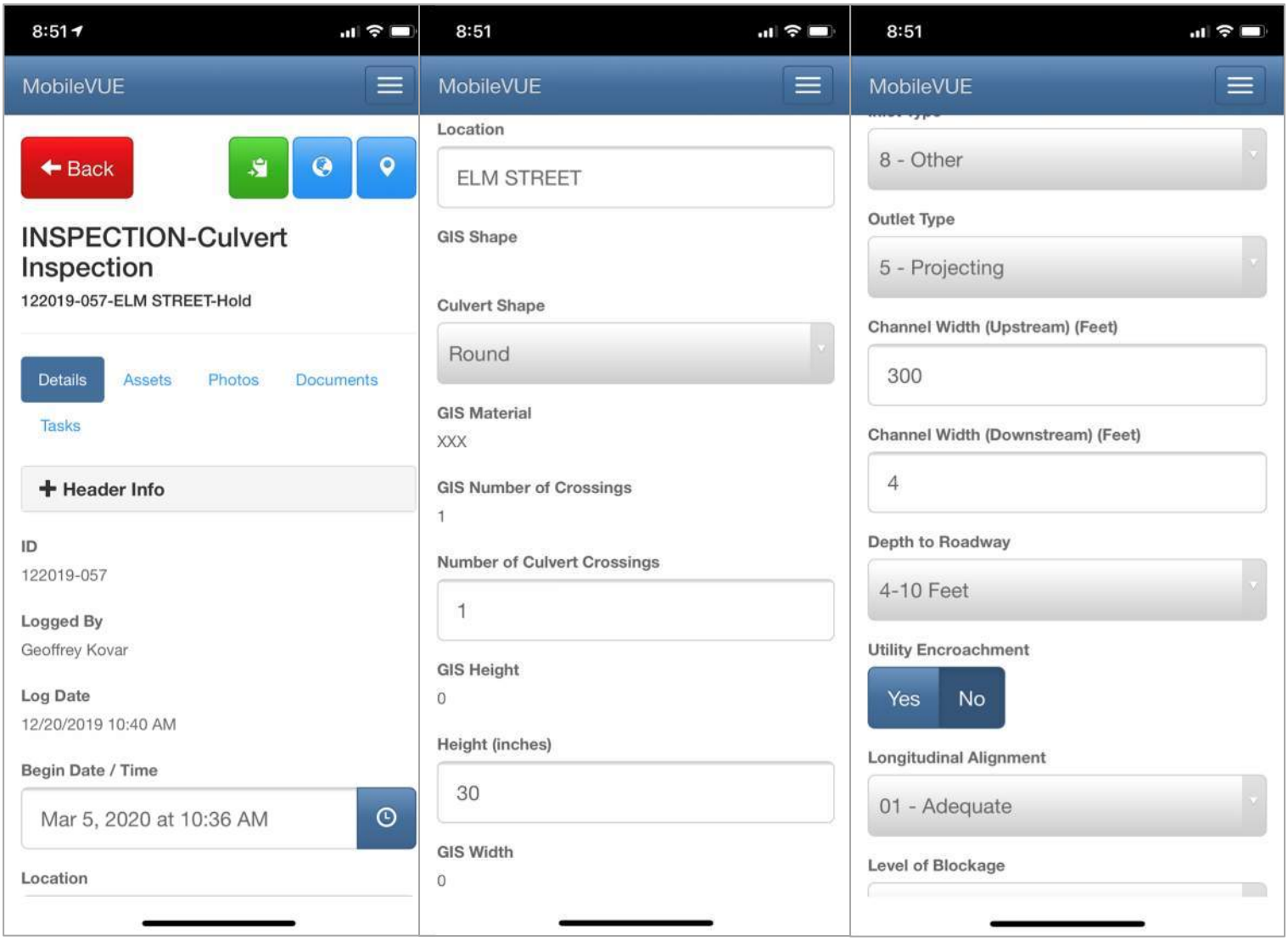
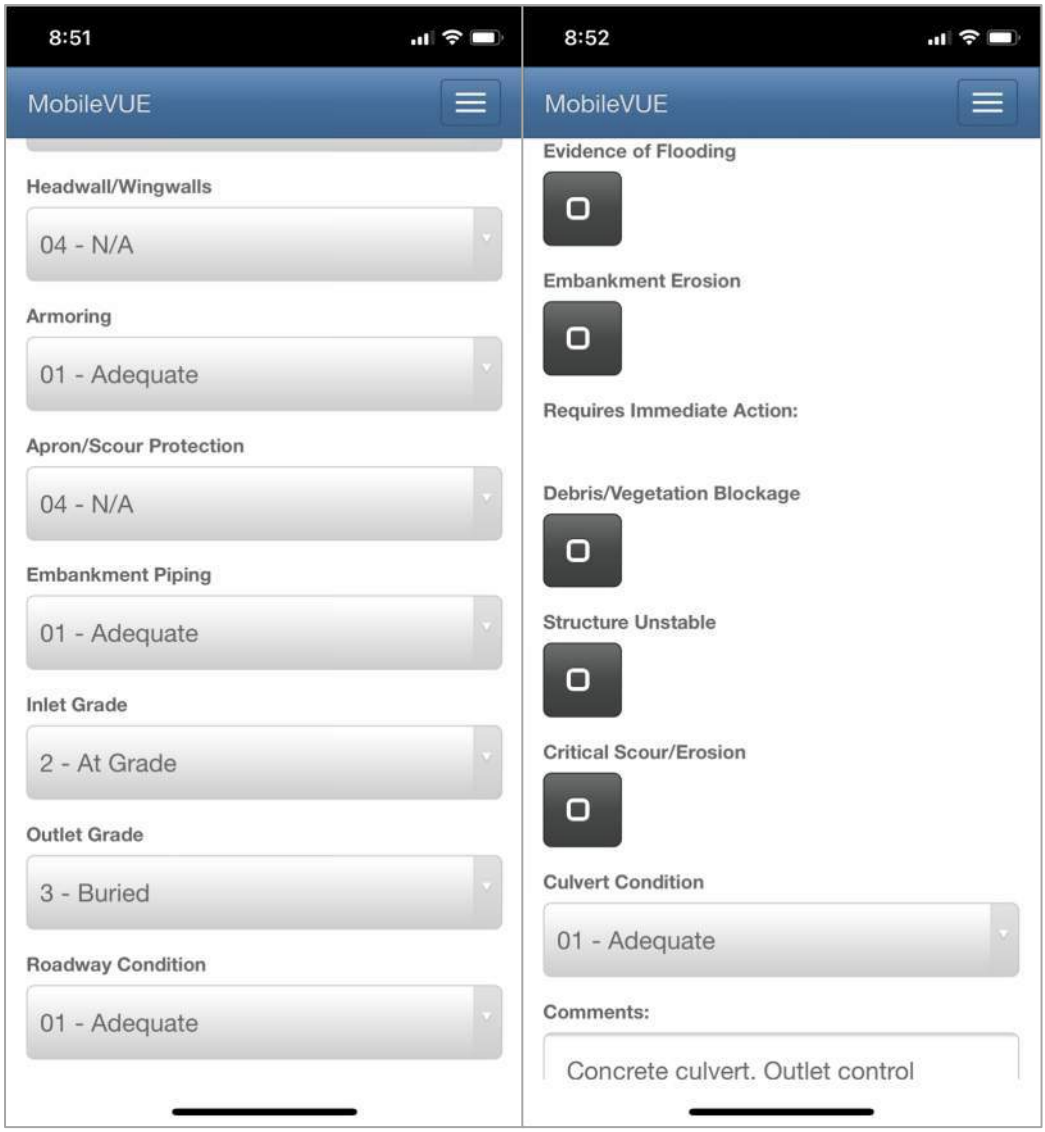

8:51
MobileVUE
Back
INSPECTION-Culvert Inspection
122019-057-ELM STREET-Hold
Details
Assets
Photos
Documents
Tasks
+ Header Info
ID
122019-057
Logged By
Geoffrey Kovar
Log Date
12/20/2019 10:40 AM
Begin Date / Time
Mar 5, 2020 at 10:36 AM
Location
8:51
MobileVUE
Location
ELM STREET
GIS Shape
Culvert Shape
Round
GIS Material
XXX
GIS Number of Crossings
1
Number of Culvert Crossings
1
GIS Height
0
Height (inches)
30
GIS Width
0
8:51
MobileVUE
8 - Other
Outlet Type
5 - Projecting
Channel Width (Upstream) (Feet)
300
Channel Width (Downstream) (Feet)
4
Depth to Roadway
4-10 Feet
Utility Encroachment
Yes
No
Longitudinal Alignment
01 - Adequate
Level of Blockage


8:51
MobileVUE
Headwall/Wingwalls
04 - N/A
Armoring
01 - Adequate
Apron/Scour Protection
04 - N/A
Embankment Piping
01 - Adequate
Inlet Grade
2 - At Grade
Outlet Grade
3 - Buried
Roadway Condition
01 - Adequate
8:52
MobileVUE
Evidence of Flooding
Embankment Erosion
Requires Immediate Action:
Debris/Vegetation Blockage
Structure Unstable
Critical Scour/Erosion
Culvert Condition
01 - Adequate
Comments:
Concrete culvert. Outlet control

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 15

(1) **PROJECT NAME:** Hartford Street Culvert Design & Construction FY24
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This is for conceptual design and permitting, with the intent that construction would be by the on-call (unit price) DPW contractor. This culvert is considered the most at-risk culvert in the City and was rated "Critical" with a risk score of 83 in the recent December 2020 city-wide Culvert Assessment and Prioritization Report. It was originally a 36" by 34" stone box culvert that was extended with two 24" concrete pipes. It crosses Hartford Street, a busy arterial roadway, and the contributing drainage area is substantial in size. Part of the stone portion of the culvert has collapsed, and there are critical blockages and deformations. In addition, the headwall has loose stones and is unstable and existing guardrail is substandard and in disrepair. Because of the complexity of the culvert and the need to keep Hartford Street in operation during construction, the project requires a full design and cannot be upgraded by going directly to construction, as is the case with some of the other culverts in the City.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

Recommend just funding the design in FY24.

(3) **PURPOSE OF PROJECT:**

x	Replace existing infrastructure
x	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
x	New infrastructure
x	New capital asset
	New vehicle
	New equipment
x	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design	750,000					
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	750,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

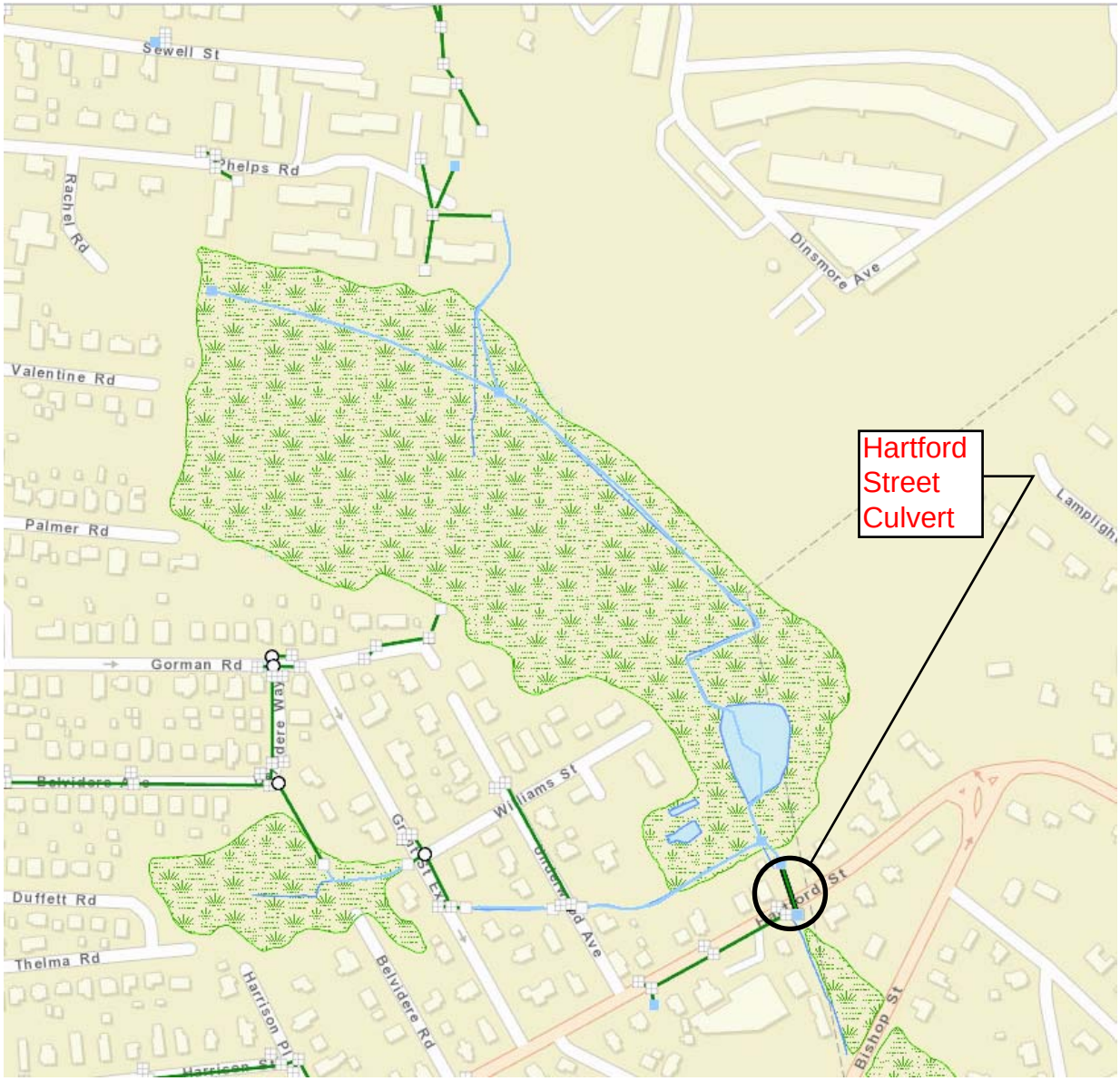
1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Hartford Street and Bishop Street

(11) **ASSET TYPE:**

(7a)	**POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**
(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**



Hartford Street Culvert (2505652 & 2512002)

www.vhb.com

September 3, 2021

Ref: 14484.01

Mr. Matthew Hayes
Senior Project Manager – Transportation
Framingham Dept of Public Works
110 Western Avenue
Framingham, MA 01702

Re: Opinion of Probable Costs - Hartford Street Culvert Replacement

Dear Mr. Hayes,

VHB has prepared this letter to provide a description and opinion of probable construction, permitting, and design cost for the replacement of the existing culvert crossing on Hartford Street (located at approximately 172 Hartford Street, Asset ID #2505652).

The existing culvert is two reinforced concrete pipes at the upstream end (one 24-inch, one approximately 18-inches) and turns into an approximate 3-foot-wide stone box culvert under Hartford Street. The culvert crosses Hartford Street between the intersection with Underwood Ave and Bishop Street and conveys an approximate drainage area of 26 acres (.04 square miles). The culvert was recently evaluated as part of the city-wide Culvert Assessment and Prioritization Report, which found the culvert in critical condition. This critical rating is due to an interior stone collapse blocking flow of water through the culvert, causing back-up upstream with the potential for flooding. Both the upstream and downstream headwalls are in need of repair. The downstream headwall has loose stones and is leaning outward.

The collapsed culvert has the potential to impact adjacent property infrastructure and property. These impacts could include flooding to adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of the roadway.

This replacement is assumed to be a reinforced concrete box open-bottom culvert with an opening to meet Massachusetts stream crossing standards (estimated to be 6-foot by 3-foot). Estimated costs include the design, permitting, and construction of new concrete culvert and headwalls, associated civil work including roadway, sidewalks, and guardrail replacement, and dredging of the downstream channel. VHB assumes that control of water will be necessary because there is dry weather flow in the culvert. Contingencies added to the construction cost include the required utility support, police detail, and mobilization.

Engineers | Scientists | Planners | Designers

101 Walnut Street
PO Box 9151
Watertown, Massachusetts 02471
P 617.924.1770
F 617.924.2286

The estimated cost associated with the design, permitting, and construction of the Hartford Street culvert is estimated to be $747,000.

If you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,

Vanasse Hangen Brustlin, Inc.

Mark Costa, PE
Project Manager

Tracie Lenhardt, PE
Senior Project Manager

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 9/3/2021

Project: Hartford St Culvert Replacement

Job Number: 14484.01

Location: Framingham, MA
Estimator: KS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$25.0	$500.00
141	400	CY	CLASS A TRENCH EXCAVATION	$42.3	$16,924.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$119.0	$2,380.00
151.	1	CY	GRAVEL BORROW	$45.9	$45.90
151.1	145	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$66.1	$9,577.30
151.2	45	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$52.3	$2,354.90
156.1	120	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$56.6	$6,795.60
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000.0	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90.0	$10,800.00
180.41	420	CY	MONITORING/HANDLING AND STOCKPILING OF EXCAVATED SOILS	$20.0	$8,400.00
180.6	3	EA	MISCELLANEOUS SOIL TESTING	$900.0	$2,700.00
181.2	100	TON	DISPOSAL OF EXCAVATED MATERIAL AS LESS THAN RCS-1 (CLASS A-2)	$35.0	$3,500.00
181.3	100	TON	DISPOSAL OF EXCAVATED MATERIAL AS DAILY COVER IN AN UNLINED LANDFILL (CLASS B-1)	$65.0	$6,500.00
181.4	100	TON	DISPOSAL OF EXCAVATED MATERIAL AS DAILY COVER IN A LANDFILL (CLASS B-2)	$65.0	$6,500.00
451.	25	TON	HMA FOR PATCHING	$225.0	$5,625.00
482.01	60	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$2.3	$135.00
482.3	60	FT	SAWCUTTING ASHALT PAVEMENT	$2.8	$166.80
580.	20	FT	CURB REMOVED AND RESET	$33.2	$664.00
631.	20	FT	GUARDRAIL	$33.3	$665.60
657.	260	FT	TEMPORARY FENCE	$21.8	$5,657.60
657.5	260	FT	TEMPORARY FENCE REMOVED AND RESET	$13.6	$3,538.60
698.1	270	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$5.2	$1,395.90
701.	1	TON	HMA SIDEWALK	$62.8	$62.80
767.121	260	FT	SEDIMENT CONTROL BARRIER	$7.0	$1,830.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$8.2	$164.60
983.1	115	TON	RIP RAP	$72.5	$8,338.70
995.011	1	LS	CULVERT STRUCTURE	$159,000	$159,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$80,000	$80,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00

Subtotal	$370,223
Mobilization (Assumed 5%)	$18,511
Police Detail & Traffic Control (Assumed 10%)	$37,022
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$37,022
Contingency (25%)	$92,556
Subtotal	$555,334
Permitting & Design (Assumed 25%)	$111,067
Construction Observation (Assumed 10%)	$55,533
Right-of-way and Easement Acquisition	$15,000
DPW Overtime	$10,000
Total	$746,934
SAY	**$747,000**

Assumptions:

- Replacement of culvert with 6' x 3' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 5.5-feet
- Headwalls to be installed on upstream and downstream ends
- Assume dredgling limits to back of adjacent property (75-feet long) by 1-foot deep by 6-feet wide

Hartford Street Culvert Design – FY24 Capital Project Submission – Department of Public Works

Existing Culvert Conditions









CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 21

(1) **PROJECT NAME:** Henry Street Drainage FY24 ARPA
PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

Stormwater improvements were installed on Union Avenue between 2015 and 2020, and are continuing in 2022 with the MassDOT TIP project. The downstream drainage system on Henry Street must be replaced to accommodate the upstream capacity of the system. The Henry Street Drainage Improvements includes the installation of approximately 750 LF of 30" drainage pipe on Henry Street, connecting to the existing culvert located on the railyard property owned and operated by CSX, Inc. before discharging to Farm Pond. Additionally, an off-line Water Quality Unit will be installed to capture roadway contaminants, improving the water quality of Farm Pond (an impaired water body).

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	1,200,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	1,200,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2) **Grants**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Henry Street

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

ARPA

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

Culvert Assessment and Prioritization Report

Framingham, MA

PREPARED FOR

City of Framingham
Department of Public Works
110 Western Avenue
Framingham, MA, 01702
508.532.5600

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

MARCH 2021

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Executive Summary

The City of Framingham (the City) contracted VHB to perform an assessment of city-owned culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. The project was deemed necessary because culvert failures have the potential to significantly impact traffic, public safety, and cause property damage. In addition, many culverts throughout the City do not meet the latest environmental standards for stream crossing, resulting in poor aquatic passage and environmental health, as well as insufficient hydraulic capacity which can cause flooding impacts. While there are privately-owned culverts and culverts owned by other government agencies within the city's boundary, the project evaluated only city-owned culverts, as the City of Framingham is responsible for their maintenance as well as impacts associated with culvert failures.

VHB performed the field assessments of city-owned culverts from January 2020 through March 2021 evaluating various culvert criteria. The City created electronic work orders for each culvert, via the VUEworks asset management software and VHB performed field assessments and desktop review at each culvert location. All assessment data and pictures were collected electronically using the City's work order system. As part of the field and office review, VHB identified specific culverts that were difficult to evaluate due to poor visibility. These poor visibility culverts were then revisited and evaluated using CCTV in order to collect additional assessment data.

VHB and the City created a scoring matrix to assist in the prioritization of culverts. This scoring matrix created a "Risk Score" for each culvert assessed that incorporated the data collected as well as additional criteria including roadway classification and watershed area. High-level cost estimates were then developed for the ten (10) culverts which received the highest risk score.

- In summary, VHB evaluated a total of 98 culverts and gave them overall ratings of "adequate", "poor," or "critical" based on the conditions of individual culvert components and the potential impact of culvert failure at each location. The ratings generally were defined as:
  - Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.
  - Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
  - Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

› As previously stated, the evaluation included 98 city-owned culverts. Of the evaluated culverts, the following results were found:

Condition	Number of Culverts
Critical	9
Poor	33
Adequate*	56
Total (City-owned Culverts)	98

*Millwood Street culvert (Asset ID 2511576) was recently replaced and is assumed to be adequate.

Culverts rated poor and critical have the potential to impact adjacent infrastructure or property. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway.

- Culvert conditions, risk scores and locations are viewable in an ArcGIS Online dashboard (https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a) and Figure 7 in the report.

› Culverts were evaluated for actions that require immediate action including debris and vegetation blockage, critical scour and erosion, and unstable structures. The following results were found:

Immediate Action Item	Number of Culverts
Debris/Vegetation Blockage*	22
Critical Scour/Erosion	0
Unstable Structure	8

*There were 5 culverts where blockage was the only issue

› The conditions of the culvert and the culvert parts, such as footings, joints and seams, and headwalls, were used to develop a risk score for all evaluated culverts to determine culverts with the highest risk of failure. High-level cost estimates, which can be seen in Appendix 4, were then developed for the ten (10) culverts which received the highest risk score. The ten culverts which received the highest risk scores were the 9 critical culverts and the Fountain St (Asset ID:2506913) culvert, which was rated poor.

› The highest scored culverts and their associated cost estimates are:

High Risk Culverts and Cost Estimates

Risk Score	Asset ID	Approximate Location	Summary of Condition	Approximate Replacement Cost and Resolution	
83.0	2505652	172 Hartford St	Collapsed stone culvert causing blockage	$755,000	Concrete culvert
77.0	2511942	82 Herbert St	Collapsed stone culvert and sediment causing blockage	$285,000	Concrete culvert
76.2	2515114	65 Bates Rd	Severe deterioration and crushing of corrugated metal pipes	$1,067,000 $273,000	20' Bridge or Open Channel
75.1	2506907	15 Gates St	Severe deterioration of corrugated metal pipe and outlet control structure	$988,000	Concrete culvert
74.3	2511788	38 Wayside Inn Rd	Unstable stone structure and embankment erosion	$303,000	Concrete culvert
71.3	2511831	704 Salem End Rd	Unstable stone structure with partial roof collapse	$964,000	Concrete culvert
71.1	2511778	93 Parmenter Rd	Collapsed stone culvert causing blockage	$244,000	Concrete culvert
69.2	2506912	14 Badger Rd	Severe blockage caused by collapsed stone headwalls	$449,000	Concrete culvert
61.5	2506913	250 Fountain St	Significant debris blockage and unstable headwall	$412,000	Concrete culvert
60.3	2511728	43 Garvey Rd	Displaced outlet control structure	$228,000	Outlet control structure only

› Flooding occurs in areas throughout the City:

- Several culverts and channels need routine maintenance. This includes channel clearing, dredging and blockage removal. These maintenance items are likely contributing to flooding issues.
- In other areas flooding is complex and likely requires further evaluation and study to evaluate alternatives for improvements

› VHB provides the following recommendations:

- The City should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- The City should develop a city-specific inspection frequency of culverts; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City's Department of Public Works should address "immediate actions" flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity.
- For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

1

Introduction

The City of Framingham (the City) contracted VHB to perform an assessment of culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. The project's goals are to identify culverts with poor structural integrity, create a scoring matrix to identify risk of each culvert, prioritize culverts for improvements, and develop cost estimates for high priority culverts.

In summary this report will:

- Describe background information including the City's GIS database, culvert evaluation methodology, data collection methods, and CCTV evaluation,
- Present data from field evaluations,
- Identify locations with known flooding issues,
- Provide a prioritization of improvements of culverts based on their risk score, and
- Provide cost estimates to perform repairs and replacements for high risk culverts.

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2

Background Information

A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. For the purposes of this assessment, a stream crossing was considered a culvert if the span of the crossing was less than 10 feet in width. Crossings with spans of 10 feet or greater are considered bridges by the Massachusetts Chapter 85 regulations and are subject to additional regulations and require certified bridge inspectors. Bridges were not included in this report.

This section details the City's existing GIS data, the culvert evaluation criteria, and field collection processes used for the culvert assessments.

City of Framingham GIS Database

The City of Framingham's culvert and stormwater drainage data is currently stored electronically in a Geographic Information Systems (GIS) geodatabase. The City's geodatabase stores the culvert and drainage data geospatially, based on their location. Each culvert, catch basin, pipe, manhole and outlet are stored as unique assets in the geodatabase. Each unique asset has attributes associated with it, providing details on the structure's characteristics such as length, shape, material, year installed, and a unique identifier. VHB found that some culverts are further broken up into separate assets depending on length, layout, or material changes in the culverted segment. An example is a culvert that is stone at the upstream opening and concrete in the downstream section. Such a culvert may be in GIS as two separate assets, one for the upstream segment, with the material described as "Stone" and one for the downstream segment, with the material as

"Concrete". For culvert evaluations at a location with multiple assets, this report names the asset whose AssetID was populated in the associated work order. VHB did a high-level review of the culvert data confirming no duplicate work orders, culverts were city-owned, and assets were associated with each work order, though VHB relied on the accuracy of culvert asset attributes provided by the City to complete the culvert assessments.

The data is accessible to VHB through the City's VUEWorks web application and the VUEWorks MobileVue mobile application. VHB was assigned 98 work orders by the City in VUEWorks to evaluate 155 of the City's culvert assets. Each work order has an associated culvert asset or assets, depending on potential segmentation in the GIS data, as described above. For example, one work order may have 3 culvert assets associated with it because the culvert is composed of 3 segments with different materials and there is a separate asset for each material segment. Because the three assets compose one culvert crossing, they are included in the same work order. The work order evaluation considers the condition of each asset that composes the total culvert and bases the overall culvert condition on the condition of the multiple parts of the culvert. The notes section of the work order was used to describe conditions of the individual assets if the conditions varied significantly. While the culvert asset includes attributes to describe constant characteristics, the work orders are where the field assessment data is recorded. The work order data records condition information at the time of the field visit. Fifteen assessment locations were initially included in the assigned work orders but were found to be previously included in the 2013 Bridge Master Plan. Prior to learning the locations were bridges and were included in the Bridge Master Plan, VHB completed field inspections on 9 of the locations. These locations were not included in the findings of this report as they have been previously evaluated. VHB also did not include a potentially collapsed culvert (Asset ID 2511576) on Millwood Street, directly south of Callahan State Park South Entrance. This culvert was evaluated by the developer of a nearby development and has been replaced as of September 29, 2020.

Culvert Evaluation Methodology

Prior to the start of VHB's culvert assessments, the City of Framingham had completed 37 culvert assessments within the City. The City's assessments and their workorder template were based upon the "Culvert Condition Assessment Manual"[1] 2017 Edition. Since the development of this 2017 Assessment Manual, subsequent culvert assessment guidance has been developed by Massachusetts Department of Transportation (MassDOT) and the recently released (August 2020) American Association of State Highway and Transportation Officials (AASHTO) Culvert and Storm Drain System Inspection Guide[2]. VHB and the City of Framingham project manager and stormwater engineer worked with the City's GIS group to update the previously used rating system to incorporate the applicable evaluation criteria

1 The Center for Agriculture, Food, and the Environment, North Atlantic Aquatic Connectivity Collaborative, The Nature Conservancy, and UMass Amherst Transportation Center. "Culvert Condition Assessment Manual". https://streamcontinuity.org/sites/streamcontinuity.org/files/pdf-doc-ppt/CulvertManual_2019_082919.pdf

2 AASHTO, Culvert and Storm Drain System Inspection Guide, 1st Edition, 2020. https://aashtojournal.org/2020/08/14/aashto-releases-culvert-storm-drain-inspection-guide/

from the new MassDOT and initial AASHTO guidance into a new work order template. The fields that were added to the new work order template include:

Features

- Channel Width Upstream
- Channel Width Downstream
- Depth to Roadway

Condition

- Evidence of flooding
- Embankment erosion

Immediate Action Items

- Debris/Vegetation Blockage
- Structure Unstable
- Critical Scour/Erosion

The new work order template was created in VUEWorks (Appendix 5) to balance the need to efficiently evaluate nearly one hundred culverts while obtaining sufficient condition information in order to properly prioritize culvert repairs. VHB reevaluated the 37 previously evaluated culverts as part of the city-wide assessments using the updated assessment criteria to create consistency across all evaluated culverts and allow for a consistent ranking methodology. VHB evaluated the following criteria of each culvert:

General Criteria

- **Channel Width Downstream/Upstream:** These fields document the average width of the stream channel, in feet, upstream and downstream of the culvert.
- **Culvert Shape:** The shape of the culvert
- **Culvert Size:** Size of the culvert. For circular culverts, the width field was used to document the diameter, in inches. For rectangular or ellipse culverts, height and width were documented in the appropriate field
- **Culvert Material:** Material the length of culvert is composed of.
- **Number of Culvert Crossings:** Number of culvert pipes at the crossing location.
- **Depth to Roadway:** Depth from the top of the culvert opening to the roadway surface above.
- **Inlet Grade:** Describes if the upstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Outlet Grade:** Describes if the downstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Inlet Type:** Describes the type of structure present at the upstream end of the culvert.

- **Outlet Type:** Describes the type of structure present at the downstream end of the culvert.
- **Roadway Condition:** Describes the condition of the roadway directly above the culvert through visual evaluation of cracking or sinking.
- **Overall Culvert Condition:** Overall condition of the culvert considering the condition of all individual parts of the culvert evaluated

Structural Criteria

- **Headwall/Wingwall:** Condition of the headwall/wingwall, if present, structure depending on visual evidence of cracking, spalling, exposed rebar, and settlement of structure.
- **Footings:** Condition of the culvert footing, if present.
- **Invert Deterioration:** Condition of the culvert's bottom material, if not an open bottom culvert. Condition assessment considers evidence of corrosion, perforations, spalling, etc. depending on visual evidence of cracking, weathering, settlement or undermining.
- **Buoyancy or Crushing:** Degree to which the culvert has been deformed by the weight of the pipe, weight of the fill material above the pipe or the weight of the water in the pipe.
- **Cross-Section Deformation:** Degree to which the culvert is deformed or distorted resulting in flattening of the invert and/or crown of the pipe.
- **Structural Integrity of Barrel:** Condition of the culvert barrel depending on the presence of cracking and deterioration around bolts and seam or tearing of material.
- **Level of Blockage:** Degree of debris, sediment, or vegetation blockage of the interior of the culvert.
- **Utility Encroachment:** If other utilities are within or adjacent to the culvert crossing that would require additional coordination if work was to be performed on the culvert.
- **Joints and Seams:** Condition of the joints and seams, if present, based on visual evidence of separation of joints and seams.

Hydrology/Hydraulic Criteria

- **Longitudinal Alignment:** the angle measured from the upstream channel to the centerline of the culvert barrel at the culvert opening.
- **Embankment Erosion:** If there is evidence of erosion from the ground material surrounding the culvert.
- **Embankment Piping:** If there is presence of water seeping through the culvert barrel into the surrounding embankment material
- **Evidence of Flooding:** If there is evidence the stream bank has flooded, including debris lines or discoloration on trees.
- **Apron/Scour Protection:** Condition of the apron or scour protection, if present, based on evidence of undermining of culvert, deterioration of joint between apron and headwall, and presence of a scour hole downstream of the apron.

- **Armoring:** This field was used in the field evaluation to document the presence of scour at the culvert.

Immediate Maintenance Items

Evidence of the following are noted to require immediate action:

- **Critical Scour/Erosion:** Presence of scour or erosion that creates an immediate hazard.
- **Debris/Vegetation Blockage:** Presence of vegetation or debris that blocks the culvert opening, creating an immediate flooding hazard.
- **Structure Unstable:** If the structure's condition is unstable and could cause an immediate collapse of the culvert.

Culvert shape, size, and material fields required text or numerical descriptions for their responses. All other criteria above utilized set domains for responses with either a check box for a "yes" or "no" domain or a domain of "adequate", "poor", "critical", and "N/A" to describe the culvert criteria's condition. To create consistency across all culvert assessments and with varying team members performing the assessments, VHB followed the Culvert Assessment Manual Methodology to assign ranking to each criteria included in the field assessments.

Collection Methods

The City of Framingham created and assigned work orders for each assessment location using the City's VUEWorks account. VHB collected data in the field using the VUEWorks MobileVue mobile application (Figure 1). Utilizing the mobile application allowed for streamlined data management, with data, both evaluations and photographs, being loaded directly from the mobile application into the City's geodatabase and associated with the culvert assets.

All culvert assessments were evaluated by two-person teams consisting of one water resource engineer and one structural engineer to evaluate the culverts for performance and functionality from both the hydrologic and structural perspectives. Culvert assessments were completed between January 2020 and March 2021. VHB's field teams provided details about criteria rated poor or critical in the "notes" field of the culvert's assessment and included additional pictures to show the poor or critical feature.

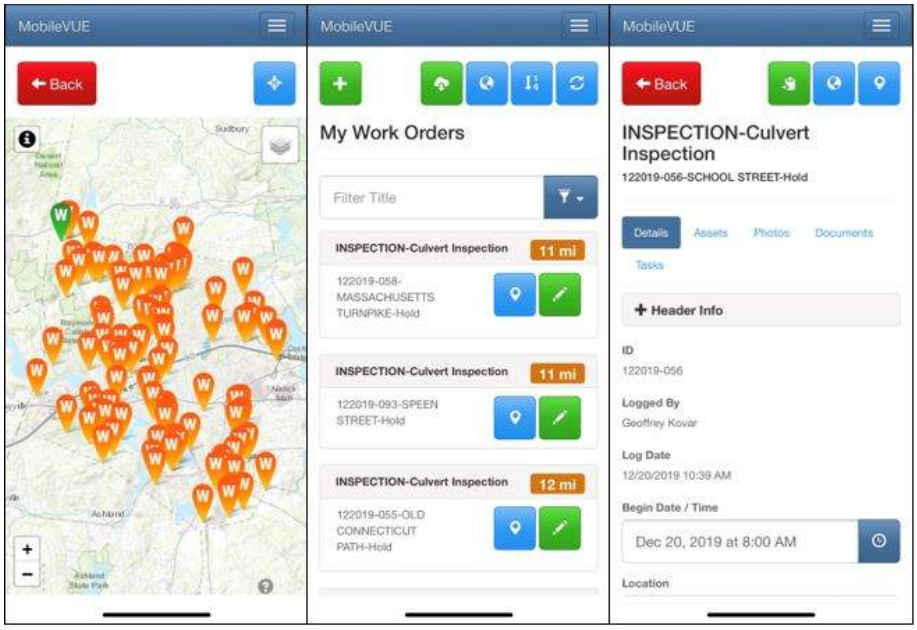


Figure 1 Screenshots of the VUEWorks MobileVUE application

In addition to the above criteria evaluated in the field, VHB also found the watershed area to each culvert using U.S. Geological Survey (USGS) StreamStats[3] web application for available streams and the roadway functional classification at each culvert using the MassDOT Roadway Inventory[4] web application. Both the criteria collected in the field and the criteria supplemented through the above web applications were used in ranking the risk of failure for each culvert.

At the completion of each field assessment, VHB's field staff updated the culvert's work order status from "Open" to "Hold" to signify the field evaluation was completed and allow VHB's office staff to perform a quality review of the data collected. The quality reviewers utilized the photos attached to the culvert assessment in the VUEWorks web application to determine if the assigned criteria aligned with what was visible in the photos. Once final review was complete, the work order statuses were set to "Closed". In the VUEWorks web application, users can access the work orders by selecting "Find / Manage / Report" under "Work Orders" in the left pane of the map viewer. Once the "Manage Work Order" pop-up appears, the user can filter by setting Department to be "Engineering", Program to "Inspection", Activity Description to "Culvert Inspection" and Status to "Closed". Once the filter is applied, the list of work orders is shown under the "Table View" tab. When a work order is selected in the "Table View" tab the details of the work order are viewable under the "Form View" tab, photos are saved under the "Documents" subtab. A specific asset can also be viewed by selecting "Find/Manage/Report" under "GIS Assets" in the left pane of the map viewer. Once the "GIS Assets" pop-up appears populated the field "Table / Layer" with "Drain Pipe", set "Field" to "ASSETID", "Operator" to "Equal To" and type the culvert's Asset ID

3 U.S. Geological Survey (USGS). StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water Resource Applications. https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects

4 Massachusetts Department of Transportation. Roadway Inventory Web Application. https://gis.massdot.state.ma.us/roadinventory/

referenced in this report into the fourth box and "Apply Filter". The reviewers noted if additional data or photos were needed from the field. If additional information was needed, VHB's field staff revisited the culvert location and updated the evaluation form with the additional information. In addition to revisiting structures for additional information, all critical structures were revisited with a senior engineer and utility engineer to review potential constructability issues.

CCTV Evaluation

Through field culvert evaluations and office review, VHB identified culvert locations where the inside of the culvert couldn't be fully evaluated due to length, alignment, or high-water levels. These culverts were identified as locations to perform video evaluations using closed circuit television (CCTV) cameras to record the inside of the culvert where the structure's condition was not visible in the field. Twenty-one culverts were identified to have a CCTV evaluation be performed (Table 1). Nine (9) of the culverts were identified as having high-water levels that would require dewatering of the culvert prior to performing the CCTV evaluation.

Table 1 Culvert Locations for CCTV Evaluation

Culvert Work Order	Asset ID	Nearby Address	Dewatering Needed
122019-087	2511831	704 Salem End Road	No
122019-088	2511840	635 Salem End Road	No
122019-054	2508317	121 A Street	No
122019-045	2517849	45 Leland Street	Yes
122019-078	2511681	132 Millwood Street	No
122019-080	2511778	68 Parmenter Road	No
122019-060	2506913	250 Fountain Street	No
122019-052	2508663	118 Howe Street	Yes
122019-051	2508218	183 Wilson Street	Yes
122019-113	2511638	3 Chicatawbut Road.	No
122019-032	2501693	106 Dudley Road	Yes
122019-102	2511205	7 Sloane Drive	Yes
122019-070	2511187	20 Knight Road	Yes
122019-077	2511660	33 Grove Street	Yes
122019-120	2511130	4 Frost Street	Yes
122019-119	2511122	10 Scott Drive	No
122019-083	2511788	689 Edmands Road	No
122019-095	2511577	155 Millwood Street	No
122019-114	2520964	6 Lyman Way	No
122019-124	2508880	26 Hickory Hill Lane	No
122019-027	2505652	172 Hartford Street	Yes
		Total # of Culverts =	21

VHB coordinated with the City of Framingham Conservation Commission and was administratively approved for CCTV evaluations to be performed within jurisdictional areas. VHB subcontracted Truax Corporation to complete the CCTV evaluations. All CCTV evaluation were completed between July and September 2020 by Truax with a VHB engineer present. Once CCTV video was collected in the field, Truax provided VHB with the culvert videos and summary of the evaluations. The CCTV evaluations resulted in some minor updates to culvert dimensions and material as well as providing additional information about the culvert condition that allowed VHB to more accurately evaluate the culvert. The final condition ratings and risk scores for culverts which received CCTV incorporate the conditions found during CCTV.

3

Culvert Evaluation Summary

VHB completed the field assessments of culverts at 98 locations in the City from January 2020 to March 2021. The data collected during the field evaluations was reviewed in the office by VHB to confirm completeness of the evaluation and accuracy of the conditions assigned to each culvert and its parts. CCTV video evaluation was performed on culverts which were not able to be fully evaluated during the initial field evaluation due to inability to see the interior condition of the culvert.

Findings of Assessment

Upon review of the collected data, 56 culverts were rated and received overall culvert conditions of "Adequate", 33 culverts were rated as "Poor", and 9 culverts were rated as "Critical" (Figure 2). As noted above, the Millwood Street culvert (Asset ID 2511576) has been replaced as of September 2020. The new culvert is assumed to be in adequate condition. For the individual parts of the culvert that were evaluated, the differences between adequate, poor, and critical were defined in the NAACC Culvert Condition Assessment Manual. The overall condition ratings used for the field assessments were determined based on the condition of the individual parts and engineering judgment. The overall condition ratings are defined as:

- Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.

- Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
- Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

All culverts and their evaluation results are detailed in the following graphics and are also available in to view interactively via the ArcGIS Online Dashboard at https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a. The online Dashboard allows the data to be shown geospatially, allowing the user to see where the culvert is located within the city. The Dashboard also symbolizes culverts by their overall condition and allows you to click on the culvert to view the complete results from the field evaluation as well as their final risk scores.

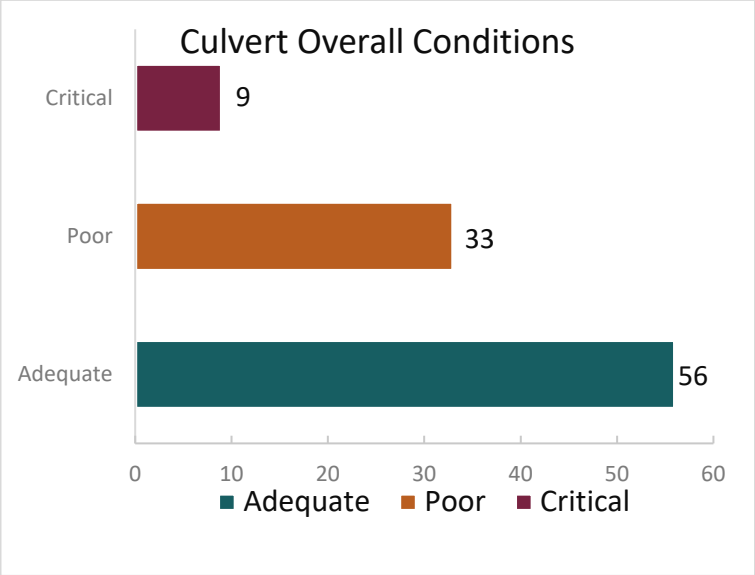


Figure 2 Culvert Overall Conditions

In addition to culverts receiving an overall condition rating, the culverts were evaluated for condition of 12 individual parts of each culvert, if applicable to the culvert. Overall, the City's culverts were found to be mostly in adequate condition. Condition ratings for "Headwall/Wingwalls" and "Level of Blockage" had the most poor and critical conditions of the culvert parts. Debris and vegetation blockage was also found to be the most needed immediate action item.

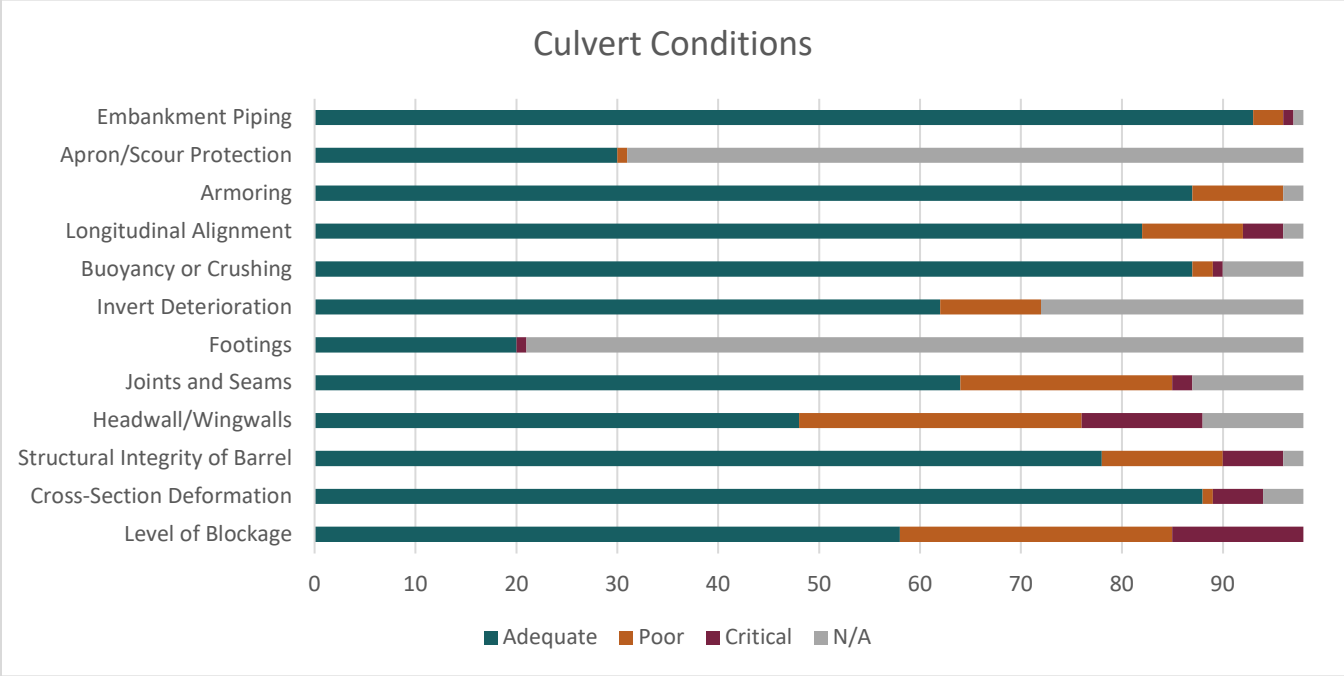


Figure 3 Culvert Conditions

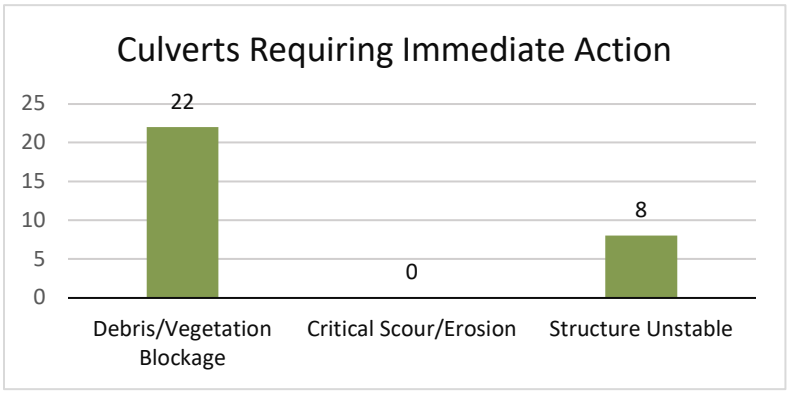


Figure 4 Culverts Requiring Immediate Action

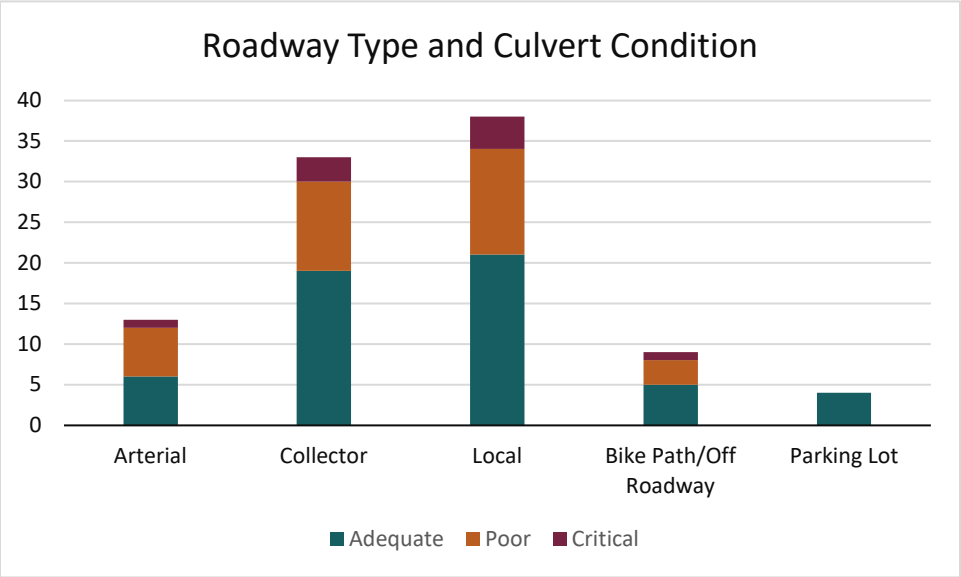


Figure 5 Culvert Condition by Roadway Type

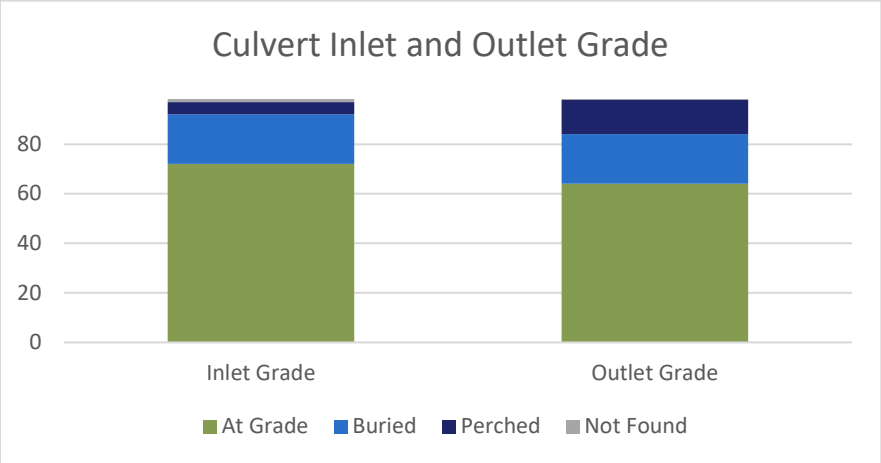
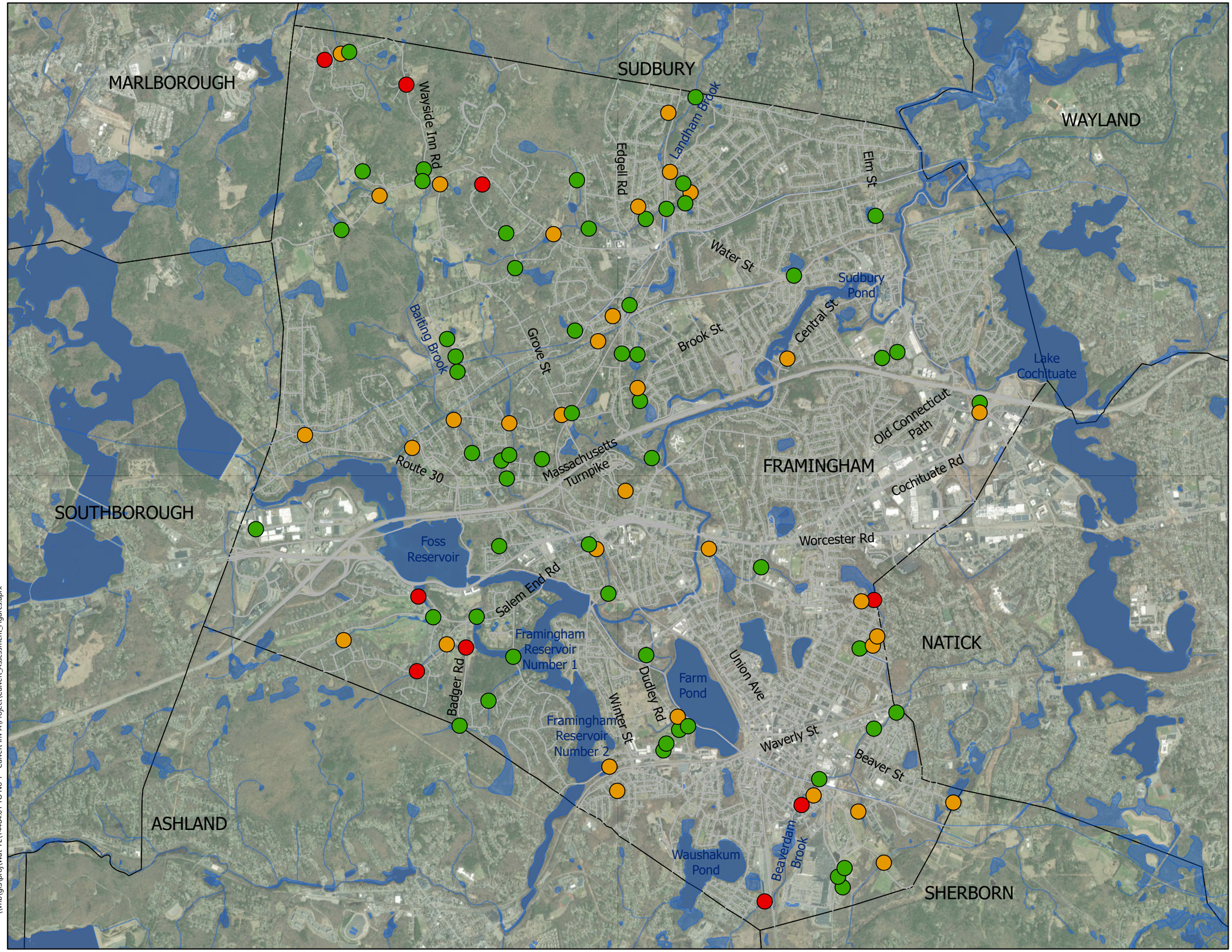


Figure 6 Culvert Inlet and Outlet Grades

FIGURE 1



Culvert Condition

- Adequate
- Poor
- Critical
- Municipal Boundary
- Roadways
- Waterbodies

N

0 1,500 3,000 6,000 Feet

City-Owned Culvert Assessment
Culvert Condition Ratings

Framingham, MA

March 18, 2021

Source: City of Framingham VueWorks Culvert Work Order Data

\\vhbgis\proj\Wat-TE\14484.01 TO No 1 - Culvert Inv A\Project\Culvert_Assessment_Figures.aprx

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Locations with Known Flooding Issues

Part of the culvert evaluations included assessing if there was visible evidence of flooding. VHB's field team spoke with Framingham residents who lived near some of the culvert locations to learn if the residents were aware of any flooding issues at the culverts. These conversations with residents helped provide experiential knowledge of the culvert over time. VHB documented these occasions of resident-reported flooding, as well as visual evidence, in the comments section of the associated work order. Visual flooding evidence was documented with photos, if possible. The cause of flooding at culverts is often complex, with multiple factors influencing the flooding. Further study of the locations noted below is needed before mitigation methods can be recommended. The following culvert locations were noted to have flooding issues by resident's anecdote. While this list includes culverts where residents noted flooding during the field evaluation, this list is not comprehensive of all culverts with flooding issues throughout the City.

Asset ID: 2515114 - CC Beaver Dam Brook

Flooding reported by neighbor when culvert is not maintained. Flooding is likely the result of culvert blockage and failure.

Asset ID: 2511184 - Knight Road

Flooding reported by neighbor. Neighbor routinely clears debris from culvert. Poor alignment upstream. Stagnant water is present downstream of the culvert indicate downstream backwater conditions which is likely resulting in flooding.

Asset ID: 2511840 - Salem End Road

Flooding on roadway at catch basin reported by neighbor. Based on a preliminary desktop review, this catch basin is not connected to the culvert. Further evaluation is required to determine the cause of flooding at this location.

Asset ID:2508898 - Willowbrook Road

Resident says upstream area does not drain well and backs up into the yards. Upstream channel is littered with tree debris. Based on field evaluation, flooding may be result of low point in the area. Further evaluation is required to determine the cause of flooding.

Neighborhood Flooding – Tributary to Beaverdam Brook

Asset ID: 2508218 - Wilson Street and Asset ID: 2508663 - Howe Street

Stagnant water is present at both culvert locations, likely due to backwater conditions. Downstream channel is overgrown and filled with sediment.

Neighborhood Flooding – Landham Brook

Asset ID: 2511207 Gregory Road and Asset ID: 2511205 - Sloane Drive

Flooding along this segment of Landham Brook was noted in discussion with the City's Conservation Agent. Additional discussion with the Conservation Agent is recommended to further identify the flooding source and potential fixes.

In addition to the culvert location listed above, which had experiential knowledge of flooding, there were other culverts where VHB's field staff noted potential evidence of flooding. These locations are noted in the completed work orders by "Flooding Evidence" being marked "Yes". The work order notes and pictures also help document potential evidence of flooding. Further evaluation is needed for these culverts to better understand the flooding risk of the culvert locations and potential mitigation.

4

Prioritization of Culvert Improvements

VHB developed a method for assigning a risk score to each culvert based on the various culvert characteristics. The risk score of culverts based on various conditions allows the City to evaluate and prioritize improvements for culverts with the highest risk score. The following sections describe the process used to develop the risk score methodology and subsequent findings.

Risk Score Methodology

After completion of all field culvert assessments, VHB compiled the results in order to compare the culvert conditions and develop a methodology for scoring the risk of the culverts to assist the City in future capital planning efforts. To develop the scores, VHB took the raw data exported from the VUEWorks assessment forms and simplified it to only the fields using the condition rating domain of Adequate, Poor, Critical, and N/A and inlet and outlet grade which used the domain of Perched, At Grade, and Buried. Each field received a certain weight to determine the influence the criteria would have on the overall score of the culvert. In addition to the weight allotted to each field, each individual condition rating was designated a percentage to determine what percent of the criteria weight the culvert would receive. A criteria which received a condition rating of "Critical" receives the highest percentage of weight possible for the criteria, "Poor" and "Adequate" each received an increasingly smaller percentage. A criteria that received a rating of "N/A" or was left blank did not received any percentage of weight for that criteria and the total possible weight was removed from the total potential risk score for that asset. Removing the N/A or blank fields from the overall total potential weight for the asset helped more accurately show how the applicable criteria effects the culvert's overall condition.

The City reviewed and commented on the proposed risk score points prior to their finalization. The final risk score points used were updated based on the discussion with the City.

In addition to the fields which use the condition domain, the risk scoring considered roadway functional classification, and drainage area to the culvert. Roadway functional classification was determined by VHB using the MassDOT Roadway Inventory web application. The roadways were broken into the classes of: Freeway, Major Collector, Minor Arterial, Local, Parking Lot, and Bike Path. No culverts evaluated were on freeways, but the classification was kept in the possible domain for consistency with the MassDOT Roadway layer and to be adaptable if the risk scoring methodology is used in the future. The scoring shows freeways receiving the highest percentage of weight due to the high traffic of the roadway, followed by collectors, and each classification after receiving a smaller percentage of weight as they receive less traffic. Drainage area to each culvert was determined for available streams using USGS Stream Stats web application. For condition weight percentage groupings, the drainage areas were broken into thirds, with culverts in the top third, with the largest drainage area, receiving the highest percentage of the weight. Larger drainage areas were given a higher percentage of weight because a culvert failure could potentially cause more damage than for a culvert with a smaller drainage area.

The final weights for each criteria and percentages of weight associated with each condition are as follows:

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Overall Culvert Condition	40	Critical – 100% Poor – 70% Adequate – 0 N/A – 0
Roadway Classification	10	Freeway – 100% Arterial – 80% Collector – 60% Local – 40% Parking Lot – 20% Bike Path – 20%
Structural Integrity of Barrel	10	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Watershed Area	5	Largest 1/3 of watershed areas – 100% Middle 1/3 of watershed areas – 50% Smallest 1/3 of watershed areas - 0
Blockage	5	Critical – 100 % Poor – 50% Adequate – 0 N/A – 0
Headwalls	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Footings	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Cross Section Deformation	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Joints and Seems	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Invert Deterioration	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Buoyancy or Crushing	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Armoring (Scour)	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Embankment Piping	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Longitudinal Alignment	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Apron/Scour Protection	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Inlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Outlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Total Possible Risk Score	**100.00**	

The final culvert risk scores were found by dividing total score of the asset by the total potential score, removing the weight for any criteria rated N/A or blank. The culvert risk scores can range from zero to 100. The risk scoring methodology used gives culverts with the highest risk the highest score. The lower the score, the better condition the culvert, and the less risk associated with it. For example, a culvert with a risk score of 100 implies the highest potential risk, while a culvert with a risk score of 0 implies the lowest potential risk.

Risk Scoring Results

While the available range of risk is from zero to 100, the risk scores for the evaluated culverts ranged from 0.0 to 83.0.

In accordance with the scope of work VHB performed a detailed review of the 10 culverts with the highest risk scores. The following list provides notable details about the ratings of these culverts and includes cost estimates. Construction cost estimates are conceptual and generally include culvert/headwall replacement and incidental costs. See Appendix 4 for construction cost estimate breakdowns.

1. **Hartford Street, Asset ID: 2505652, Associated Work Order: 122019-027**

- Total Risk Score: 83.0
- Cost Estimate for Construction: $755,000

  Assumptions for Cost Estimate: Replacement of culvert with a 6′ x 3′ concrete box culvert, replacement of headwalls, dredging adjacent property
- Roadway Classification: Arterial
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Buoyancy or Crushing
- Summary of Culvert Condition: The culvert is half stone and half reinforced concrete. CCTV indicates a collapse in center of the stone culvert blocking flow though the culvert (Photo 1). Downstream headwall and wingwall have loose stones and are leaning outward.



Photo 1 Hartford Street culvert, interior collapse

2. **Herbert Street, Asset ID: 2511942, Associated Work Order: 122019-034**

- Total Risk Score: 77.0
- Cost Estimate for Construction: $285,000

  Assumptions for Cost Estimate: Replacement of culvert with 42″ x 24″ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: Stone collapse within culvert blocking flow through the culvert (Photo 2). The upstream invert is completely buried causing stagnant water at the upstream headwall (Photo 3).



Photo 2 Herbert Street culvert, interior collapse



Photo 3 Herbert Street culvert, upstream blockage

3. **Bates Road Extension, Asset ID: 2515114, Associated Work Order: 122019-030**

- Total Risk Score: 76.2
- Cost Estimate for Construction: $1,067,000 (Bridge) or $273,000 (Removal of crossing, restoration of Waushakum Brook)

  Cost Estimate Assumptions: Costs were estimated for 2 scenarios- replacement of the culvert with a 20' Bridge or removal of crossing and restoration of Waushakum Brook with a rip rap lined open channel. Both estimates include FEMA no-rise certificate permitting.
- Roadway Classification: Bike Path/Off Roadway
- Criteria Rated Critical: Level of Blockage, Cross-section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: The culvert is composed of four (4) corrugated metal pipes (CMP). The culvert, second from left, is partially deformed, reducing hydraulic capacity (Photo 4). The upstream left-most pipe is completely collapsed and filled with sediment and debris (Photo 5). All CMP is significantly rusted, and there is cracking in the downstream headwall. Residents have noted flooding.
- Additional Notes:
  - It is our understanding, an 8" insulated ductile iron water main is present above the culverts. Replacement or removal of the culvert will require reconstruction of the water main.
  - According to City officials, the upstream Washakum Pond ecosystem supports a rare form of sedge that requires controlled water levels in the pond. Updates to the culvert will need to include water level control measures to maintain the sedge species.
  - The open channel cost estimate is provided for reference if the City identifies another access route for the adjacent sewer system.



Photo 4 Waushakum Brook, deformation, second from left culvert



Photo 5 Waushakum Brook, interior collapse in left culvert

4. **Gates Street, Asset ID: 2506907, Associated Work Order: 122019-059**

- Total Risk Score: 75.1
- Cost Estimate for Construction: $988,000

  Assumptions for Cost Estimate: Replacement of culvert with 12′ x 6′ concrete box culvert, replacement of headwalls, replacement of outlet control, hydraulic study and flood analysis
- Roadway Classification: Collector
- Criteria Rated Critical: Structural Integrity of Barrel
- Summary of Culvert Condition: The CMP culvert has significant rusting throughout entire barrel (Photo 6). The upstream headwall includes an outlet control structure (OCS) with gate and a 6″ opening at the bottom of gate (Photo 7). The gate opening tracks are significantly deteriorated. Some exposed rebar is visible on the structure. On the downstream side, the top of projecting CMP is completely deteriorated. The downstream end of culvert is submerged in stagnant water. The Massachusetts Water Resources Authority (MWRA) operates the downstream reservoir, so upgrades to this culvert may require MWRA approval.



Photo 6 Gates Street culvert, interior deterioration



Photo 7 Gates Street culvert, rusted OCS gate

5. **Wayside Inn Road, Asset ID: 2511788, Associated Work Order: 122019-083**

- Total Risk Score: 74.3
- Cost Estimate for Construction: $303,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of upstream headwall
- Roadway Classification: Collector
- Criteria Rated Critical: Footings
- Summary of Culvert Condition: Many stones in the culvert have fallen out of place (Photo 8). Although the culvert is currently functioning, the fallen stones have left voids in the wall which reduces the structural stability of the stone culvert. Embankment erosion is present along downstream headwall (Photo 9).



Photo 8 Wayside Inn Road culvert, fallen interior stones



Photo 9 Wayside Inn Road culvert, downstream embankment erosion

6. **Salem End Road, Asset ID: 2511831, Associated Work Order: 122019-087**

- Total Risk Score: 71.3
- Cost Estimate for Construction: $964,000

  Assumptions for Cost Estimate: Replacement of culvert is 12′ x 6′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The stone culvert is lined with a concrete pipe in the upstream section. There is a failure near the downstream end of the culvert, where there is a collapse of the roof of the stone culvert (appears to be located on private property) (Photo 10). A hole, approximately a foot in diameter, can be seen at the surface (Photo 11). The downstream stone headwall has portions of loose mortar.



Photo 10 Salem End Road culvert, interior stone roof collapse



Photo 11 Salem End Road culvert, exterior hole in culvert roof

7. **Parmenter Road, Asset ID: 2511778, Associated Work Order: 122019-080**

- Total Risk Score: 71.1
- Cost Estimate for Construction: $244,000

  Assumptions for Cost Estimate: Replacement of culvert with 7′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The upstream headwall is composed of wood being held in place by a steel post. The downstream headwall is stone that shows beginning signs of settlement. CCTV indicates the stone culvert is beginning to collapse internally (Photo 12). The small hydraulic opening creates high potential for blockage to occur.

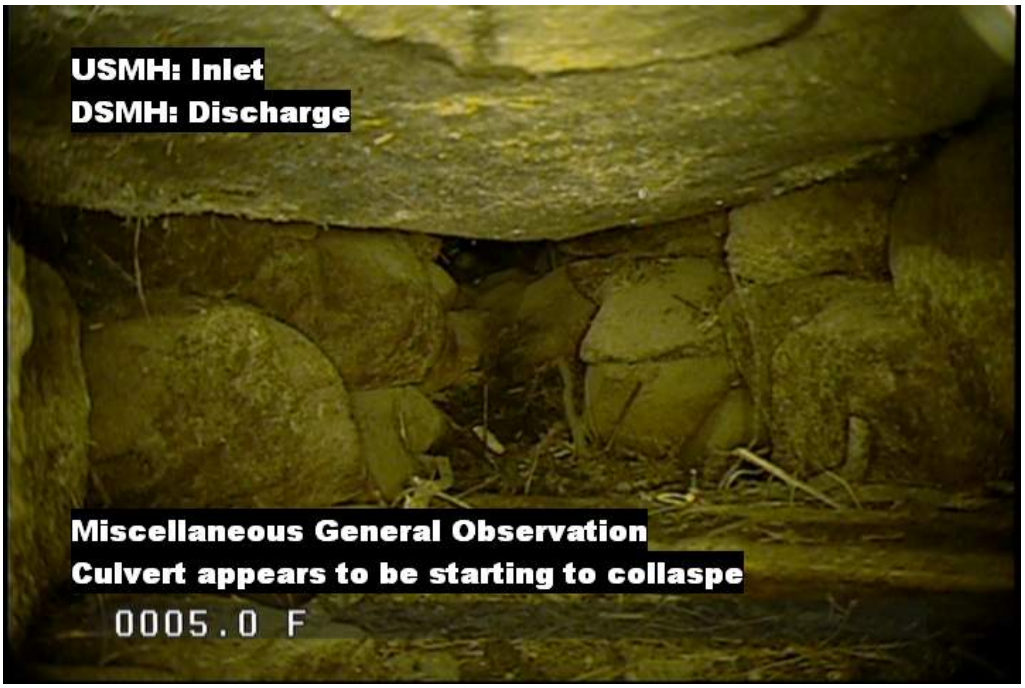

Photo 12 Parmenter Road culvert, interior collapse (CCTV)

8. **Badger Road, Asset ID: 2506912, Associated Work Order: 122019-094**

- Total Risk Score: 69.2
- Cost Estimate for Construction: $449,000

  Assumptions for Cost Estimate: Replacement of culvert with 9′ x 5′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage and Headwall/Wingwalls
- Summary of Culvert Condition: The upstream stone headwall is collapsed, causing a small hydraulic opening. Erosion is present from the roadway at the upstream headwall (Photo 13). The stream runs parallel to the roadway before entering the stone culvert and flowing perpendicular under the roadway. The downstream stone headwall has a major failure (Photo 14).



Photo 13 Badger Road culvert, upstream headwall collapse and erosion



Photo 14 Badger Road culvert, downstream headwall collapse

9. **Fountain Street, Asset ID: 2506913, Associated Work Order: 122019-060**

- Total Risk Score: 61.5
- Cost Estimate for Construction: $412,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage, Headwall/Wingwalls
- Summary of Culvert Condition: The upstream invert of the stone culvert is buried. The upstream channel is dry and filled with debris (Photo 15). The downstream invert has backwater from the downstream lake. The downstream headwall has loose stones. The downstream wingwall has missing stones which have fallen into the channel.



Photo 15 Fountain Street culvert, upstream headwall

10. **Garvey Road, Asset ID: 2511728, Associated Work Order: 122019-115**

- Total Risk Score: 60.3
- Cost Estimate for Construction: $228,000

  Assumptions for Cost Estimate: Replacement of outlet control structure
- Roadway Classification: Local
- Criteria Rated Critical: Headwall/Wingwall
- Summary of Culvert Condition: The outlet control structure at the inlet superstructure has dislodged outward, approximately one foot from the substructure with minimal headwall backfill (Photo 16). It is our understanding that proposed nearby roadway improvements or pump station project can be coupled with the culvert repair, which would likely reduce the cost of replacement.



Photo 16 Garvey Road culvert, inlet dislodged OCS superstructure

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5

Recommendations and Conclusions

VHB completed field and desktop evaluations of 98 culverts owned by the City of Framingham. VHB worked with the City to develop a methodology for scoring the risk of each culvert. The findings of the evaluations and the associated risk scores can help the City develop a better understanding of the condition and functionality of their culverts. The evaluation results and risk scores identify culverts with the highest potential of failure. The following section provides conclusions reached from the culvert evaluation and risk scoring and VHB's recommendations for the City moving forward.

The evaluation findings show that majority of the City's culverts (55 culverts out of 98 evaluated) are in overall adequate condition. Thirty-three culverts were deemed to be in poor condition and nine (9) were rated as critical, requiring maintenance or reconstruction to prevent failure.

The field evaluations considered the condition of various individual parts of the culvert in determining the culverts overall condition (Figure 3). The criteria that received the most poor and critical ratings was "Level of Blockage", with 13 culverts rating critical in this category and 27 rating poor. Culverts which have high levels of blockages have a reduced hydraulic capacity which can cause flooding during major storm events. The criteria that receive the second-most poor and critical ratings was "Headwall/Wingwalls" with 12 culverts rating critical and 28 culverts rating poor. Failing headwalls and wingwalls has the potential to block the culvert's openings, creating a risk of flooding. Collapsed headwalls and wingwalls also creates the potential for significant erosion and potentially undermining the roadway above.

VHB developed risk scores for each evaluated culvert, factoring in the overall condition of culvert, individual parts of the culvert, drainage area and roadway classification. This risk

scoring identified the culverts with the greatest risk associated with them. VHB further evaluated the ten culverts with the highest risk scores, scores of 60.3 to 83.0, to determine the estimated cost associated with the replacement of the culverts or the culvert parts. In total, the estimated costs for the top 10 culverts is $5,695,000.

To address the conditions and risk identified during the culvert evaluations, VHB provides the following recommendations:

- The city should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- Culverts that are rated poor or critical require continued monitoring to evaluate further degradation of the culvert. The City should develop a city-specific inspection frequency of culverts, especially those rated poor or critical that are not upgraded; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City's Department of Public Works should address "immediate actions" flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity. For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

Implementation of these recommendations can assist the City with improving culverts that are currently high risk and allow the city to maintain all culverts to reduce the deterioration of the infrastructure in the future. While there are upfront costs associated with the recommendations, improving culvert maintenance can help reduce likelihood of expensive culvert repairs and replacements in the future.

Appendices

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Appendix 1 – List of Risk Scores

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-027*	2505652	CC HARTFORD STREET	03 - Critical	83.0
122019-034	2511942	HERBERT STREET	03 - Critical	77.0
122019-030	2515114	CC BEAVER DAM BROOK	03 - Critical	76.2
122019-059	2506907	GATES STREET	03 - Critical	75.1
122019-083	2511788	WAYSIDE INN ROAD	03 - Critical	74.3
122019-087*	2511831	SALEM END ROAD	03 - Critical	71.3
122019-080*	2511778	PARMENTER ROAD	03 - Critical	71.1
122019-094	2506912	BADGER ROAD	03 - Critical	69.2
122019-060*	2506913	FOUNTAIN STREET	02 - Poor	61.5
122019-115	2511728	GARVEY ROAD	03 - Critical	60.3
122019-040	2511895	KENDALL AVENUE	02 - Poor	56.8
122019-072	2511192	BELKNAP ROAD	02 - Poor	55.9
122019-052*	2508663	HOWE STREET	02 - Poor	54.5
122019-081	2511783	PARMENTER ROAD	02 - Poor	54.5
122019-099	2511613	CC RUTHELLEN ROAD	02 - Poor	52.7
122019-106	2511214	HEMENWAY SCH FT PATH	02 - Poor	52.7
022421-025	2512189	MAIN STREET	02 - Poor	52.3
122019-074	2511558	GROVE STREET	02 - Poor	52.3
122019-028	2506893	BELKNAP ROAD	02 - Poor	51.8
122019-127	2508334	CENTRAL STREET	02 - Poor	51.8
122019-045*	2517849	LELAND STREET	02 - Poor	51.0
122019-118	2511120	BROOK STREET	02 - Poor	50.3
122019-041	2506936	MERCHANT ROAD	02 - Poor	50.1
122019-053	2506896	WAVENEY ROAD	02 - Poor	50.1
122019-033	2511947	HERBERT STREET	02 - Poor	49.4
122019-067	2511171	BELKNAP ROAD	02 - Poor	49.0
122019-075	2511569	GROVE STREET	02 - Poor	48.9
122019-051*	2508218	CC WILSON DRIVE	02 - Poor	48.7
122019-107	2511486	HEMENWAY ROAD	02 - Poor	48.2
122019-079	2511735	EDMANDS ROAD	02 - Poor	47.7
122019-093	2508594	SPEEN STREET	02 - Poor	47.7
042320-027	2508898	WILLOWBROOK ROAD	02 - Poor	47.5
122019-049	2508225	UNDERWOOD AVENUE	02 - Poor	47.4
122019-097	2509452	LYMAN ROAD	02 - Poor	47.4
122019-077*	2511660	GROVE STREET	02 - Poor	46.2
122019-101	2511055	EDMANDS ROAD	02 - Poor	45.7
122019-032*	2501693	CC DUDLEY ROAD	02 - Poor	45.7
122019-086	2511811	SALEM END ROAD	02 - Poor	45.6
122019-102*	2511205	SLOANE DRIVE	02 - Poor	44.7

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-061	2508141	VICTORY STREET	02 - Poor	44.3
122019-098	2511200	NOB HILL DRIVE	02 - Poor	44.0
122019-088*	2511840	SALEM END ROAD	02 - Poor	38.9
122019-121	2511139	EDGELL ROAD	01 - Adequate	26.2
122019-078*	2511681	MILLWOOD STREET	01 - Adequate	25.5
122019-125	2511816	WINTER STREET	01 - Adequate	21.9
122019-065	2510409	EDGELL ROAD	01 - Adequate	21.0
122019-084	2511798	NIXON ROAD	01 - Adequate	21.0
122019-124*	2508880	HICKORY HILL LANE	01 - Adequate	20.8
122019-120*	2511130	FROST STREET	01 - Adequate	19.5
122019-071	2511190	BERKELEY ROAD	01 - Adequate	18.8
122019-026	2502862	DUDLEY ROAD	01 - Adequate	18.2
122019-031	2512689	DUDLEY ROAD	01 - Adequate	17.8
122019-048	2508221	BISHOP STREET	01 - Adequate	16.8
122019-073	2511557	EDMANDS ROAD	01 - Adequate	16.8
122019-047	2518282	CC FRASER ROAD	01 - Adequate	16.7
122019-029	2509026	WAYSIDE INN ROAD	01 - Adequate	16.2
122019-085	2511802	EDMANDS ROAD	01 - Adequate	16.2
122019-057	2506849	ELM STREET	01 - Adequate	15.8
122019-090	2511887	SINGLETARY LANE	01 - Adequate	15.4
122019-054*	2508317	CC A STREET	01 - Adequate	14.9
122019-066	2511169	MILL STREET	01 - Adequate	14.9
122019-104	2511209	HEMENWAY ROAD	01 - Adequate	14.8
122019-070*	2511187	KNIGHT ROAD	01 - Adequate	14.7
122019-063	2508339	WATER STREET	01 - Adequate	14.2
122019-095*	2511577	MILLWOOD STREET	01 - Adequate	14.1
122019-062	2508274	OLD WORCESTER ROAD	01 - Adequate	14.0
122019-082	2511788	PARMENTER ROAD	01 - Adequate	14.0
122019-089	2511864	BADGER ROAD	01 - Adequate	14.0
122019-112	2511560	WINCH STREET	01 - Adequate	13.4
122019-116	2511729	GARVEY ROAD	01 - Adequate	13.4
122019-096	2521199	CONCORD STREET	01 - Adequate	13.0
122019-100	2508280	NEW YORK AVENUE	01 - Adequate	12.6
122019-103	2511207	GREGORY ROAD	01 - Adequate	12.6
122019-043	2515102	IRVING STREET	01 - Adequate	12.4
122019-039	2514070	SECOND STREET	01 - Adequate	12.3
122019-123	2506908	SALEM END ROAD	01 - Adequate	12.2
122019-092	2511669	MAPLE STREET	01 - Adequate	11.9
122019-119*	2511122	SCOTT DRIVE	01 - Adequate	11.5
122019-111	2511546	JUNIPER LANE	01 - Adequate	11.3
122019-069	2511186	LITTLE TREE LANE	01 - Adequate	11.2
122019-064	2508881	PARKER ROAD	01 - Adequate	11.0
122019-114*	2520964	LYMAN WAY	01 - Adequate	10.8

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-068	2511184	KNIGHT ROAD	01 - Adequate	10.5
122019-036	2515315	CC DUDLEY ROAD	01 - Adequate	10.4
122019-105	2511212	CC APPLEDO'R ROAD	01 - Adequate	10.4
122019-109	2511495	GREGORY ROAD	01 - Adequate	10.1
122019-108	2511488	COLONIAL DRIVE	01 - Adequate	9.9
122019-042	2515095	TARALLI TERRACE	01 - Adequate	9.6
122019-113*	2511638	CHICATAWBUT ROAD	01 - Adequate	9.5
122019-117	2511116	MCLEAN DRIVE	01 - Adequate	9.5
122019-091	2511571	CC GROVE STREET	01 - Adequate	8.1
042320-028	2522006	CC FOUNTAIN STREET	01 - Adequate	8.0
042320-029	2522007	CC FOUNTAIN STREET	01 - Adequate	7.8
122019-058	2506853	MASSACHUSETTS TURNPIKE	01 - Adequate	7.5
122019-122	2521337	CC WESTERN AVENUE	01 - Adequate	7.4
122019-038	2517767	CC WESTERN AVENUE	01 - Adequate	0.0
122019-046	2518019	CC WESTERN AVENUE	01 - Adequate	0.0

* Asterisks next to the work order ID notes that the culvert received CCTV evaluation

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Appendix 2 – Inspection Results Table

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WorkOrderID	ASSETID	Culvert Condition	Roadway Classification	Drainage Area (sq mi)	Level of Blockage	Cross-Section Deformation	Structural Integrity of Barrel	Headwall/Wingwalls	Joints and Seams	Footings	Invert Deterioration	Buoyancy or Crushing	Longitudinal Alignment	Armoring	Apron/Scour Protection	Embankment Piping	Inlet Grade	Outlet Grade	Location
031821-042	2512189	02 - Poor	Collector	0.75	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	1 - Perched	2 - At Grade	MAIN STREET
122019-026	2502862	01 - Adequate	Collector		03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	DUDLEY ROAD
122019-027*	2505652	03 - Critical	Arterial	0.04	03 - Critical	03 - Critical	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC HARTFORD STREET
122019-028	2506893	02 - Poor	Arterial	0.14	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-029	2509026	01 - Adequate	Collector	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	WAYSIDE INN ROAD
122019-030	2515114	03 - Critical	Bike Path	1.73	03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC BEAVER DAM BROOK
122019-031	2512689	01 - Adequate	Collector	0.082	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	DUDLEY ROAD
122019-032*	2501693	02 - Poor	0	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC DUDLEY ROAD
122019-033	2511947	02 - Poor	Local	0	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	HERBERT STREET
122019-034	2511942	03 - Critical	Local		03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HERBERT STREET
122019-036	2515315	01 - Adequate	Parking Lot		02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC DUDLEY ROAD
122019-038	2517767	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC WESTERN AVENUE
122019-039	2514070	01 - Adequate	Local	5.66	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SECOND STREET
122019-040	2511895	02 - Poor	Arterial	0.076	03 - Critical	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	KENDALL AVENUE
122019-041	2506936	02 - Poor	Local	1.42	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MERCHANT ROAD
122019-042	2515095	01 - Adequate	Local	5.51	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	TARALLI TERRACE
122019-043	2515102	01 - Adequate	Collector	4.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	IRVING STREET
122019-045*	2517849	02 - Poor	Collector	0.053	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LELAND STREET
122019-046	2518019	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-047	2518282	01 - Adequate	Local	0.51	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC FRASER ROAD
122019-048	2508221	01 - Adequate	Collector	0.25	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BISHOP STREET
122019-049	2508225	02 - Poor	Local		02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	UNDERWOOD AVENUE
122019-051*	2508218	02 - Poor	Local	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	0	0	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	CC WILSON DRIVE
122019-052*	2508663	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	04 - N/A	0	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	HOWE STREET
122019-053	2506896	02 - Poor	Local	1.46	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	WAVENEY ROAD
122019-054*	2508317	01 - Adequate	Collector		01 - Adequate	0	0	01 - Adequate	0	04 - N/A	0	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC A STREET
122019-057	2506849	01 - Adequate	Arterial	0.08	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	ELM STREET
122019-058	2506853	01 - Adequate	Bike Path	1.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MASSACHUSETTS TURNPIKE
122019-059	2506907	03 - Critical	Collector	0.45	02 - Poor	01 - Adequate	03 - Critical	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GATES STREET
122019-060*	2506913	02 - Poor	Collector	0.19	03 - Critical	01 - Adequate	0	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	FOUNTAIN STREET
122019-061	2508141	02 - Poor	Local	0.12	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	VICTORY STREET
122019-062	2508274	01 - Adequate	Local	0.13	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	OLD WORCESTER ROAD
122019-063	2508339	01 - Adequate	Arterial	0.53	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WATER STREET
122019-064	2508881	01 - Adequate	Collector	0.41	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARKER ROAD
122019-065	2510409	01 - Adequate	Arterial	0.76	02 - Poor	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	EDGELL ROAD
122019-066	2511169	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	2 - At Grade	1 - Perched	MILL STREET
122019-067	2511171	02 - Poor	Arterial	0.63	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-068	2511184	01 - Adequate	Local	2.94	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	KNIGHT ROAD
122019-069	2511186	01 - Adequate	Local	2.92	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LITTLE TREE LANE
122019-070*	2511187	01 - Adequate	Local	0.69	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	KNIGHT ROAD
122019-071	2511190	01 - Adequate	Local	2.1	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BERKELEY ROAD
122019-072	2511192	02 - Poor	Arterial	2.02	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-073	2511557	01 - Adequate	Collector	0.16	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	EDMANDS ROAD
122019-074	2511558	02 - Poor	Collector	0.16	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	1 - Perched	1 - Perched	GROVE STREET
122019-075	2511569	02 - Poor	Collector	0.069	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GROVE STREET
122019-077*	2511660	02 - Poor	Collector	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	GROVE STREET
122019-078*	2511681	01 - Adequate	Collector	0.098	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	2 - At Grade	0	MILLWOOD STREET
122019-079	2511735	02 - Poor	Collector	0.58	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	03 - Critical	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-080*	2511778	03 - Critical	Local	0.085	02 - Poor	03 - Critical	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-081	2511783	02 - Poor	Local	0.065	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-082	2511788	01 - Adequate	Local	0.46	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	PARMENTER ROAD
122019-083	2511788	03 - Critical	Collector	0.12	01 - Adequate	04 - N/A	02 - Poor	04 - N/A	04 - N/A	03 - Critical	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WAYSIDE INN ROAD
122019-084	2511798	01 - Adequate	Collector	0.07	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	1 - Perched	NIXON ROAD
122019-085	2511802	01 - Adequate	Collector	0.11	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-086	2511811	02 - Poor	Collector	3.32	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-087*	2511831	03 - Critical	Local	0.4	01 - Adequate	03 - Critical	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-088*	2511840	02 - Poor	Local	0.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-089	2511864	01 - Adequate	Local	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	BADGER ROAD
122019-090	2511887	01 - Adequate	Collector	0.79	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	SINGLETARY LANE
122019-091	2511571	01 - Adequate	Bike Path	0.069	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC GROVE STREET
122019-092	2511669	01 - Adequate	Collector	3.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MAPLE STREET
122019-093	2508594	02 - Poor	Arterial	1.69	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SPEEN STREET
122019-094	2506912	03 - Critical	Collector	0.57	03 - Critical	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	BADGER ROAD
122019-095*	2511577	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MILLWOOD STREET

122019-096	2521199	01 - Adequate	Arterial		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CONCORD STREET
122019-097	2509452	02 - Poor	Local	0.11	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	LYMAN ROAD
122019-098	2511200	02 - Poor	Local	0.28	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	NOB HILL DRIVE
122019-099	2511613	02 - Poor	Bike Path	0.12	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	CC RUTHELLEN ROAD
122019-100	2508280	01 - Adequate	Local	0.04	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	NEW YORK AVENUE
122019-101	2511055	02 - Poor	Collector	1.5	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	EDMANDS ROAD
122019-102*	2511205	02 - Poor	Local	1.64	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	SLOANE DRIVE
122019-103	2511207	01 - Adequate	Local	1.4	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-104	2511209	01 - Adequate	Collector	1.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-105	2511212	01 - Adequate	Bike Path	1.33	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC APPLEDO'R ROAD
122019-106	2511214	02 - Poor	Bike Path		02 - Poor	02 - Poor	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HEMENWAY SCH FT PATH
122019-107	2511486	02 - Poor	Collector	1.8	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-108	2511488	01 - Adequate	Local	2.32	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	COLONIAL DRIVE
122019-109	2511495	01 - Adequate	Local	1.66	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-111	2511546	01 - Adequate	Local	1.16	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	JUNIPER LANE
122019-112	2511560	01 - Adequate	Collector	0.07	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINCH STREET
122019-113*	2511638	01 - Adequate	Local	0.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CHICATAWBUT ROAD
122019-114*	2520964	01 - Adequate	Local	0.1	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	1 - Perched	LYMAN WAY
122019-115	2511728	03 - Critical	Local		02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	GARVEY ROAD
122019-116	2511729	01 - Adequate	Local	0.06	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	2 - At Grade	GARVEY ROAD
122019-117	2511116	01 - Adequate	Local	0.89	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MCLEAN DRIVE
122019-118	2511120	02 - Poor	Collector	0.87	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	BROOK STREET
122019-119*	2511122	01 - Adequate	Local	0.42	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SCOTT DRIVE
122019-120*	2511130	01 - Adequate	Collector	0.26	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	FROST STREET
122019-121	2511139	01 - Adequate	Arterial	0.38	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	EDGELL ROAD
122019-122	2521337	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-123	2506908	01 - Adequate	Collector	0.086	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-124*	2508880	01 - Adequate	Local	0.47	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HICKORY HILL LANE
122019-125	2511816	01 - Adequate	Arterial	3.29	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINTER STREET
122019-127	2508334	02 - Poor	Arterial	0.064	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CENTRAL STREET
042320-027	2508898	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	3 - Buried	WILLOWBROOK ROAD
042320-028	2522006	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET
042320-029	2522007	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET

Appendix 3 – Immediate Action Culverts

Number of Structures Requiring Immediate Action Type

Debris/Vegetation Blockage	Critical Scour/Erosion	Structure Unstable
22	0	8

Culverts with Debris/Vegetation Blockage

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-030	2515114	CC BEAVER DAM BROOK
122019-032	2501693	CC DUDLEY ROAD
122019-047	2518282	CC FRASER ROAD
122019-027	2505652	CC HARTFORD STREET
122019-051	2508218	CC WILSON DRIVE
122019-026*	2502862	DUDLEY ROAD
122019-031*	2512689	DUDLEY ROAD
122019-060	2506913	FOUNTAIN STREET
122019-106	2511214	HEMENWAY SCH FT PATH
122019-034	2511942	HERBERT STREET
122019-052	2508663	HOWE STREET
122019-040	2511895	KENDALL AVENUE
122019-070	2511187	KNIGHT ROAD
122019-045	2517849	LELAND STREET
122019-076	2511576	MILLWOOD STREET
122019-100*	2508280	NEW YORK AVENUE
122019-039	2514070	SECOND STREET
122019-093*	2508594	SPEEN STREET
122019-049	2508225	UNDERWOOD AVENUE
122019-061*	2508141	VICTORY STREET
122019-029	2509026	WAYSIDE INN ROAD

Culverts in blue appear in both immediate action lists.

*Culverts marked with an asterisk have debris/vegetation blockage as the only issue.

Culverts with Unstable Structure

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-028	2506893	BELKNAP ROAD
122019-027	2505652	CC HARTFORD STREET
122019-099	2511613	CC RUTHELLEN ROAD
122019-034	2511942	HERBERT STREET
122019-097	2509452	LYMAN ROAD
122019-080	2511778	PARMENTER ROAD
122019-087	2511831	SALEM END ROAD

Culverts in blue appear in both immediate action lists.

Appendix 4 – Cost Estimate

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101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020

Project: Hartford St Culvert Replacement

Job Number: 14484.01

Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	400	CY	CLASS A TRENCH EXCAVATION	$45	$18,000.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350.00	$7,000.00
151.	1	CY	GRAVEL BORROW	$45	$45.00
151.1	145	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$7,250.00
151.2	45	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$2,565.00
156.1	120	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$6,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	60	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$180.00
482.3	60	FT	SAWCUTTING ASHALT PAVEMENT	$4	$210.00
580.	20	FT	CURB REMOVED AND RESET	$27	$530.00
631.	20	FT	GUARDRAIL	$30	$600.00
657.	260	FT	TEMPORARY FENCE	$19	$4,940.00
657.5	260	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,900.00
698.1	270	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$1,485.00
701.	1	TON	HMA SIDEWALK	$210	$210.00
767.121	260	FT	SEDIMENT CONTROL BARRIER	$7	$1,778.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	115	TON	RIP RAP	$65	$7,475.00
995.011	1	LS	CULVERT STRUCTURE	$159,000	$159,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$80,000	$80,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00

Subtotal	$344,326
Mobilization (Assumed 5%)	$17,216
Police Detail & Traffic Control (Assumed 10%)	$34,433
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$34,433
Contingency (35%)	$120,514
Subtotal	$550,922
Permitting & Design (Assumed 25%)	$137,730
Construction Observation (Assumed 12%)	$66,111
Total	$754,763
SAY	**$755,000**

Assumptions:

- Replacement of culvert with 6' x 3' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 5.5-feet
- Headwalls to be installed on upstream and downstream ends
- Assume dredgling limits to back of adjacent property (75-feet long) by 1-foot deep by 6-feet wide

101 Walnut Street
Watertown
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Preliminary Construction Cost Estimate

Date: 8/18/2020
Job Number: 14484.01

Project: Herbert St Culvert Replacement
Location: Framinham, MA
Estimator: JAD
Checked By: MAC

Item No.	Qty	Unit	Description	Unit Price	Amount
101.	0.1	A	CLEARING AND GRUBBING	$34,000	$3,400.00
103.	10	EA	TREE REMOVED - DIAMETER UNDER 24 INCHES	$1,500	$15,000.00
120.1	200	CY	UNCLASSIFIED EXCAVATION	$40	$8,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	100	CY	CLASS A TRENCH EXCAVATION	$45	$4,500.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350	$7,000.00
151.	2	CY	GRAVEL BORROW	$45	$90.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	60	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$5,400.00
415.1	45	SY	PAVEMENT MILLING STANDARD	$8	$337.50
451.	20	TON	HMA FOR PATCHING	$225	$4,536.00
482.01	70	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$210.00
482.3	70	FT	SAWCUTTING ASHALT PAVEMENT	$4	$245.00
580.	30	FT	CURB REMOVED AND RESET	$27	$795.00
631.	30	FT	GUARDRAIL REMOVED AND RESET	$23	$690.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
701.	15	SY	CEMENT CONCRETE SIDEWALK	$61	$915.00
765.	15	SY	SEEDING	$2	$30.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	20	TON	RIP RAP	$65	$1,300.00
995.01	1	LS	CULVERT STRUCTURE	$30,000	$30,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL	$20,000	$20,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
				Subtotal	$129,654
				Mobilization (Assumed 5%)	$6,483
				Police Detail & Traffic Control (Assumed 10%)	$12,965
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$12,965
				Contingency (35%)	$45,379
				Subtotal	$207,446
				Permitting & Design (Assumed 25%)	$51,862
				Construction Observation (Assumed 12%)	$24,894
				Total	$284,201
				SAY	**$285,000**

Assumptions:

- Given existing culvert is clogged and does not carry dry weather flow no control of water costs included
- Culvert size to match existing culvert (42-inch x 24-inch)
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
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Preliminary Construction Cost Estimate

Option A

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	100	CY	UNCLASSIFIED EXCAVATION	$40	$4,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
151.1	60	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$3,000.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
631.	60	FT	GUARDRAIL	$30	$1,800.00
657.	85	FT	TEMPORARY FENCE	$19	$1,615.00
657.5	85	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,275.00
698.1	95	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$522.50
767.121	85	FT	SEDIMENT CONTROL BARRIER	$7	$581.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	70	TON	RIP RAP	$65	$4,550.00
995.01	1	LS	BRIDGE STRUCTURE (includes walls)	$380,000	$380,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$486,333
				Mobilization (Assumed 5%)	$24,317
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$97,267
				Contingency (35%)	$170,216
				Subtotal	$778,132
				Permitting & Design (Assumed 25%)	$194,533
				Construction Observation (Assumed 12%)	$93,376
				Total	$1,066,041
				SAY	**$1,067,000**

Assumptions:

- Replacement of culvert with 20' Bridge
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 20-feet
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

101 Walnut Street
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Massachusetts 02272
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Preliminary Construction Cost Estimate

Option B

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	235	CY	UNCLASSIFIED EXCAVATION	$40	$9,400.00
125.	15	CY	TOPSOIL EXCAVATED AND STACKED	$30	$450.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
657.	110	FT	TEMPORARY FENCE	$19	$2,090.00
657.5	110	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,650.00
698.1	110	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$605.00
767.121	140	FT	SEDIMENT CONTROL BARRIER	$7	$957.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	100	TON	RIP RAP	$65	$6,500.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$117,201
				Mobilization (Assumed 5%)	$5,860
				Police Detail & Traffic Control (Assumed 10%)	$11,720
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$23,440
				Contingency (35%)	$41,020
				Subtotal	$199,242
				Permitting & Design (Assumed 25%)	$49,811
				Construction Observation (Assumed 12%)	$23,909
				Total	$272,962
				SAY	**$273,000**

Assumptions:

- Removal of crossing and restoration of Beaver Dam Brook with a rip rap lined open channel
-Control of water is necessary
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

101 Walnut Street
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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Gates St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	420	CY	CLASS A TRENCH EXCAVATION	$45	$18,900.00
151.	170	CY	GRAVEL BORROW	$45	$7,650.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	30	TON	HMA FOR PATCHING	$225	$6,750.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	90	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$495.00
631.	55	FT	GUARDRAIL REMOVED AND RESET	$23	$1,265.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	135	TON	RIP RAP	$65	$8,775.00
995.011	1	LS	CULVERT STRUCTURE	$135,000	$135,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$5,000	$5,000.00
	1	LS	REPLACEMENT OF OUTLET CONTROL	$20,000	$20,000.00
	1	LS	COFFERDAM- CONTROL OF WATER	$50,000	$50,000.00
	1	LS	H&H STUDY	$50,000	$50,000.00
				Subtotal	$423,850
				Mobilization (Assumed 5%)	$21,193
				Police Detail & Traffic Control (Assumed 10%)	$42,385
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$84,770
				Contingency (35%)	$148,348
				Subtotal	$720,546
				Permitting & Design (Assumed 25%)	$180,136
				Construction Observation (Assumed 12%)	$86,465
				Total	$987,147
				SAY	**$988,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet. This assumes need to meet Stream Crossings Standards for grant funding, however proposed culvert could be smaller if Citv-funded.
- Headwalls to be installed on upstream and downstream ends

-The replacement of this culvert will likely require coordination of a hydrologic and hydraulic study and a flood analysis. An approximate cost of $50,000 is carried for this analysis

-Additional contigency was provided for potential utility relocations (Assumed 20% of costs) given the proximity of the sewer force main, water main, and sewer pump station to the culvert

Preliminary Construction Cost Estimate

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Date: 10/13/2020

Job Number: 14484.01

Project: Wayside Inn Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	115	CY	CLASS A TRENCH EXCAVATION	$45	$5,175.00
151.	6	CY	GRAVEL BORROW	$45	$270.00
151.1	55	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,750.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	45	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
631.	15	FT	GUARDRAIL REMOVED AND RESET	$23	$345.00
657.	100	FT	TEMPORARY FENCE	$19	$1,900.00
657.5	100	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,500.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
767.121	100	FT	SEDIMENT CONTROL BARRIER	$7	$684.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	50	TON	RIP RAP	$65	$3,250.00
995.011	1	LS	CULVERT STRUCTURE	$50,000	$50,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$25,000	$25,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$1,500	$1,500.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
				Subtotal	$138,124
				Mobilization (Assumed 5%)	$6,906
				Police Detail & Traffic Control (Assumed 10%)	$13,812
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$13,812
				Contingency (35%)	$48,343
				Subtotal	$220,998
				Permitting & Design (Assumed 25%)	$55,249
				Construction Observation (Assumed 12%)	$26,520
				Total	$302,767
				SAY	**$303,000**

Assumptions:

- Replacement of the culvert with a 8' x 4' concrete box culvert
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream end only

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Salem End Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	690	CY	UNCLASSIFIED EXCAVATION	$40	$27,600.00
125.	30	CY	TOPSOIL EXCAVATED AND STACKED	$30	$900.00
151.	15	CY	GRAVEL BORROW	$45	$675.00
151.1	270	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$13,500.00
151.2	80	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$4,560.00
156.1	200	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$10,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	50	TON	HMA FOR PATCHING	$225	$11,250.00
482.01	80	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$240.00
482.3	80	FT	SAWCUTTING ASHALT PAVEMENT	$4	$280.00
657.	290	FT	TEMPORARY FENCE	$19	$5,510.00
657.5	290	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$4,350.00
691.	50	FT	STONE WALL REMOVED AND REBUILT	$150	$7,500.00
698.1	460	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$2,530.00
767.121	290	FT	SEDIMENT CONTROL BARRIER	$7	$1,983.60
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	255	TON	RIP RAP	$65	$16,575.00
995.011	1	LS	CULVERT STRUCTURE	$251,000	$251,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00
			Subtotal		$439,753
			Mobilization (Assumed 5%)		$21,988
			Police Detail & Traffic Control (Assumed 10%)		$43,975
			Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)		$43,975
			Contingency (35%)		$153,914
			Subtotal		$703,605
			Permitting & Design (Assumed 25%)		$175,901
			Construction Observation (Assumed 12%)		$84,433
			Total		$963,939
			SAY		**$964,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet, assumes grant funding. If project is City-funded proposed replacement culvert could be smaller to save cost.

- Headwalls to be installed on upstream and downstream ends
-Pavement restoration assumes road and driveway restoration

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Parmenter Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	95	CY	CLASS A TRENCH EXCAVATION	$45	$4,275.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.1	45	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,250.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	35	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$1,750.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	15	TON	HMA FOR PATCHING	$225	$3,375.00
482.01	35	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$105.00
482.3	35	FT	SAWCUTTING ASHALT PAVEMENT	$4	$122.50
657.	90	FT	TEMPORARY FENCE	$19	$1,710.00
657.5	90	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,350.00
698.1	80	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$440.00
767.121	90	FT	SEDIMENT CONTROL BARRIER	$7	$615.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	35	TON	RIP RAP	$65	$2,275.00
995.011	1	LS	CULVERT STRUCTURE	$39,000	$39,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$24,000	$24,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$110,931
				Mobilization (Assumed 5%)	$5,547
				Police Detail & Traffic Control (Assumed 10%)	$11,093
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$11,093
				Contingency (35%)	$38,826
				Subtotal	$177,489
				Permitting & Design (Assumed 25%)	$44,372
				Construction Observation (Assumed 12%)	$21,299
				Total	$243,160
				SAY	**$244,000**

Assumptions:

- Replacement of culvert with 7' x 4' concrete box culvert
- Given existing culvert does not carry dry weather flow no control of water costs included
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 7-feet
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Badger Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	200	CY	CLASS A TRENCH EXCAVATION	$45	$9,000.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	85	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,250.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	65	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
691.	15	FT	STONE WALL REMOVED AND REBUILT	$150	$2,250.00
698.1	150	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$825.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	70	TON	RIP RAP	$65	$4,550.00
995.011	1	LS	CULVERT STRUCTURE	$76,000	$76,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALL	$64,000	$64,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$204,769
				Mobilization (Assumed 5%)	$10,238
				Police Detail & Traffic Control (Assumed 10%)	$20,477
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$20,477
				Contingency (35%)	$71,669
				Subtotal	$327,630
				Permitting & Design (Assumed 25%)	$81,907
				Construction Observation (Assumed 12%)	$39,316
				Total	$448,853
				SAY	**$449,000**

Assumptions:

- Replacement of culvert with 9' x 5' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 9-feet

- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Fountain St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	160	CY	CLASS A TRENCH EXCAVATION	$45	$7,200.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	80	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,000.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	60	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	50	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$150.00
482.3	50	FT	SAWCUTTING ASHALT PAVEMENT	$4	$175.00
631.	25	FT	GUARDRAIL REMOVED AND RESET	$23	$575.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
698.1	140	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$770.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	65	TON	RIP RAP	$65	$4,225.00
995.011	1	LS	CULVERT STRUCTURE	$68,000	$68,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$48,000	$48,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00

Subtotal	$187,637
Mobilization (Assumed 5%)	$9,382
Police Detail & Traffic Control (Assumed 10%)	$18,764
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$18,764
Contingency (35%)	$65,673
Subtotal	$300,219
Permitting & Design (Assumed 25%)	$75,055
Construction Observation (Assumed 12%)	$36,026
Total	$411,300
SAY	**$412,000**

Assumptions:

- Replacement of culvert with 8' x 4'
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Garvey Rd OCS Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	20	CY	UNCLASSIFIED EXCAVATION	$40	$800.00
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.2	2	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$114.00
156.1	5	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
657.	200	FT	TEMPORARY FENCE	$19	$3,800.00
657.5	200	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,000.00
767.121	200	FT	SEDIMENT CONTROL BARRIER	$7	$1,368.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	10	TON	RIP RAP	$65	$650.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
	1	LS	OUTLET CONTROL STRUCTURE	$60,000	$60,000.00
				Subtotal	$103,957
				Mobilization (Assumed 5%)	$5,198
				Police Detail & Traffic Control (Assumed 10%)	$10,396
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$10,396
				Contingency (35%)	$36,385
				Subtotal	$166,330
				Permitting & Design (Assumed 25%)	$41,583
				Construction Observation (Assumed 12%)	$19,960
				Total	$227,873
				SAY	**$228,000**

Assumptions:

- Replacement of outlet control structure
-Control of water is necessary
-Replacement of outlet control structure only, existing 2-foot by 2-foot culvert to remain
-Assume approx. quantity 20 cubic yards of excavation

Appendix 5 – VUEWork MobileVue App

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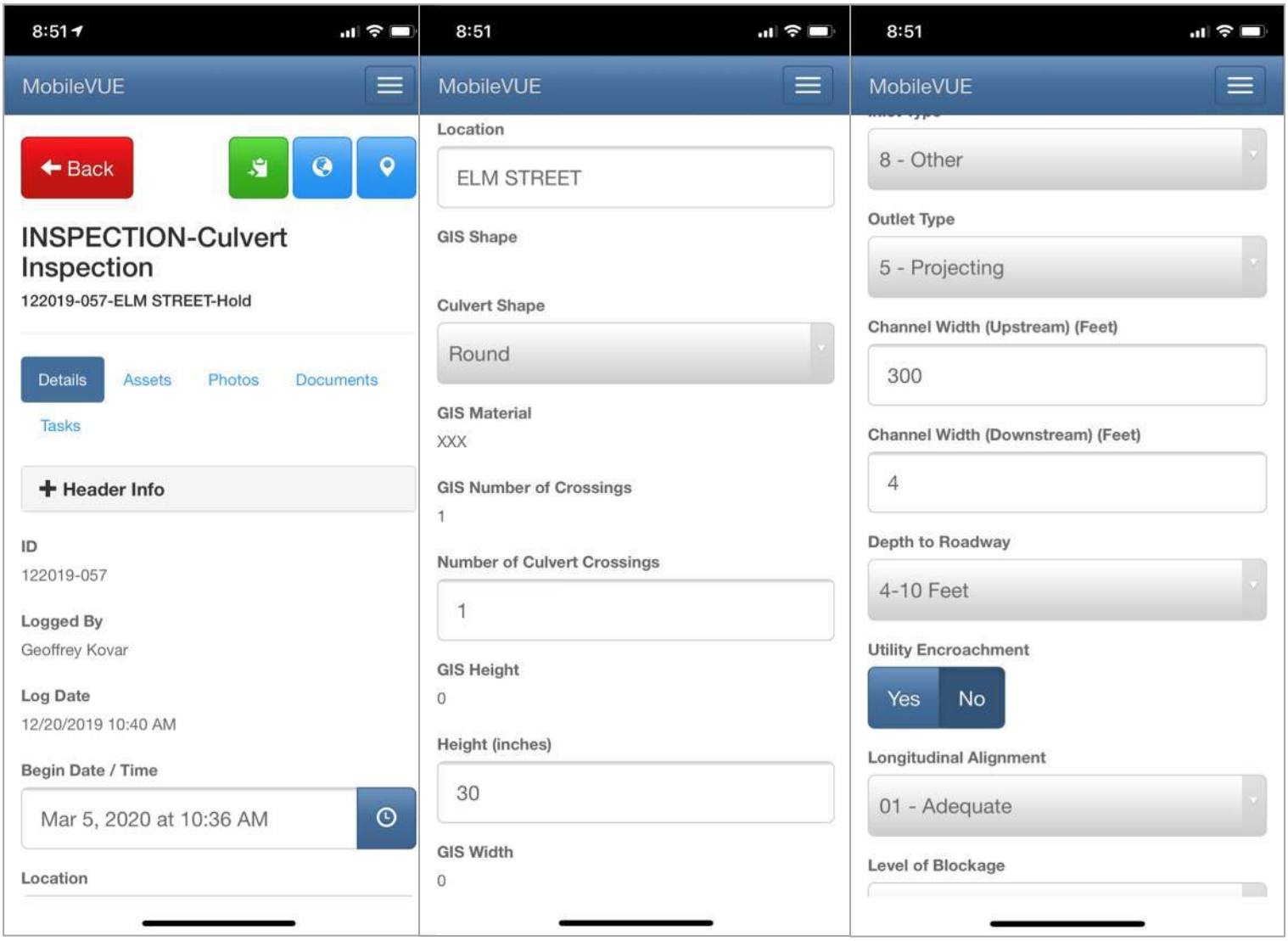
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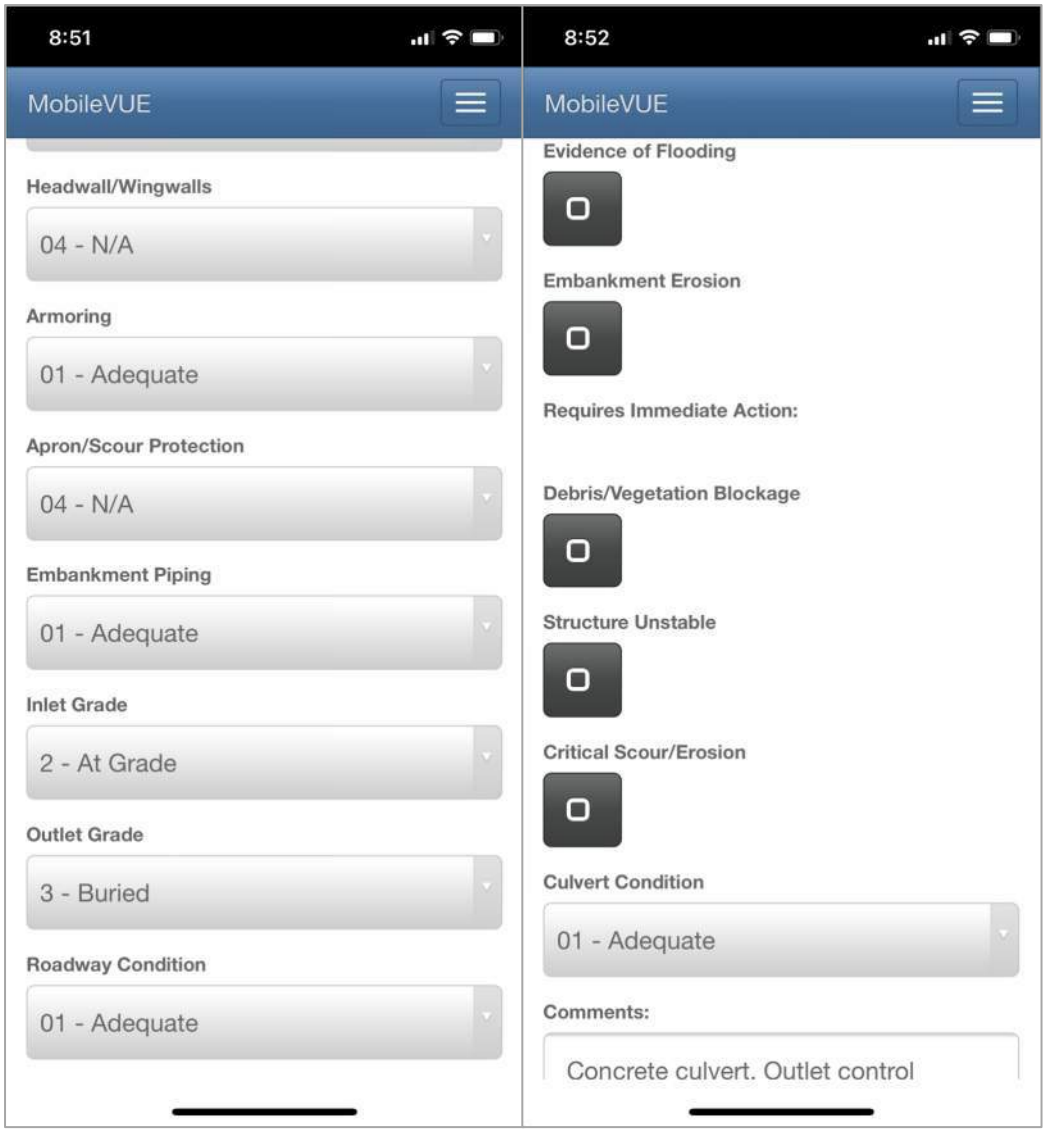
MobileVUE
Back
INSPECTION-Culvert Inspection
122019-057-ELM STREET-Hold
Details
Assets
Photos
Documents
Tasks
+ Header Info
ID
122019-057
Logged By
Geoffrey Kovar
Log Date
12/20/2019 10:40 AM
Begin Date / Time
Mar 5, 2020 at 10:36 AM
Location
8:51
MobileVUE
Location
ELM STREET
GIS Shape
Culvert Shape
Round
GIS Material
XXX
GIS Number of Crossings
1
Number of Culvert Crossings
1
GIS Height
0
Height (inches)
30
GIS Width
0
8:51
MobileVUE
8 - Other
Outlet Type
5 - Projecting
Channel Width (Upstream) (Feet)
300
Channel Width (Downstream) (Feet)
4
Depth to Roadway
4-10 Feet
Utility Encroachment
Yes
No
Longitudinal Alignment
01 - Adequate
Level of Blockage


8:51
MobileVUE
Headwall/Wingwalls
04 - N/A
Armoring
01 - Adequate
Apron/Scour Protection
04 - N/A
Embankment Piping
01 - Adequate
Inlet Grade
2 - At Grade
Outlet Grade
3 - Buried
Roadway Condition
01 - Adequate
8:52
MobileVUE
Evidence of Flooding
Embankment Erosion
Requires Immediate Action:
Debris/Vegetation Blockage
Structure Unstable
Critical Scour/Erosion
Culvert Condition
01 - Adequate
Comments:
Concrete culvert. Outlet control

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 8

(1) **PROJECT NAME:** Herbert Street, Badger Road, and Parmenter Road Design and Construction FY24

PROJECT STATUS:

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This request is for the design and construction of "critical" culvert repairs intended to extend their usage. Locations include Badger Road, Herbert Street and Parmenter Road. Culverts perform a crucial role in drainage throughout the City. As part of the city wide inventory and assessment of drainage culverts, the Badger Road, Herbert Street and Parmenter Road culverts were determined to be in critical condition and in need of attention to prevent failure. Since the report, one critical culvert has already collapsed. A culvert failure can have serious consequences, with the potential to cause upstream flooding to residents and businesses; overtop roads, causing unsafe conditions for travel; and damage other city owned infrastructure, including roads and utilities. These culvert improvements are not intended to meet stream crossing standards.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

yes	Replace existing infrastructure
yes	Replace existing capital asset
no	Replace existing vehicle
no	Replace equipment
no	New infrastructure
no	New capital asset
no	New vehicle
no	New equipment
yes	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	400,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	400,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Herbert St., Badger Rd., Parmenter Rd.

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Diane Hayes
(9)	**FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM

DEPARTMENT OF PUBLIC WORKS | ADMINISTRATION

Blake D. Lukis
Director
Diane M. Conner
Deputy Director of Administration
William R. Sedewitz, P.E.
Chief Engineer

508-532-5601
dpwgeneral@framinghamma.gov
www.framinghamma.gov

MEMORIAL BUILDING
150 Concord Street, Room 213
Framingham, MA 01702

M E M O R A N D U M

TO: Jen Pratt, Acting Chief Financial Officer

FROM: William Sedewitz, wrs Chief Engineer

DATE: October 25, 2021

RE: FY23 Capital Request - Herbert Street, Badger Road, and Parmenter Road Culvert Design & Construction

---

A Culvert Assessment and Prioritization Report prepared by VHB in March 2021 determined that nine of ninety-eight city owned culverts had an overall condition rating of critical. These nine included culverts across Herbert Street, Badger Road, and Parmenter Road. VHB's preliminary estimate to design and replace these three culverts is in excess of $900,000. DPW believes that using a combination of in-house forces and on-call construction contracts, these three culverts can be addressed at a significantly lower cost.

Cc: Blake Lukis | DPW Director

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 22

(1) **PROJECT NAME:** Indian Head Heights Cross Country Drainage FY24 ARPA
PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The purpose of this project is to line approximately 900 linear feet of 30-inch corrugated metal pipe (CMP). The existing Indian Head Road cross country drainage system includes twin pipes which start at a concrete headwall on the south side of Indian Head Road east of #97 Indian Head Road. The pipes are both 30-inch diameter, one being reinforced concrete pipe (RCP) and other corrugated metal pipe (CMP). These pipes extend northerly under Indian Head Road, then continue perpendicular to the road and across private property all the way to Central Street and daylight at an existing concrete headwall adjacent to the Sudbury River. Routine maintenance and inspection shows areas of deterioration and potential structural deficiency. The CMP is over 80 years old. Pipe of this age and material consistently experiences corrosion and section loss. Lining will reestablish structural integrity and restore the hydraulic capacity.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:
New project recommended for ARPA funding.

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	220,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	220,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**
1) **Grants**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**
Indian Head Road Area

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

	ARPA
(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 27

(1) **PROJECT NAME:** Lake Cochituate Infrastructure & Water Quality Improvements FY24 ARPA

PROJECT STATUS:

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The design and construction of drainage retrofits within the Lake Cochituate watershed will improve water quality and reduce impacts from severe storms. This project focuses on replacement and/ or repair of connected or contributing drainage infrastructure, installation of a water quality unit and green infrastructure on City owned Parks & Recreation property. Potential for retrofits at the beach parking lot.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

New project to improve Lake Cochituate water quality

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	1,200,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	1,200,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2) **Grants**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Lake Cochituate watershed

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

ARPA

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 24

(1) **PROJECT NAME:** Lake Waushakum Infrastructure and Water Quality Improvements FY24 ARPA

PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The design and construction of drainage retro-fits within the Lake Waushakum watershed will improve water quality and reduce impacts from severe storms. This project focuses on replacement and/or repair of connected or contributing drainage infrastructure, installation of a water quality unit and green infrastructure on City owned Parks & Recreation property. Emphasis for retrofit and demonstration projects to provide system efficiencies and meet EPA MS4 permit requirements.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	600,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	600,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2) **Grants**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:** **Lake Waushakum**

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

ARPA

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 26

(1) PROJECT NAME: Learned Pond Infrastructure & Water Quaility Improvements FY24 ARPA

PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

Inspect, repair or replace drainage infrastructure to outfalls, and repair headwalls as necessary to Learned Pond. Install water quality unit or other stormwater BMP to improve water quality discharging to Learned Pond.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

New project to improve Learned Pond Water Quality

(3) PURPOSE OF PROJECT:

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	1,500,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	1,500,000	-	-	-	-	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

1) **Bond**
2) **Grants**
3)

(10) PROJECT OR EQUIPMENT LOCATION:

Outfalls to Learned Pond

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

ARPA

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 7

(1) **PROJECT NAME:** MS4 Permit Implementation Yr 6 - FY24
PROJECT STATUS:

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This project will provide funds to assist with compliance of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit requirements. Specifically, this project will provide consultant and contractor services for catchment investigations (i.e. inspections of the drainage system to identify pollution sources and asses infrastructure), outfall screenings and other permit obligations. The City of Framingham is required to operate its storm sewer system under a permit from the US EPA. The permit requires the City to complete catchment investigations by FY'28. Deferring this work creates an unsustainable workload in following years. In addition to water quality benefits, this work will help the City improve asset management of drainage infrastructure. Non-compliance could result in administrative orders or fines.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
x	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility	300,000					
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	300,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

City-wide

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

FY'24 MS4 Permit Implementation Year 6		
Stormwater BMP retrofit implementation	$	100,000.00
Wet weather sampling	$	25,000.00
Annual permit compliance training	$	2,000.00
Annual permit compliance SWPPP inspections	$	23,000.00
50 Supplemental catchment investigations to stay on track for FY28 goals. Estimate $3,000/ catchment. Catchment sizes and needs will vary affecting the cost per catchment. Catchment investigations require consultant field time, laboratory sampling & equipment, police details, CCTV, and consultant reporting.	$	150,000.00
Request Amount		**$300,000**

CITY OF FRAMINGHAM
DEPARTMENT OF PUBLIC WORKS

100 Western Avenue
Framingham, MA 01702
www.framinghamma.gov

To:	Mr. William Sedewitz, P.E.; Robert Sheldon, P.E.
From:	Alison L. Eliot, P.E., L.S.P., Senior Stormwater & Environmental Engineer
Cc:	Eric Johnson, P.E.
Date:	October 14, 2022
Re:	FY24 Capital Improvements Project Request – NPDES MS4 Permit Compliance Year 6

Project Description – This project will provide funds to assist with compliance with the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit FY24 requirements. Specifically, this project will support water quality sampling in lakes and streams, investigating the City's infrastructure to identify potential sources of pollution, assessment of City properties to improve stormwater management, and identifying ways to improve water quality at Lake Waushakum, Farm Pond, Cochituate Brook, and other waters that do not meet the current water quality standards for recreation and other identified uses.

Project Justification – Compliance with the Environmental Protection Agency (EPA)'s NPDES MS4 permit, an unfunded federal mandate, is required to operate the City's drainage system. The focus of this permit is improving water quality from stormwater runoff, which is the primary source of water pollution in Framingham and causes beach closures and other negative impacts to Framingham. The City is required to report annually to the EPA and MassDEP on the status of our compliance with these deadlines. Deferring work and associated funding could result in non-compliance which may result in violations and fines.

Project Budget – The estimated total cost associated with the aforementioned project is **$300,000**.

Operating impact – This investment is needed to continue complying with the NPDES MS4 permit requirements. Without additional operational funding or staff to support compliance requirements, DPW needs to hire consultants to complete the compliance work. Otherwise, DPW Highway and Engineering staff and equipment will need to be diverted from other activities (i.e. cleaning and fixing drains, roadway and sidewalk improvements, etc.) to complete this work. This would result in deferred maintenance which increases the risk of failure of the City's infrastructure.

United States Environmental Protection Agency (EPA)
National Pollutant Discharge Elimination System (NPDES)

GENERAL PERMITS FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS IN MASSACHUSETTS (as modified)

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act (CWA), as amended (33 U.S.C. §1251 *et seq.*), and the Massachusetts Clean Waters Act, as amended (M.G.L. Chap.21 §§ 26-53), any operator of a small municipal separate storm sewer system whose system:

- Is located in the areas described in part 1.1;
- Is eligible for coverage under part 1.2 and part 1.9; and
- Submits a complete and accurate Notice of Intent in accordance with part 1.7 of this permit and EPA issues a written authorization

is authorized to discharge in accordance with the conditions and the requirements set forth herein.

The following appendices are also included as part of these permits:
Appendix A – Definitions, Abbreviations, and Acronyms;
Appendix B – Standard permit conditions applicable to all authorized discharges;
Appendix C – Endangered Species Act Eligibility Guidance;
Appendix D – National Historic Preservation Act Eligibility Guidance;
Appendix E – Information required for the Notice of Intent (NOI);
Appendix F – Requirements for MA Small MS4s Subject to Approved TMDLs;
Appendix G – Impaired Waters Monitoring Parameter Requirements;
Appendix H – Requirements related to discharges to certain water quality limited waterbodies;

This modifies parts: 2.0; 2.1; 2.1.1; 2.1.2.a; 2.2.; 2.2.2 (paragraphs 2 and 3); 2.3.3; 2.3.5; 2.3.6; 2.3.7.b; 4.1; 4.4; 5.1.5; 6.5; Appendix F part A.I; Appendix F part A.II; and Appendix H of the permits that became effective on July 1, 2018

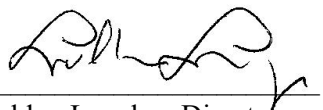
These permit modifications become effective on **January 6, 2021**.

These permits and the authorization to discharge expire at midnight, **June 30, 2022**.

Signed this **7th** day of **December 2020**

/S/Signature On File
_____
Ken Moraff, Director
Water Division
United States Environmental Protection Agency
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Signed this **7th** day of **December 2020**


_____
Lealdon Langley, Director
Division of Watershed Management
Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

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1.0. Introduction

This document consists of three (3) general permits listed in part 1.1. Each general permit is applicable to a particular type of municipal system within Massachusetts. Many of the permit terms and conditions are applicable across all regulated entities, and therefore are presented just once in parts 1-2, part 4, and Appendices A through E. Other conditions are applicable to a particular set of authorized entities; these terms and conditions are included in parts 3, and 5 and Appendices F through H. Throughout the permit, the terms "this permit" or "the permit" will refer to the three general permits.

1.1. Areas of Coverage

This permit covers small municipal separate storm sewer systems (MS4s) located in the Commonwealth of Massachusetts:

- Traditional Cities and Towns (NPDES Permit No. MAR041000)
- State, federal, county and other publicly owned properties (Non-traditional) (MAR042000)
- State transportation agencies (except for MassDOT- Highway Division) (MAR043000)

1.2. Eligibility

The MS4 shall meet the eligibility provisions described in part 1.2.1 and part 1.9 to be eligible for authorization under this permit.

1.2.1. Small MS4s Covered

This permit authorizes the discharge of stormwater from small MS4s as defined at 40 CFR § 122.26(b) (16). This includes MS4s described in 40 CFR §122.32(a) (1) and (a) (2). An MS4 is eligible for coverage under this permit if it is:

- A small MS4 within the Commonwealth of Massachusetts;
- Not a large or medium MS4 as defined in 40 CFR §§122.26(b)(4) or (7);
- Located either fully or partially within an urbanized area as determined by the latest Decennial Census by the Bureau of Census as of the effective date of this permit (the 2010 Census); or
- Located in a geographic area designated by EPA as requiring a permit.

If the small MS4 is not located entirely within an urbanized area, only the portion of the MS4 that is located within the urbanized area is regulated under 40 CFR §122.32(a) (1).

A small municipal separate storm sewer system means all separate storm sewers that are:

- Owned or operated by the United States, a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States.
- Not defined as large or medium municipal separate storm sewer systems pursuant to 40 CFR § 122.26(b) (4) and (b) (7) or designated under 40 CFR § 122.26(a) (1) (v).
- This term includes systems similar to separate storm sewer systems in municipalities such as systems at military bases, large hospitals or prison complexes, and highways

and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

1.3. Limitations on Coverage

This permit does not authorize the following:

a. Stormwater discharges mixed with sources of non-stormwater unless such non-stormwater discharges are:

- Authorized under a separate NPDES permit; or
- A non-stormwater discharge as listed in part 1.4.

b. Stormwater discharges associated with industrial activity as defined in 40 CFR §122.26 (b) (14) (i)-(ix) and (xi).

c. Stormwater discharges associated with construction activity as defined in 40 CFR §122.26(b) (14) (x) or (b) (15).

d. Stormwater discharges currently authorized under another NPDES permit, including discharges covered under other regionally issued general permits.

e. Stormwater discharges or discharge related activities that are likely to adversely affect any species that are listed as endangered or threatened under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA. The permittee shall follow the procedures detailed in Appendix C to make a determination regarding eligibility. The permittee shall certify compliance with this provision on the submitted NOI.

f. Stormwater discharges whose direct or indirect impacts do not prevent or minimize adverse effects on any Essential Fish Habitat.

g. Stormwater discharges, or implementation of a stormwater management program, which adversely affects properties listed or eligible to be listed on the National Register of Historic Places. The permittee shall follow the procedures detailed in Appendix D to make a determination regarding eligibility. The permittee shall certify compliance with this provision on the submitted NOI.

h. Stormwater discharges prohibited under 40 CFR § 122.4.

i. Stormwater discharges to the subsurface subject to state Underground Injection Control (UIC) regulations. Although the permit includes provisions related to infiltration and groundwater recharge, structural controls that dispose of stormwater into the ground may be subject to UIC regulation requirements. Authorization for such discharges shall be obtained from Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, Underground Injection Control, One Winter Street, Boston, MA 02108 – phone 617-292-5859.

j. Any non-traditional MS4 facility that is a "new discharger" as defined in part 5.1.4. and discharges to a waterbody listed in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or (Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride (Chloride) or oil and grease

(Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants.

1.4. Non-Stormwater Discharges

The following categories of non-stormwater discharges are allowed under this permit *unless* the permittee, EPA, or the MassDEP identifies any category or individual discharge of non-stormwater discharge in part 1.4.a-r as a significant contributor of pollutants to the MS4, then that category or individual discharge is not allowed under part 1.4, but rather shall be deemed an "illicit discharge" under part 2.3.4.1, and the permittee shall address that category or individual discharge as part of the Illicit Discharge Detection and Elimination (IDDE) Program described in part 2.3.4 of this permit.

a. Water line flushing
b. Landscape irrigation
c. Diverted stream flows
d. Rising ground water
e. Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
f. Uncontaminated pumped ground water
g. Discharge from potable water sources
h. Foundation drains
i. Air conditioning condensation
j. Irrigation water, springs
k. Water from crawl space pumps
l. Footing drains
m. Lawn watering
n. Individual resident car washing
o. Flows from riparian habitats and wetlands
p. De-chlorinated swimming pool discharges
q. Street wash waters
r. Residential building wash waters without detergents

Discharges or flows from firefighting activities are allowed under this permit need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

1.5. Permit Compliance

Non-compliance with any of the requirements of this permit constitutes a violation of the permit and the CWA and may be grounds for an enforcement action and may result in the imposition of injunctive relief and/or penalties.

1.6. Continuation of this Permit

If this permit is not reissued prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedure Act and remain in force and effect for discharges that were authorized prior to expiration. If a small MS4 was granted permit authorization prior to the expiration date of this permit, it will automatically remain authorized by this permit until the earliest of:

- Authorization under a reissued general permit following timely and appropriate submittal of a complete and accurate NOI requesting authorization to discharge under the reissued permit; or
- Issuance or denial of an individual permit for the MS4's discharges; or

- Authorization or denial under an alternative general permit.

If the MS4 operator does not submit a timely, appropriate, complete, and accurate NOI requesting authorization to discharge under the reissued permit or a timely request for authorization under an individual or alternative general permit, authorization under this permit will terminate on the due date for the NOI under the reissued permit unless otherwise specified in the reissued permit.

1.7. Obtaining Authorization to Discharge

1.7.1. How to Obtain Authorization to Discharge

To obtain authorization under this permit, a small MS4 shall:

- Be located in the areas listed in part 1.1 of this permit;
- Meet the eligibility requirements in part 1.2 and part 1.9;
- Submit a complete and accurate Notice of Intent (NOI) in accordance with the requirements of part 1.7.2; and
- EPA issues a written authorization.

1.7.2. Notice of Intent

a. Operators of Small MS4s seeking authorization to discharge under the terms and conditions of this permit shall submit a Notice of Intent that contains the information identified in Appendix E. This includes operators of small MS4s that were previously authorized under the May 1, 2003 small MS4 general permit (MS4-2003 permit).

b. The NOI shall be signed by an appropriate official (see Appendix B, Subparagraph B.11, Standard Conditions).

c. The NOI shall contain the following certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print the name and title of the official, followed by signature and date.

d. The NOI shall be submitted within 90 days of the effective date of the permit. If EPA notifies an MS4 that it is designated under 40 CFR § 122.32(a) (2) or (b), the NOI shall be submitted within 180 days of receipt of notice unless granted a longer period of time by EPA.

1.7.3. Submission of Notice of Intent

a. All small MS4s shall submit a complete and accurate Notice of Intent (suggested form in Appendix E) to EPA-Region 1 at the following address:

United States Environmental Protection Agency
Stormwater and Construction Permits Section (OEP06-1)
Five Post Office Square, Suite 100

Boston, MA 02109

Or submitted electronically to EPA at the following email address: stormwater.reports@epa.gov

b. All small MS4s shall also submit a copy of the NOI to the MassDEP at the following address:

Massachusetts Department of Environmental Protection
One Winter Street -5th Floor
Boston, Massachusetts 02108
ATTN: Frederick Civian, Stormwater Coordinator

c. Late notification: A small MS4 is not prohibited from submitting a NOI after the dates provided in part 1.7.2.d. However, if a late NOI is submitted, authorization is only for discharges that occur after permit authorization is granted. EPA and MassDEP reserve the right to take enforcement actions for any unpermitted discharges. All NOIs submitted after December 21, 2020 must be submitted electronically.

1.7.4. Public Notice of NOI and Effective Date of Coverage

a. EPA will provide a public notice and opportunity for comment on the contents of the submitted NOIs. The public comment period will be a minimum of 30 calendar days.

b. Based on a review of a small MS4's NOI or other information, EPA may grant authorization, extend the public comment period, or deny authorization under this permit and require submission of an application for an individual or alternative NPDES permit. (See part 1.8) A small MS4 will be authorized to discharge under the terms and conditions of this permit upon receipt of notice of authorization from EPA.

c. Permittees whose authorization to discharge under the MS4-2003 permit, which expired on May 1, 2008, has been administratively continued in accordance with the Administrative Procedure Act 5 U.S.C. § 558(c) and 40 CFR § 122.6, who wish to obtain coverage under this permit, must submit a new NOI requesting permit coverage in accordance with the requirements of part 1.7 of this permit to EPA within 90 days after the effective date of this permit. Permittees whose authorization to discharge under the expired MS4-2003 permit was administratively continued, who fail to submit a timely, complete and accurate NOI or an application for an individual NPDES permit within 90 days after the effective date of this permit will be considered to be discharging without a permit (see 40 CFR § 122.28(b)(3)(iii)).

1.8. Individual Permits and Alternative General Permits

a. EPA may require a small MS4 to apply for and obtain authorization under either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition EPA in accordance with the provisions of 40 CFR § 122.26(f) to require a small MS4 to apply for and/or obtain authorization under either an individual NPDES permit or an alternative NPDES general permit. If EPA requires a small MS4 to apply for an individual or alternative NPDES permit, EPA will notify the small MS4 in writing that a permit application is required. This notification will include a brief statement of the reasons for this decision and will provide application information and an application deadline. If a small MS4 is authorized under the MS4-2003 permit or this permit and fails to submit an individual NPDES or an alternative general permit NPDES permit application as required by EPA, then the authorization under the MS4-2003 permit or this permit to the small MS4 is automatically terminated at the end of the date specified by EPA as the deadline

for application submittal. EPA reserves the right to take enforcement action for any unpermitted discharge.

b. A small MS4 may request to be excluded from this general permit by applying for an individual permit or authorization under an alternative general permit. In such a case, a small MS4 shall submit an individual permit application in accordance with the requirements of 40 CFR § 122.33(b) (2) (i) or § 122.33(b) (2) (ii), with reasons supporting the request, to EPA at the address listed in part 1.7.3 of this permit. The request may be granted by issuance of an individual permit or authorization under an alternative general permit if EPA determines that the reasons stated by the small MS4 are adequate to support the request. (See 40 CFR § 122.28(b) (3)).

c. When an individual NPDES permit is issued, or a small MS4 is authorized to discharge under an alternative NPDES general permit, authorization under this permit automatically terminates on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit.

1.9. Special Eligibility Determinations

1.9.1. Documentation Regarding Endangered Species

The small MS4 shall certify eligibility regarding endangered species in the NOI required by part 1.7.2. The Stormwater Management Program (SWMP) shall include documentation supporting the permittee's eligibility determination with regard to federal Endangered and Threatened Species and Critical Habitat Protection, including:

- Results of the Appendix C U.S. Fish and Wildlife Service endangered species screening determination; and
- If applicable, a description of the measures the small MS4 shall implement to protect federally listed endangered or threatened species, or critical habitat, including any conditions imposed by the U.S. Fish and Wildlife Service. If a permittee fails to document and implement such measures, the permittee's discharges are ineligible for coverage under this permit.

1.9.2. Documentation Regarding Historic Properties

The small MS4 shall certify eligibility regarding historic properties on the NOI required by part 1.7.2. The SWMP shall include documentation supporting the small MS4's eligibility determination with regard to Historic Properties Preservation, including:

- Information on whether the permittee's stormwater discharges, allowable non-stormwater discharges, or stormwater discharge-related activities would have an effect on a property that is listed or eligible for listing on the National Register of Historic Properties (NRHP);
- Where such effects may occur, any documents received by the permittee or any written agreements the permittee has made with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other Tribal representative to mitigate those effects;
- Results of the Appendix D historic property screening investigations; and
- If applicable, a description of the measures the permittee shall implement to avoid or minimize adverse impacts on places listed, or eligible for listing, on the NRHP, including any conditions imposed by the SHPO or THPO. If the permittee fails to

document and implement such measures, those discharges are ineligible for coverage under this permit.

1.10. Stormwater Management Program (SWMP)

a. The permittee shall develop and implement a written (hardcopy or electronic) SWMP. The SWMP shall be signed in accordance with Appendix B, Subsection 11, including the date of signature. A signature and date is required for initial program preparation and for any significant revision to the program, which shall be in writing. The written SWMP shall be completed within one (1) year of the effective date of the permit.

The SWMP is the document used by the permittee to describe and detail the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP shall accurately describe the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term.

b. Permittees authorized by the MS4-2003 permit shall modify or update their existing Best Management Practices (BMPs) and measurable goals to meet the terms and conditions of part 2.3 of this permit within one (1) year of the effective date of the permit. These modifications and updates shall be reflected in the written (hardcopy or electronic) SWMP. Permittees authorized by the MS4-2003 permit shall continue to implement their existing SWMP until the program has been updated.

1.10.1. Stormwater Management Program Availability

a. The permittee shall retain a copy of the current SWMP required by this permit at the office or facility of the person listed as the program contact on the submitted Notice of Intent (NOI). The SWMP shall be immediately available to representatives from EPA, MassDEP, U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) at the time of an onsite inspection or upon request.

b. The permittee shall make the SWMP available to the public during normal business hours. The permittee shall also post the SWMP online[1] if the permittee has a website on which to post the SWMP.

1.10.2. Contents and Timelines of the Stormwater Management Program for 2003 permittees

The following information must be included in the SWMP within one (1) year of the permit effective date and updated annually thereafter, as necessary:

- Identification of names and titles of people responsible for program implementation. If a position is currently unfilled, list the title of the position and modify the SWMP with the name once the position is filled;
- Documentation of compliance with part 1.9.1;
- Documentation of compliance with part 1.9.2;

[1] Should a permittee not wish to post mapping information included in the SWMP (see part 1.10.2) on their website for public safety reasons, they must state the reason either with or within the online SWMP and provide how the MS4 mapping information can be obtained. The permittee must retain the entire SWMP, including all completed mapping, at a location where it can be made available to the public during normal business hours.

- Documentation of authorization of all new or increased discharges granted by MassDEP in compliance with part 2.1.2;
- Listing of all discharges identified pursuant to part 2.1.1 and description of response;
- Description of practices to achieve compliance with part 2.3 (MEP requirements) identified in the permittee's NOI and any updates to those BMPs within the first year;
  For each permit condition in part 2.3 identify:
  - The person(s) or department responsible for the measure;
  - The BMPs for the control measure or permit requirement;
  - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal shall have a measure of assessment associated with it;
- Sanitary Sewer Overflow (SSO) inventory including all of the information required in part 2.3.4.4.b;
- Written IDDE Program pursuant to part 2.3.4.6;
- Written procedures for site inspections and enforcement of sediment and erosion control procedures in accordance with part 2.3.5;
- Description of measures to avoid or minimize impacts to surface public drinking water supply sources. The permittee is also encouraged to include provisions to notify public water supplies in the event of an emergency. Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, One Winter Street, Boston, MA 02108 – phone 617.292.5770.
- Description of activities to achieve compliance with part 3.0;
- Annual program evaluation (part 4.1). Update annually and maintain copies.

The following information must be included in the SWMP within two (2) years of the permit effective date and updated annually thereafter, as necessary:

- Listing of all receiving waterbody segments, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and number of outfalls from the MS4 that discharge to each waterbody. In addition to the receiving water, the permittee shall document in the SWMP all surface public drinking water sources that may be impacted by MS4 discharges;
- Listing of all interconnected MS4s and other separate storm sewer systems receiving a discharge from the permitted MS4, the receiving waterbody segment(s) ultimately receiving the discharge, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and the number of interconnections;
- Written procedures to require submission of as-built drawings and ensure long term operation and maintenance in accordance with part 2.3.6.a.iii;
- The map of the separate storm sewer system required by part 2.3.4.5.

The following information must be included in the SWMP within four (4) years of the permit effective date and updated annually thereafter, as necessary:

- Report(s) assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover.

The following information must be included in the SWMP concurrent with the applicable

deadlines in Appendix F and H and updated annually thereafter, as necessary:

- Description of practices to achieve compliance with part 2.2.1 (TMDL requirements) including:
  - The person(s) or department responsible for the measure;
  - The BMPs for the control measure or permit requirement;
  - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment.
- Description of practices to achieve compliance with part 2.2.2 (discharges to certain water quality limited waters subject to additional requirements) including:
  - The person(s) or department responsible for the measure;
  - The BMPs for the control measure or permit requirement;
  - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment;
- Description of any other practices to achieve compliance with part 2.1 (water quality based requirements)

1.10.3. Contents and Timelines of the Stormwater Management Program for New Permittees

a. Permittees seeking authorization for the first time shall meet all deadlines contained in this permit except the following:

- Timelines for public education requirements in part 2.3.2.c shall be extended by one (1) year and need to include one (1) message to each audience over the permit term;
- The ordinances, by-laws, or other regulatory mechanisms required by parts 2.3.4, 2.3.5 and 2.3.6 shall be completed as soon as possible, but no later than three (3) years from the permit effective date; and
- All other deadlines in part 2.3.4 shall be extended by three (3) years.
- All other deadlines in part 2.3.5, 2.3.6 and 2.3.7 shall be extended by two (2) years.
- All deadlines for discharges to water quality limited waters without a TMDL under part 2.2.2 shall be extended by two (2) years.

b. Contents of the Stormwater Management Program for New Permittees

The following information must be included in the SWMP within one (1) year of the permit effective date and updated annually thereafter, as necessary:

- Identification of names and titles of people responsible for program implementation. If a position is currently unfilled, list the title of the position and modify the SWMP with the name once the position is filled;
- Documentation of compliance with part 1.9.1;
- Documentation of compliance with part 1.9.2;
- Documentation of authorization of all new or increased discharges granted by MassDEP in compliance with part 2.1.2;
- Listing of all discharges identified pursuant to part 2.1.1 and description of response;
- Description of practices to achieve compliance with part 2.3 (MEP requirements)

identified in the permittee's NOI and any updates to those BMPs within the first year;
For each permit condition in part 2.3 identify:
- The person(s) or department responsible for the measure;
- The BMPs for the control measure or permit requirement;
- The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal shall have a measure of assessment associated with it;

- Description of measures to avoid or minimize impacts to surface public drinking water supply sources. The permittee is also encouraged to include provisions to notify public water supplies in the event of an emergency. Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program, One Winter Street, Boston, MA 02108 – phone 617.292.5770. Description of activities to achieve compliance with part 3.0;
- Annual program evaluation (part 4.1). Update annually and maintain copies.

The following information must be included in the SWMP within three (3) years of the permit effective date and updated annually thereafter, as necessary:

- Written procedures for site inspections and enforcement of sediment and erosion control procedures in accordance with part 2.3.5;

The following information must be included in the SWMP within four (4) years of the permit effective date and updated annually thereafter, as necessary:

- Outfall and interconnection inventory;
- Sanitary Sewer Overflow (SSO) inventory including all of the information required in part 2.3.4.4.b;
- Written IDDE Program pursuant to part 2.3.4.6.
- Written operation and maintenance procedures for municipal activities in part 2.3.7.a.ii;
- Written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4 in accordance with part 2.3.7.a.iii.1;
- Written procedures to require submission of as-built drawings and ensure long term operation and maintenance in accordance with part 2.3.6.a.iii;

The following information must be included in the SWMP within five (5) years of the permit effective date and updated annually thereafter, as necessary:

- Phase 1 of the map of the separate storm sewer system required by part 2.3.4.5;
- Listing of all receiving waterbody segments, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs and WLAs, and number of outfalls from the MS4 that discharge to each waterbody. In addition to the receiving water, the permittee shall document in the SWMP all surface public drinking water sources that may be impacted by MS4 discharges;
- Listing of all interconnected MS4s and other separate storm sewer systems receiving a discharge from the permitted MS4, the receiving waterbody segment(s) ultimately receiving the discharge, their classification under the applicable state water quality standards, any impairment(s) and associated pollutant(s) of concern, applicable TMDLs

and WLAs, and the number of interconnections;

The following information must be included in the SWMP within six (6) years of the permit effective date and updated annually thereafter, as necessary:

- Report(s) assessing current street design and parking lot guidelines and other local requirements within the municipality that affect the creation of impervious cover.

The following information must be included in the SWMP concurrent with the applicable deadlines in Appendix F and H (extended by two (2) years) and updated annually thereafter, as necessary:

- Description of practices to achieve compliance with part 2.2.1 (discharges subject to requirements related to approved TMDLs)including:
  - The person(s) or department responsible for the measure;
  - The BMPs for the control measure or permit requirement;
  - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment.
- Description of practices to achieve compliance with part 2.2.2 (discharges to certain water quality limited waters subject to additional requirements) including:
  - The person(s) or department responsible for the measure;
  - The BMPs for the control measure or permit requirement;
  - The measurable goal(s) for each BMP. Each measurable goal shall include milestones and timeframes for its implementation and have a quantity or quality associated with its endpoint. Each goal must have an associated measure of assessment;
- Description of any other practices to achieve compliance with part 2.1 (water quality based requirements).

2.0. Non-Numeric Effluent Limitations

This section includes terms and conditions necessary to reduce the discharge of pollutants from the MS4 to the maximum extent practicable; to protect water quality and to satisfy the appropriate water quality requirements of the Clean Water Act and the Massachusetts Water Quality Standards.

2.1. Water Quality Based Effluent Limitations

Pursuant to Clean Water Act 402(p)(3)(B)(iii), this permit includes provisions to ensure that discharges from the permittee's small MS4 meet applicable water quality standards as set forth in part 2.1.1. below.

2.1.1. Requirement to Meet Water Quality Standards

a. The permittee's discharges shall meet applicable water quality standards by complying with parts 2.1.1.b and/or 2.1.1.c in accordance with the schedules set forth therein.[2] Any other

[2] Applicable water quality standards are the state standards that have been federally approved or promulgated as of the issuance date of this permit and are compiled by EPA at http://www.epa.gov/waterscience/standards/wqslibrary/.

discharge of a pollutant that: (i) is not addressed by part 2.1.1.b, part 2.1.1.c, part 2.2.1, and/or part 2.2.2, (ii) is not the result of an illicit discharge subject to part 2.3.4, and (iii) does not meet applicable water quality standards, either independently or in conjunction with other discharges, shall comply with part 2.1.1.d.

b. If there is a discharge from the MS4 to a waterbody (or its tributaries in some cases) that is subject to an EPA approved or established TMDL identified in part 2.2.1, the permittee is subject to the requirements of part 2.2.1 and Appendix F of this permit and the permittee shall comply with all applicable schedules, alternative schedules and requirements in Appendix F. A permittee's compliance with all applicable requirements and BMP implementation schedules in Appendix F or any alternative schedules applicable to it will constitute compliance with part 2.1.1.a. of the Permit for discharges of pollutants addressed in Appendix F.

c. If (i)there is a discharge from the MS4 to a waterbody (or its tributaries in some cases) that is water quality limited (see definition in Appendix A) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enterococcus or Fecal Coliform), chloride (Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease) and is not subject to an approved TMDL, or (ii)the MS4 is located within a municipality listed in part 2.2.2.a.-b., then the permittee is subject to the requirements of part 2.2.2 and Appendix H of this permit and the permittee shall comply with all applicable schedules and requirements in Appendix H. A permittee's compliance with all applicable requirements and BMP implementation schedules in Appendix H applicable to it will constitute compliance with part 2.1.1.a. of the Permit for discharges of pollutants addressed in Appendix H.

d. Pursuant to Part 2.1.1.a, upon notice from EPA or MassDEP to the permittee that a discharge of a pollutant from the MS4 that is exceeding applicable water quality standards, the permittee must, within 60 days, remedy the exceedance or eliminate the discharge. However, where such remedy or elimination within 60 days is impracticable, the permittee shall submit to EPA, by the same deadline, a schedule of actions to achieve a remedy or elimination in the shortest time not impracticable. The permittee shall implement such actions on the schedule submitted to EPA and report on progress in its annual reports unless or until EPA takes any other action that effectively replaces the schedule..

2.1.2. Increased Discharges

a. Any increased discharge, including increased pollutant loading(s) through the MS4 to waters of the United States is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for increased discharges where appropriate[3]. Any authorization of an increased discharge by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies conditions or requirements related to the increased discharge, such requirements may be independently enforceable under State law and may be adopted into a future permit.

b. There shall be no increased discharges, including increased pollutant loading(s) from the MS4 to impaired waters listed in categories 5 or 4b on the most recent Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) unless the permittee

[3] Contact MassDEP for guidance on compliance with 314 CMR 4.04

demonstrates that there is no net increase in loading from the MS4 to the impaired water of the pollutant(s) for which the waterbody is impaired. The permittee may demonstrate compliance with this provision by *either:*

i. Documenting that the pollutant(s) for which the waterbody is impaired is not present in the MS4's discharge and retaining documentation of this finding with the SWMP; or

ii. Documenting that the total load of the pollutant(s) of concern from the MS4 to any impaired portion of the receiving water will not increase as a result of the activity and retaining documentation of this finding in the SWMP. Unless otherwise determined by the Permittee, USEPA or by MassDEP that additional demonstration is necessary, compliance with the requirements of part 2.2.2 and part 2.3.6 of this Permit, including all reporting and documentation requirements, shall be considered as demonstrating no net increase as required by this part.

c. The requirements of this part are independent of permit conditions requiring reduction in discharges of pollutants as set forth in parts 2.1.1 and 2.2 (water quality based requirements) and 2.3 (requirements to reduce discharge of pollutants to the maximum extent practicable). Permittees remain subject to requirements to reduce the discharge of pollutants from the MS4 as set forth in those parts.

2.2. Discharges to Certain Impaired Waters

The permittee shall identify in the SWMP and Annual Reports all MS4 discharges, including both outfalls and interconnections to other MS4s or other separate storm sewer systems, that:

- Are subject to Total Maximum Daily Load (TMDL) related requirements as identified in part 2.2.1.
- Are subject to additional requirements to protect water quality as identified in part 2.2.2.

The discharge location from an interconnection shall be determined based on the receiving water of the outfall from the interconnected system.

Permittees are subject to the applicable requirements in part 2.2.1, Appendix F, or an approved alternative structural control implementation schedule, and/or the applicable requirements in part 2.2.2, and Appendix H.

2.2.1. Discharges Subject to Requirements Related to an Approved TMDL

a. "Approved TMDLs" are those that have been approved by EPA as of the date of issuance of this permit.

b. The MS4s specified below discharge to waters within Massachusetts that are subject to TMDLs, or in some cases, to tributaries of such waters, and shall comply with the requirements of Appendix F, part A. Appendix F identifies, by section, the provisions the permittee shall implement to be consistent with the terms of the approved TMDL. Alternatively, EPA may notify the permittee that an individual permit application is necessary in accordance with part 1.8.a.

i. The following is a list of municipalities in the Charles River Watershed:

1.

Arlington	Mendon
Ashland	Milford
Bellingham	Millis
Belmont	Natick
Brookline	Needham
Cambridge	Newton
Dedham	Norfolk
Dover	Sherborn
Foxborough	Walpole
Franklin	Waltham
Holliston	Watertown
Hopedale	Wayland
Hopkinton	Wellesley
Lexington	Weston
Lincoln	Westwood
Medfield	Wrentham
Medway	

Permittees that operate regulated MS4s located in municipalities listed above that discharge to the Charles River or its Tributaries shall meet the requirements of Appendix F, part A.I with respect to the reduction of phosphorus discharges from their MS4.

ii. The following is a list of municipalities that contain a lake or pond subject to an approved lake or pond phosphorus TMDL in the Northern Blackstone Basin, Chicopee Basin, Connecticut Basin, French Basin, Millers Basin or in the watershed of Bare Hill Pond, Flint Pond, Indian Lake, Lake Boon, Lake Quinsigamond, Leesville Pond, Salisbury Pond, Quaboag Pond or Quacumquasit Pond.

1.

Auburn	Millbury
Charlton	Oxford
Dudley	Shrewsbury
Gardner	Spencer
Grafton	Springfield
Granby	Stow
Hadley	Templeton
Harvard	Westminster
Hudson	Winchendon
Leicester	Wilbraham

Ludlow	

Permittees that operate regulated MS4s in the above municipalities that discharge to waterbodies listed on Table F-6 in Appendix F or their tributaries, and any other MS4 that discharges to waterbodies listed on Table F-6 in Appendix F or their tributaries, shall meet the requirements of Appendix F, part A.II with respect to reduction of phosphorus discharges from their MS4.

iii. The following is a list of municipalities that contain waters subject to an approved TMDL for bacteria or pathogens.

1.

Abington	Marshfield
Acushnet	Mashpee
Andover	Mattapoisett
Avon	Medfield
Barnstable	Medway
Bedford	Melrose
Bellingham	Mendon
Belmont	Milford
Berkley	Millis
Beverly	Milton
Billerica	Nahant
Bourne	Natick
Brewster	Needham
Bridgewater	New Bedford
Brockton	Newton
Brookline	Norfolk
Burlington	North Andover
Cambridge	Norton
Canton	Norwell
Chatham	Norwood
Cohasset	Orleans
Concord	Peabody
Danvers	Pembroke
Dartmouth	Plymouth
Dedham	Raynham
Dennis	Rehoboth
Dighton	Revere
Dover	Rockland
Duxbury	Rockport
East Bridgewater	Salem

Eastham	Sandwich
Essex	Saugus
Everett	Scituate
Fairhaven	Seekonk
Fall River	Sharon
Falmouth	Sherborn
Foxborough	Somerset
Franklin	Stoughton
Freetown	Swampscott
Gloucester	Swansea
Hanover	Taunton
Hanson	Tewksbury
Harwich	Wakefield
Holliston	Walpole
Hopedale	Waltham
Hopkinton	Wareham
Ipswich	Watertown
Kingston	Wellesley
Lawrence	Wellfleet
Lexington	West Bridgewater
Lincoln	Weston
Lynn	Westport
Lynnfield	Westwood
Malden	Whitman
Manchester	Wilmington
Mansfield	Winthrop
Marblehead	Yarmouth
Marion	

The operators of MS4s located in municipalities listed above that discharge to a waterbody segment listed on Table F-8 in Appendix F and any other MS4 that discharges directly to a waterbody segment listed on Table F-8 in Appendix F shall meet the requirements of Appendix F, part A.III with respect to reduction of bacteria/pathogens discharges from their MS4.

iv. The following is a list of municipalities located on Cape Cod that contain waters subject to an approved TMDL for nitrogen (Total Nitrogen).

1.

Bourne
Barnstable
Chatham
Falmouth

Harwich
Mashpee
Orleans
Yarmouth

Permittees that operate regulated MS4s located in the municipalities above that discharge to waterbodies found on Table F-9 in Appendix F or their tributaries and any other MS4 that discharges to waterbodies found on Table F-9 in Appendix F or their tributaries shall meet the requirements of Appendix F, part A.IV with respect to reduction of nitrogen discharges from their MS4.

v. The following is a list of municipalities located in the Assabet River Watershed:

1.

Acton	Hudson
Berlin	Littleton
Bolton	Marlborough
Boxborough	Maynard
Boylston	Northborough
Ca rlisle	Shrewsbury
Clinton	Stow
Concord	Westborough
Grafton	Westford
Harvard	

Permittees that operate regulated MS4s located in the municipalities above that discharge to the Assabet River or its tributaries shall meet the requirements of Appendix F part A.V with respect to reduction of phosphorus discharges from their MS4.

c. The MS4s specified below discharge to waters, or tributaries of waters, that have been identified in an adjacent state's approved TMDL as being impaired due, in part, to MS4 stormwater discharges in Massachusetts, and shall comply with the requirements of Appendix F, part B. Appendix F identifies, by section, the provisions the permittee shall implement to be consistent with the reasonable assumptions related to Massachusetts MS4 discharges. Alternatively, EPA may notify the permittee that an individual permit application is necessary in accordance with part 1.8.a.

i. The following is a list of municipalities in Massachusetts located in the watershed of Long Island Sound, which has an approved TMDL for nitrogen (Total Nitrogen).

1.

Adams	North Adams
Agawam	Northampton
Amherst	Oxford
Ashburnham	Palmer

Ashby	Paxton
Auburn	Pelham
Belchertown	Pittsfield
Charlton	Richmond
Cheshire	Russell
Chicopee	Rutland
Dalton	South Hadley
Douglas	Southampton
Dudley	Southbridge
East Longmeadow	Southwick
Easthampton	Spencer
Gardner	Springfield
Granby	Sturbridge
Hadley	Sutton
Hampden	Templeton
Hatfield	Ware
Hinsdale	Webster
Holyoke	West Springfield
Lanesborough	Westfield
Leicester	Westhampton
Lenox	Westminster
Longmeadow	Wilbraham
Ludlow	Williamsburg
Millbury	Winchendon
Monson	

Permittees that operate regulated MS4s located in the municipalities above that discharge to a water within the Connecticut River Watershed, the Housatonic River Watershed, or the Thames River Watershed shall meet the requirements of Appendix F part B. I with respect to nitrogen discharges from their MS4.

ii. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing phosphorus to waterbody segments that have out of state approved TMDLs for phosphorus:

1.

Attleboro
North Attleborough
Plainville
Rehoboth
Seekonk
Swansea

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-12 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. II with respect to phosphorus discharges from their MS4.

iii. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing bacteria/pathogens to waterbody segments that have out of state approved TMDLs for bacteria/pathogens:

1.

Attleboro
North Attleborough
Plainville
Rehoboth
Seekonk

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-13 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. III with respect to bacteria/pathogens discharges from their MS4.

iv. The following is a list of municipalities in Massachusetts identified in a TMDL as containing MS4s contributing metals (cadmium, lead, aluminum iron) to waterbody segments that have out of state approved TMDLs for metals (cadmium, lead, aluminum, iron):

1.

Attleboro
North Attleborough
Plainville
Seekonk

Permittees that operate regulated MS4s located in the municipalities above that discharge to a waterbody found on Table F-14 in Appendix F or its tributaries shall meet the requirements of Appendix F part B. IV with respect to metals discharges from their MS4.

2.2.2. Discharges to Certain Water Quality Limited Waters Subject to Additional Requirements

For purposes of this permit, a 'water quality limited water body' is any water body that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b).

If there is a discharge from the MS4 to a water quality limited waterbody where pollutants typically found in stormwater (specifically nutrients (Total Nitrogen or Total Phosphorus), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride (Chloride), metals (Cadmium, Copper, Iron, Lead or Zinc) and oil and grease (Petroleum Hydrocarbons or Oil and Grease)) are the cause of the impairment and is not subject to part 2.1.1.b for those pollutants, or the MS4 is located in a town listed in part 2.2.2.a.-b, the permittee shall comply with the provisions

in Appendix H applicable to it. Permittees notified by EPA or MassDEP during the permit term that they are discharging to a water quality limited water shall update their SWMP to include measures they must take in accordance with Appendix H.

In the absence of a defined pollutant reduction target and where no approved TMDL has been established as of the issuance date of this permit, this permit part and Appendix H define an iterative approach addressing pollutant reductions to waterbodies where the permittee's discharge is not meeting applicable water quality standards due to nutrients (Total Nitrogen Total Phosphorus), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride (Chloride), metals (Cadmium, Copper, Iron, Lead or Zinc) or oil and grease (Petroleum Hydrocarbons or Oil and Grease).

a. Discharges to water quality limited waterbodies where nitrogen (Total Nitrogen) is the cause of the impairment, or their tributaries

i. The requirements of this part are applicable to:

1. Permittees (including traditional and non-traditional MS4s) that own or operate an MS4 in the following municipalities. Discharges from MS4s within these municipalities are to waterbodies that are impaired due to nitrogen (Total Nitrogen), or their tributaries.

Abington	Mattapoisett
Acushnet	Middleborough
Attleboro	New Bedford
Avon	Norton
Barnstable	Peabody
Berkley	Pembroke
Bourne	Plainville
Bridgewater	Plymouth
Brockton	Plympton
Carver	Raynham
Dartmouth	Rehoboth
Dighton	Rochester
East Bridgewater	Salem
Easton	Seekonk
Fairhaven	Sharon
Fall River	Somerset
Foxborough	Stoughton
Freetown	Swansea
Halifax	Taunton
Hanson	Wakefield
Holbrook	Wareham
Kingston	West Bridgewater
Lakeville	Westport

Lynnfield	Whitman
Mansfield	Wrentham
Marion	Yarmouth

2. Any other permittee that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to nitrogen (Total Nitrogen), or a tributary of such water.

ii. Permittees subject to part 2.2.2.a.i above shall meet the requirements of Appendix H part I with respect to the control of nitrogen discharges from their MS4;

iii. During development of their Notice of Intent, the permittee may determine that all discharges from the regulated area through their MS4 are outside of a watershed that contains a nitrogen (Total Nitrogen) impairment in a downstream segment. The permittee shall retain all documentation used in this determination as part of their NOI and are relieved from the requirements of part 2.2.2.a.i and Appendix H part I.

b. Discharges to water quality limited waterbodies where phosphorus ("Total Phosphorus") is the cause of the impairment, or their tributaries

i. The requirements of this part are applicable to:

1. Permittees (including traditional and non-traditional MS4s) that own or operate an MS4 in the following municipalities. Discharges from MS4s within these municipalities are to waterbodies that are impaired due to phosphorus (Total Phosphorus), or their tributaries.

Abington	Lynn
Acushnet	Lynnfield
Andover	Malden
Arlington	Mansfield
Ashburnham	Marlborough
Ashland	Mashpee
Auburn	Medfield
Avon	Medford
Ayer	Melrose
Barnstable	Mendon
Bedford	Methuen
Belchertown	Millbury
Belmont	Millville
Billerica	Milton
Blackstone	North Andover
Bolton	Northbridge
Brewster	Norton

Bridgewater	Norwood
Brockton	Oxford
Burlington	Peabody
Cambridge	Pembroke
Canton	Pepperell
Carlisle	Pittsfield
Carver	Quincy
Chelmsford	Randolph
Chelsea	Reading
Clinton	Revere
Concord	Rockland
Dalton	Salem
Dedham	Scituate
Douglas	Seekonk
Dover	Sharon
Dracut	Shirley
Dunstable	Shrewsbury
East Bridgewater	Somerville
Eastham	Southampton
Easthampton	Spencer
Everett	Springfield
Falmouth	Stoneham
Fitchburg	Stoughton
Foxborough	Sudbury
Framingham	Sutton
Gloucester	Taunton
Grafton	Tewksbury
Granby	Townsend
Groton	Tyngsborough
Halifax	Upton
Hanover	Uxbridge
Hanson	Wakefield
Harvard	Walpole
Haverhill	Wareham
Hinsdale	Watertown
Hopkinton	Wayland
Hudson	West Bridgewater
Lancaster	Westfield

Lawrence	Westminster
Leicester	Westwood
Lenox	Whitman
Leominster	Wilmington
Lexington	Winchendon
Littleton	Winchester
Lowell	Winthrop
Lunenburg	Woburn
Lynn	

2. Any other permittee that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to phosphorus ("Total Phosphorus"), or to a tributary of such water.

ii. The permittees subject to part 2.2.2.b.i. above shall meet all requirements of Appendix H part II with respect to the control of phosphorus discharges from the MS4.

iii. During development of their Notice of Intent, the permittee may determine that all discharges from the regulated area through their MS4 are outside of a watershed that contains a phosphorus ("Total Phosphorus") impairment in a downstream segment. The permittee shall retain all documentation used in this determination as part of their NOI and are relieved from the requirements of part 2.2.2.b.i and Appendix H part II.

c. Discharges to water quality limited waterbodies where bacteria or pathogens is the cause of the impairment

i. The requirements of this part are applicable to:

1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA approved Massachusetts 303(d) list where bacteria or pathogens (E. Coli, Enteroccus or Fecal Coliform) is the cause of the impairment.
2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to bacteria or pathogens.

ii. The permittees subject to part 2.2.2.c.i. shall meet all requirements of Appendix H part III with respect to reduction of bacteria or pathogens discharges from the MS4.

d. Discharges to water quality limited waterbodies where chloride (Chloride) is the cause of the impairment

i. The requirements of this part are applicable to:

1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA approved Massachusetts 303(d) list where chloride (Chloride) is the cause of the impairment.

2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to chloride (Chloride).

ii. The permittees subject to part 2.2.2.d.i. shall meet all requirements of Appendix H part IV with respect to reduction of chloride discharges from the MS4.

e. Discharges to water quality limited waterbodies where oil and grease (Petroleum Hydrocarbons or Oil and Grease), solids (TSS or Turbidity) or metals (Cadmium, Copper, Iron, Lead or Zinc) is the cause of the impairment

i. The requirements of this part are applicable to:

1. Any MS4 discharge identified by the permittee on their Notice of Intent as discharging directly to an impaired waterbody on the most recent EPA approved Massachusetts 303(d) list where oil and grease, solids or metals (Oil and Grease, Petroleum Hydrocarbons TSS, Turbidity, Cadmium, Copper, Iron, Lead or Zinc) is the cause of the impairment.
2. Any other MS4 that, during the permit term, becomes aware that its discharge is to a waterbody that is water quality limited due to oil and grease (Petroleum Hydrocarbons or Oil and Grease), solids (TSS or Turbidity) or metals (Cadmium, Copper, Iron, Lead or Zinc).

ii. The permittees subject to part 2.2.2.d.i. shall meet all requirements of Appendix H part V with respect to reduction of solids, oil and grease or metals discharges from the MS4.

2.3. Requirements to Reduce Pollutants to the Maximum Extent Practicable (MEP)

The permittee shall reduce the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) as detailed in parts 2.3.2 through 2.3.7.

2.3.1. Control Measures

a. Permittees authorized under the MS4-2003 permit shall continue to implement their existing SWMPs while updating their SWMPs pursuant to this permit. This permit does not extend the compliance deadlines set forth in the MS4-2003 permit.

b. Implementation of one or more of the minimum control measures described in parts 2.3.2- 2.3.7 or other permit requirements may be shared with another entity (including another interconnected MS4) or the other entity may fully implement the measure or requirement, if the following requirements are satisfied:

- The other entity, in fact, implements the control measure.
- The particular control measure or component thereof undertaken by the other entity is at least as stringent as the corresponding permit requirement.
- The other entity agrees to implement the control measure on the permittee's behalf. The annual reports must specify that the permittee is relying on another entity to satisfy some of its permit obligations and specify what those obligations are.
- If the permittee is relying on another governmental entity regulated under 40 CFR §122 to satisfy all of its permit obligations, including the obligation to file annual reports, the permittee shall note that fact in its NOI, but is not required to file annual reports.

- The permittee remains responsible for compliance with all permit obligations if the other entity fails to implement the control measures (or component thereof). The permittee may enter into a legally binding agreement with the other entity regarding the other entity's performance of control measures, but the permittee remains ultimately responsible for permit compliance.

2.3.2. Public Education and Outreach

Objective: The permittee shall implement an education program that includes educational goals based on stormwater issues of significance within the MS4 area. The ultimate objective of a public education program is to increase knowledge and change behavior of the public so that pollutants in stormwater are reduced.

a. The permittee shall continue to implement the public education program required by the MS4-2003 permit by distributing educational material to the MS4 community. The educational program shall define educational goals, express specific messages, define the targeted audience for each message, and identify responsible parties for program implementation. If appropriate for the target audience, materials may be developed in a language other than English. At a minimum, the program shall provide information concerning the impact of stormwater discharges on water bodies within the community, especially those waters that are impaired or identified as priority waters. The program shall identify steps and/or activities that the public can take to reduce the pollutants in stormwater runoff and their impacts to the environment.

b. The educational program shall include education and outreach efforts for the following four audiences: (1) residents, (2) businesses, institutions (churches, hospitals), and commercial facilities, (3) developers (construction), and (4) industrial facilities, unless one of these audiences is not present in the MS4 community. In such a situation, the MS4 must document in both the NOI and SWMP which audience is absent from the community and no educational messages are required to that audience.

c. The permittee shall distribute a minimum of two (2) educational messages over the permit term to each audience identified in part 2.3.2.b. The distribution of materials to each audience shall be spaced at least a year apart. Educational messages may be printed materials such as brochures or newsletters; electronic materials such as websites; mass media such as newspaper articles or public service announcement (radio or cable); targeted workshops on stormwater management, or displays in a public area such as town/city hall. The permittee may use existing materials if they are appropriate for the message the permittee chooses to deliver or the permittee may develop its own educational materials. The permittee may partner with other MS4s, community groups or watershed associations to implement the education program to meet this permit requirement.

Some EPA educational materials are available at: http://cfpub.epa.gov/npstbx/index.html.

d. The permittee shall, at a minimum, consider the topics listed in part 2.3.2.d.i. – iv when developing the outreach/education program. The topics are not exclusive and the permittee shall focus on those topics most relevant to the community.

i. Residential program: effects of outdoor activities such as lawn care (use of pesticides, herbicides, and fertilizers and information on Massachusetts Regulation 331 CMR 31 pertaining to proper use of phosphorus containing fertilizers on turf grasses) on water

quality; benefits of appropriate on-site infiltration of stormwater; effects of automotive work and car washing on water quality; proper disposal of swimming pool water; proper management of pet waste; maintenance of septic systems. If the small MS4 area has areas serviced by septic systems, the permittee shall consider information pertaining to maintenance of septic systems as part of its education program.

ii. Business/Commercial/Institution program: proper lawn maintenance (use of pesticides, herbicides and fertilizer, and information on Massachusetts Regulation 331 CMR 31 pertaining to proper use of phosphorus containing fertilizers on turf grasses); benefits of appropriate on-site infiltration of stormwater; building maintenance (use of detergents); use of salt or other de-icing and anti-icing materials (minimize their use); proper storage of salt or other de-icing/anti-icing materials (cover/prevent runoff to storm system and contamination to ground water); proper storage of materials (emphasize pollution prevention); proper management of waste materials and dumpsters (cover and pollution prevention); proper management of parking lot surfaces (sweeping); proper car care activities (washing of vehicles and maintenance); and proper disposal of swimming pool water by entities such as motels, hotels, and health and country clubs (discharges must be dechlorinated and otherwise free from pollutants).

iii. Developers and Construction: proper sediment and erosion control management practices; information about Low Impact Development (LID) principles and technologies; and information about EPA's construction general permit (CGP). This education can also be a part of the Construction Site Stormwater Runoff Control measure detailed in part 2.3.5.

iv. Industrial program: equipment inspection and maintenance; proper storage of industrial materials (emphasize pollution prevention); proper management and disposal of wastes; proper management of dumpsters; minimization of use of salt or other de-icing/anti-icing materials; proper storage of salt or other de-icing/anti-icing materials (cover/prevent runoff to storm system and ground water contamination); benefits of appropriate on-site infiltration of stormwater runoff from areas with low exposure to industrial materials such as roofs or employee parking; proper maintenance of parking lot surfaces (sweeping); and requirements for coverage under EPA's Multi-Sector General Permit.

e. The program shall show evidence of focused messages for specific audiences as well as evidence that progress toward the defined educational goals of the program has been achieved. The permittee shall identify methods that it will use to evaluate the effectiveness of the educational messages and the overall education program. Any methods used to evaluate the effectiveness of the program shall be tied to the defined goals of the program and the overall objective of changes in behavior and knowledge.

f. The permittee shall modify any ineffective messages or distribution techniques for an audience prior to the next scheduled message delivery.

g. The permittee shall document in each annual report the messages for each audience; the method of distribution; the measures/methods used to assess the effectiveness of the messages, and the method/measures used to assess the overall effectiveness of the education program.

2.3.3. Public Involvement and Participation

Objective: The permittee shall provide opportunities to engage the public to participate in the review and implementation of the permittee's SWMP.

a. All public involvement activities shall comply with state public notice requirements (MGL Chapter 30A, Sections 18 – 25 – effective 7/10/2010). The SWMP, all documents submitted to EPA in accordance with Appendix F, and all annual reports shall be available to the public online if the permittee has a website on which to post these documents.

b. The permittee shall annually provide the public an opportunity to participate in the review and implementation of the SWMP.

c. The permittee shall report on the activities undertaken to provide public participation opportunities including compliance with part 2.3.3.a. Public participation opportunities pursuant to part 2.3.3.b may include, but are not limited to, websites; hotlines; clean-up teams; monitoring teams; or an advisory committee.

2.3.4 Illicit Discharge Detection and Elimination (IDDE) Program

Objective: The permittee shall implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

a. Legal Authority - The IDDE program shall include adequate legal authority to: prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and implement appropriate enforcement procedures and actions. Adequate legal authority consists of a currently effective ordinance, by-law, or other regulatory mechanism. For permittees authorized by the MS4-2003 permit, the ordinance, by-law, or other regulatory mechanism was a requirement of the MS4-2003 permit and was required to be effective by May 1, 2008. For new permittees the ordinance, by-law, or other regulatory mechanism shall be in place within 3 years of the permit effective date.
b. During the development of the new components of the IDDE program required by this permit, permittees authorized by the MS4-2003 permit must continue to implement their existing IDDE program required by the MS4-2003 permit to detect and eliminate illicit discharges to their MS4.

2.3.4.1. Definitions and Prohibitions

The permittee shall prohibit illicit discharges and sanitary sewer overflows (SSOs) to its MS4 and require removal of such discharges consistent with parts 2.3.4.2 and 2.3.4.4 of this permit.

An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

An illicit discharge is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities.

2.3.4.2. Elimination of Illicit Discharges

a. Upon detection of an illicit discharge, the permittee shall locate, identify and eliminate the illicit discharge as expeditiously as possible. Upon identification of the illicit source the MS4 notify all responsible parties for any such discharge and require immediate cessation of improper disposal

practices in accordance with its legal authorities. Where elimination of an illicit discharge within 60 days of its identification as an illicit discharge is not possible, the permittee shall establish an expeditious schedule for its elimination and report the dates of identification and schedules for removal in the permittee's annual reports. The permittee shall immediately commence actions necessary for elimination. The permittee shall diligently pursue elimination of all illicit discharges. In the interim, the permittee shall take all reasonable and prudent measures to minimize the discharge of pollutants to and from its MS4.

b. The period between identification and elimination of an illicit discharge is not a grace period. Discharges from an MS4 that are mixed with an illicit discharge are not authorized by this Permit (part 1.3.a) and remain unlawful until eliminated.

2.3.4.3. Non-Stormwater Discharges

The permittee may presume that the sources of non-stormwater listed in part 1.4 of this permit need not be addressed. However, if the permittee identifies any of these sources as significant contributors of pollutants to the MS4, then the permittee shall implement measures to control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely, consistent with part 2.3.4.

2.3.4.4. Sanitary Sewer Overflows

a. Upon detection of an SSO the permittee shall eliminate it as expeditiously as possible and take interim mitigation measures to minimize the discharge of pollutants to and from its MS4 until elimination is completed.

b. The permittee shall identify all known locations where SSOs have discharged to the MS4 within the previous five (5) years. This shall include SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for communication of flow between the systems. Within one (1) year of the effective date of the permit, the permittee shall develop an inventory of all identified SSOs indicating the following information, if available:

1. Location (approximate street crossing/address and receiving water, if any);
2. A clear statement of whether the discharge entered a surface water directly or entered the MS4;
3. Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
4. Estimated volume(s) of the occurrence;
5. Description of the occurrence indicating known or suspected cause(s);
6. Mitigation and corrective measures completed with dates implemented; and
7. Mitigation and corrective measures planned with implementation schedules.

The permittee shall maintain the inventory as a part of the SWMP and update the inventory annually, all updates shall include the information in part 2.3.4.4.b.1-7.

c. In accordance with Paragraph B.12 of Appendix B of this permit, upon becoming aware of an SSO to the MS4, the permittee shall provide oral notice to EPA within 24 hours. Additionally, the permittee shall provide written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence and shall include the information in the updated inventory. The notice shall contain all of the information listed in part 2.3.4.4.b. Where common notification requirements for SSOs are

included in multiple NPDES permits issued to a permittee, a single notification may be made to EPA as directed in the permittee's wastewater or CSO NPDES permit and constitutes compliance with this part.

d. The permittee shall include and update the SSO inventory in its annual report, including the status of mitigation and corrective measures implemented by the permittee to address each SSO identified pursuant to this part.

e. The period between detection and elimination of a discharge from the SSO to the MS4 is not a grace period. Discharges from an MS4 that are mixed with an SSO are not authorized by this Permit (part 1.3.a) and remain unlawful until eliminated.

2.3.4.5. System mapping

The permittee shall develop a revised and more detailed map than was required by the MS4-2003 permit. This revised map of the MS4 shall be completed in two phases as outlined below. The mapping shall include a depiction of the permittee's separate storm sewer system in the permit area. The mapping is intended to facilitate the identification of key infrastructure and factors influencing proper system operation, and the potential for illicit sanitary sewer discharges.

a. Phase I: The system map shall be updated within two (2) years of the permit effective date to include the following information:

- Outfalls and receiving waters (required by MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems , bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of waters report pursuant to Clean Water Act section 303(d) and 305(b)
- Initial catchment delineations. Any available system data and topographic information may be used to produce initial catchment delineations. For the purpose of this permit, a catchment is the area that drains to an individual outfall or interconnection.

b. Phase II: The system map shall be updated annually as the following information becomes available during implementation of catchment investigation procedures in part 2.3.4.8. This information must be included in the map for all outfalls within ten (10) years of the permit effective date:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations shall be updated to reflect information collected during catchment investigations
- Municipal sanitary sewer system (if available)
- Municipal combined sewer system (if applicable).

c. Recommended elements to be included in the system map as information becomes available:

- Storm sewer material, size (pipe diameter) and age
- Sanitary sewer system material, size (pipe diameter) and age
- Privately-owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high-density urban areas
- Area where the permittee's MS4 has received or could receive flow from septic system discharges (e.g., areas with poor soils, or high ground water elevations unsuitable for conventional subsurface disposal systems)
- Seasonal high water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed (with legend) of past illicit discharge investigations (e.g., flow isolation, dye testing, CCTV)
- Locations of suspected, confirmed and corrected illicit discharges (with dates and flow estimates).

d. The mapping may be produced by hand or through computer-aided methods (e.g. GIS). The required scale and detail of the map shall be appropriate to facilitate a rapid understanding of the system by the permittee, EPA and the state. In addition, the mapping shall serve as a planning tool for the implementation and phasing of the IDDE program and demonstration of the extent of complete and planned investigations and corrections. The permittee shall update the mapping as necessary to reflect newly discovered information and required corrections or modifications.

e. The permittee shall report on the progress towards the completion of the system map in each annual report.

2.3.4.6. Written Illicit Discharge Detection and Elimination Program

The IDDE program shall be recorded in a written (hardcopy or electronic) document. The IDDE program shall include each of the elements described in parts 2.3.4.7 and part 2.3.4.8, unless the permittee provides a written explanation within the IDDE program as to why a particular element is not applicable to the permittee.

Notwithstanding the permittee's explanation, EPA may at any time determine that a particular element is in fact applicable to the permittee and require the permittee to add it to the IDDE program. The written (hardcopy or electronic) IDDE program shall be completed within one (1) year of the effective date of the permit and updated in accordance with the milestones of this part. The permittee shall implement the IDDE program in accordance with the goals and milestones contained in this part.

a. The written (hardcopy or electronic) IDDE program shall include a reference or citation of the authority the permittee will use to implement all aspects of the IDDE program.

b. Statement of IDDE Program Responsibilities - The permittee shall establish a written (hardcopy or electronic) statement that clearly identifies responsibilities with regard to eliminating illicit discharges. The statement shall identify the lead municipal agency(ies) or department(s) responsible for implementing the IDDE Program as well as any other agencies or departments that may have responsibilities for aspects of the program (e.g., board of health responsibilities for overseeing septic system construction; sanitary sewer system staff; inspectional services for enforcing plumbing codes;

town counsel responsibilities in enforcement actions, etc.). Where multiple departments and agencies have responsibilities with respect to the IDDE program specific areas of responsibility shall be defined and processes for coordination and data sharing shall be established and documented.

c. Program Procedures – The permittee shall include in the written IDDE program all written procedures developed in accordance with the requirements and timelines in parts 2.3.4.7 and 2.3.4.8 below. At a minimum this shall include the written procedures for dry weather outfall screening and sampling and for catchment investigations.

2.3.4.7. Assessment and Priority Ranking of Outfalls/Interconnections

The permittee shall assess and priority rank the outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. This ranking will determine the priority order for screening of outfalls and interconnections pursuant to part 2.3.4.7.b, catchment investigations for evidence of illicit discharges and SSOs pursuant to part 2.3.4.8, and provides the basis for determining permit milestones of this part.

a) Outfall/Interconnection Inventory and Initial Ranking:
An initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information shall be completed within one (1) year from the effective date of the permit; an updated inventory and ranking will be provided in each annual report thereafter. The inventory shall be updated annually to include data collected in connection with the dry weather screening and other relevant inspections conducted by the permittee.

i. The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other activities under the permittee's IDDE program.

- An outfall means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. (40 CFR § 122.26(b)(9)). However, it is strongly recommended that a permittee inspect all accessible portions of the system as part of this process. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.
- An interconnection means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

ii. The permittee shall classify each of the permittee's outfalls and interconnections into one of the following categories:

- Problem Outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall

include any outfalls/interconnections where previous screening indicates likely sewer input.[4] Problem Outfalls need not be screened pursuant to part 2.3.4.7.b.

- High Priority Outfalls: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:
  - discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds;
  - determined by the permittee as high priority based on the characteristics listed below or other available information;
- Low Priority Outfalls: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.
- Excluded outfalls: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

iii. The permittee shall priority rank outfalls into the categories above (except for excluded outfalls), based on the following characteristics of the defined initial catchment area where information is available:

- Past discharge complaints and reports.
- Poor receiving water quality- the following guidelines are recommended to identify waters as having a high illicit discharge potential: exceeding water quality standards for bacteria; ammonia levels above 0.5 mg/l; surfactants levels greater than or equal to 0.25 mg/l.
- Density of generating sites- Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.
- Age of development and infrastructure – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.
- Sewer conversion – contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
- Historic combined sewer systems – contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.
- Surrounding density of aging septic systems – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
- Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.
- Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved TMDLs applicable to the permittee, where illicit discharges have the potential to

[4] Likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

contain the pollutant identified as the cause of the water quality impairment.
- The permittee may also consider additional relevant characteristics, including location-specific characteristics; if so, the permittee shall include the additional characteristics in its written (hardcopy or electronic) IDDE program.

b) Dry Weather Outfall and Interconnection Screening and Sampling
All outfalls/interconnections (excluding Problem and excluded Outfalls) shall be inspected for the presence of dry weather flow within three (3) years of the permit effective date. The permittee shall screen all High and Low Priority Outfalls in accordance with their initial ranking developed at part 2.3.4.7.a.

i. Written procedure: The permittee shall develop an outfall and interconnection screening and sampling procedure to be included in the IDDE program within one (1) year of the permit effective date. This procedure shall include the following procedures for:

- sample collection,
- use of field kits,
- storage and conveyance of samples (including relevant hold times), and
- field data collection and storage.

An example screening and sampling protocol (*EPA New England Bacterial Source Tracking Protocol*) can be found on EPA's website.

ii. Weather conditions: Dry weather screening and sampling shall proceed only when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.

iii. Screening requirements: For each outfall/interconnection:

1. The permittee shall record all of the following information and include it in the outfall/interconnection inventory and priority ranking:

   - unique identifier,
   - receiving water,
   - date of most recent inspection,
   - dimensions,
   - shape,
   - material (concrete, PVC),
   - spatial location (latitude and longitude with a minimum accuracy of +/-30 feet,
   - physical condition,
   - indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatables, or oil sheen).

2. If an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.

3. If no flow is observed, but evidence of illicit flow exists, the permittee shall revisit the

outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow (proceed as in iv. below).

4. Where dry weather flow is found at an outfall/interconnection, at least one (1) sample shall be collected, and:

    a) Samples shall be analyzed at a minimum for:

        - ammonia,
        - chlorine,
        - conductivity,
        - salinity,
        - *E. coli* (freshwater receiving water) or enterococcus (saline or brackish receiving water),
        - surfactants (such as MBAS),
        - temperature, and
        - pollutants of concern[5]

    b) All analyses with the exception of indicator bacteria and pollutants of concern can be performed with field test kits or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. Sampling for ammonia and surfactants must use sufficiently sensitive methods to detect those parameters at or below the threshold indicator concentrations of 0.5 mg/L for ammonia and 0.25 mg/L for surfactants. Sampling for residual chlorine must use a method with a detection limit of 0.02 mg/L or 20 ug/L.

iv. The permittee may rely on screening conducted under the MS4-2003 permit, pursuant to an EPA enforcement action, or by the state or EPA to the extent that it meets the requirements of part 2.3.4.7.b.iii.4. All data shall be reported in each annual report. Permittees that have conducted substantially equivalent monitoring to that required by part 2.3.4.7.b as part of an EPA enforcement action can request an exemption from the requirements of part 2.3.4.7.b by submitting a written request to EPA and retaining exemption approval from EPA as part of the SWMP. Until the permittee receives formal written approval of the exemption from part 2.3.4.7.b from EPA the permittee remains subject to all requirements of part 2.3.4.7.b.

v. The permittee shall submit all screening data used in compliance with this part in its Annual Report.

c) <u>Follow-up ranking of outfalls and interconnections</u>:

i. The permittee's outfall and interconnection ranking (2.3.4.7.a) shall be updated to reprioritize outfalls and interconnections based on information gathered during dry weather screening (part 2.3.4.7.b).

[5] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL as indicated in Appendix F; the sample shall be analyzed for the pollutant(s) of concern identified as the cause of the impairment as specified in Appendix G

ii. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input[6] shall be considered highly likely to contain illicit discharges from sanitary sources, and such outfalls/interconnections shall be ranked at the top of the High Priority Outfalls category for investigation. At this time, permittees may choose to rank other outfalls and interconnections based on any new information from the dry weather screening.

iii. The ranking can be updated continuously as dry weather screening information becomes available, but shall be completed within three (3) years of the effective date of the permit.

2.3.4.8. Catchment Investigations

The permittee shall develop a systematic procedure to investigate each catchment associated with an outfall or interconnection within their MS4 system.

a. Timelines:

- A written catchment investigation procedure shall be developed within 18 months of the permit effective date in accordance with the requirements of part 2.3.4.8.b below.
- Investigations of catchments associated with Problem Outfalls shall begin no later than two (2) years from the permit effective date.
- Investigations of catchments associated with High and Low Priority Outfalls shall follow the ranking of outfalls updated in part 2.3.4.7.c.
- Investigations of catchments associated with Problem Outfalls shall be completed within seven (7) years of the permit effective date
- Investigations of catchments where any information gathered on the outfall/interconnection identifies sewer input[7] shall be completed within seven (7) years of the permit effective date.
- Investigations of catchments associated with all High- and Low-Priority Outfalls shall be completed within ten (10) years of the permit effective date.

*For the purposes of these milestones, an individual catchment investigation will be considered complete if all relevant procedures in part 2.3.4.8.c. and 2.3.4.8.d. below have been completed.

b. A written catchment investigation procedure shall be developed that:

i. **Identifies maps, historic plans and records, and other sources of data**, including but not limited to plans related to the construction of the storm drain and of sanitary sewers, prior work performed on the storm drains or sanitary sewers, board of health or other municipal data on septic system failures or required upgrades, and complaint records related to SSOs, sanitary sewer surcharges, and septic system breakouts. These data sources will be used in identifying system

[6] Likely sewer input indicators are any of the following:
- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

[7] Likely sewer input indicators are any of the following:
- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

vulnerability factors within each catchment.

ii. **Includes a manhole inspection methodology** that shall describe a storm drain network investigation that involves systematically and progressively observing, sampling (as required below) and evaluating key junction manholes (see definition in Appendix A) in the MS4 to determine the approximate location of suspected illicit discharges or SSOs. The manhole inspection methodology may either start from the outfall and work up the system or start from the upper parts of the catchment and work down the system or be a combination of both practices. Either method must, at a minimum, include an investigation of each key junction manhole within the MS4, even where no evidence of an illicit discharge is observed at the outfall. The manhole inspection methodology must describe the method the permittee will use. The manhole inspection methodology shall include procedures for dry and wet weather investigations.

iii. **Establishes procedures to isolate and confirm sources of illicit discharges** where manhole investigations or other physical evidence or screening has identified that MS4 alignments are influenced by illicit discharges or SSOs. These shall include isolation of the drainage area for implementation of more detailed investigations, inspection of additional manholes along the alignment to refine the location of potential contaminant sources, and methods such as sandbagging key junction manhole inlets, targeted internal plumbing inspections, dye testing, video inspections, or smoke testing to isolate and confirm the sources.

c. Requirements for each catchment investigation associated with an outfall/interconnection:

i. For each catchment being investigated, the permittee shall review relevant mapping and historic plans and records gathered in accordance with Part 2.3.4.8.b.i. This review shall be used to identify areas within the catchment with higher potential for illicit connections. The permittee shall identify and record the presence of any of the following specific **System Vulnerability Factors (SVFs)**:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages;
- Common or twin-invert manholes serving storm and sanitary sewer alignments;
- Common trench construction serving both storm and sanitary sewer alignments;
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system;
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system;
- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints;
- Areas formerly served by combined sewer systems;
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.

EPA recommends the permittee include the following in their consideration of System Vulnerability Factors:

- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs;
- Any sanitary sewer and storm drain infrastructure greater than 40 years old;

- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);

The permittee shall document the presence or absence of System Vulnerability Factors for each catchment, retain this documentation as part of its IDDE program, and report this information in Annual Reports. Catchments with a minimum of one (1) System Vulnerability Factor are subject to wet weather sampling requirements of part 2.3.4.8.c.ii.2.

ii. For each catchment, the permittee must inspect key junction manholes and gather catchment information on the locations of MS4 pipes, manholes, and the extent of the contributing catchment.

1. <u>For all catchments</u>
   a) Infrastructure information shall be incorporated into the permittee's mapping required at part 2.3.4.5; the permittee will refine their catchment delineation based on the field investigation where appropriate.
   b) The SVF inventory for the catchment will be updated based on information obtained during the inspection, including common (twin invert) manholes, directly piped connections between storm drains and sanitary sewer infrastructure, common weir walls, sanitary sewer underdrain connections and other structural vulnerabilities where sanitary discharges could enter the storm drain system during wet weather.
      1) **Where a minimum of one (1) SVF is identified based on previous information or the investigation, a wet weather investigation must be conducted at the associated outfall (see below).**
   c) During dry weather, key junction manholes[8] shall be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present).
      1) If flow is observed, the permittee shall sample the flow at a minimum for ammonia, chlorine and surfactants and can use field kits for these analyses.
      2) Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole shall be flagged for further upstream investigation.
   d) Key junction and subsequent manhole investigations will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

2. <u>For all catchments with a minimum of one (1) SVF identified</u>
   a) The permittee shall meet the requirements above for dry weather screening
   b) The permittee shall inspect and sample under wet weather conditions to the extent necessary to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the

[8] Where catchments do not contain junction manholes, the dry weather screening and sampling shall be considered as meeting the manhole inspection requirement. In these catchments, dry weather screenings that indicate potential presence of illicit discharges shall be further investigated pursuant to part 2.3.4.8.d. Investigations in these catchments may be considered complete where dry weather screening reveals no flow; no evidence of illicit discharges or SSOs is indicated through sampling results or visual or olfactory means; and no wet weather System Vulnerability Factors are identified.

MS4.

1) The permittee shall conduct at least one wet weather screening and sampling at the outfall that includes the same parameters required during dry weather screening, part 2.3.4.7.b.iii.4.
2) Wet weather sampling and screening shall proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge. EPA strongly recommends sampling during the spring (March through June) when groundwater levels are relatively high.
3) The permit does not require a minimum rainfall event prior to wet weather screening. However, permittees may incorporate provisions that assist in targeting such discharges, including avoiding sampling during the initial period of discharge ("first flush") and/or identifying minimum storm event intensities likely to trigger sanitary sewer interconnections.

c) This sampling can be done upon completion of any dry weather investigation but must be completed before the catchment investigation is marked as complete.

iii. All data collected as part of the dry and wet weather catchment investigations shall be recorded and reported in each annual report.

d. Identification/Confirmation of illicit source

Where the source of an illicit discharge has been approximated between two manholes in the permittee's MS4, the permittee shall isolate and identify/confirm the source of the illicit discharge using more detailed methods identified in their written procedure (2.3.4.8.b.iii). For outfalls that contained evidence of an illicit discharge, catchment investigations will be considered complete upon confirmation of all illicit sources.

e. Illicit discharge removal

When the specific source of an illicit discharge is identified, the permittee shall exercise its authority as necessary to require its removal pursuant to part 2.3.4.2 or 2.3.4.3.

i. For each confirmed source the permittee shall include in the annual report the following information:

- the location of the discharge and its source(s);
- a description of the discharge;
- the method of discovery;
- date of discovery;
- date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal; and
- estimate of the volume of flow removed.

ii. Within one year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening shall be conducted. The confirmatory screening shall be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening shall be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment shall be scheduled for additional investigation.

2.3.4.9. Indicators of IDDE Program Progress

The permittee shall define or describe indicators for tracking program success and evaluate and report on the overall effectiveness of the IDDE program in each annual report. At a minimum the permittee shall document in each annual report:

- the number of SSOs and illicit discharges identified and removed,
- the number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure,
- all dry weather and wet weather screening and sampling results and
- the volume of sewage removed

2.3.4.10 Ongoing Screening

Upon completion of all catchment investigations pursuant to part 2.3.4.8.c and illicit discharge removal and confirmation (if necessary) pursuant to paragraph 2.3.4.8.e, each outfall or interconnection shall be reprioritized for screening in accordance with part 2.3.4.7.a and scheduled for ongoing screening once every five years. Ongoing screening shall consist of dry weather screening and sampling consistent with part 2.3.4.7.b; wet weather screening and sampling shall also be required at outfalls where wet weather screening was required due to SVFs and shall be conducted in accordance with part 2.3.4.8.c.ii. All sampling results shall be reported in the permittee's annual report.

2.3.4.11 Training

The permittee shall, at a minimum, annually provide training to employees involved in IDDE program about the program, including how to recognize illicit discharges and SSOs. The permittee shall report on the frequency and type of employee training in the annual report.

2.3.5. Construction Site Stormwater Runoff Control

Objective: The objective of an effective construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S through the permittee's MS4. The construction site stormwater runoff control program required by this permit is a separate and distinct program from EPA's Construction General Permit in that the former is implemented by the MS4 operator to ensure that runoff from construction sites discharging to the MS4 are controlled consistent with the MS4's applicable requirements, whereas the latter is implemented by construction site operators to comply with the terms and conditions of EPA's permit (https://www.epa.gov/npdes/2017-construction-general-permit-cgp).

a. Permittees shall implement and enforce a program to reduce pollutants in any stormwater runoff discharged to the MS4 from all construction activities that result in a land disturbance of greater than or equal to one acre within the regulated area. The permittee's program shall include disturbances less than one acre if that disturbance is part of a larger common plan of development or sale that would disturb one or more acres. Permittees authorized under the MS4-2003 permit shall continue to implement and enforce their existing program and modify as necessary to meet the requirements of this part.

b. The permittee does not need to apply its construction program requirements to projects that receive a waiver from EPA under the provisions of 40 CFR § 122.26(b) (15) (i).

c. The permittee shall develop and implement a construction site runoff control program that includes the elements in Paragraphs i. through iii. of this part:

i. An ordinance or regulatory mechanism that requires the use of sediment and erosion control practices at construction sites. In addition to addressing sediment and erosion control, the ordinance must include controls for other wastes on construction sites such as demolition debris, litter and sanitary wastes. The ordinance or regulatory mechanisms shall provide that the permittee may, to the extent authorized by law, impose sanctions to ensure compliance with the local program. Development of an ordinance or other regulatory mechanism was a requirement of the MS4-2003 permit (See part II.B.4 and part IV.B.4).The ordinance or other regulatory mechanism required by the MS4-2003 permit shall have been effective by May 1, 2008.

ii. Written (hardcopy or electronic) procedures for site plan review, site inspections and enforcement of sediment and erosion control measures by the permittee. If not already existing, these procedures shall be completed within one (1) year from the effective date of the permit.

1. The site plan review procedure shall include:
   - a pre-construction review by the permittee of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development;
   - consideration of potential water quality impacts;
   - procedures for the receipt and consideration of information submitted by the public; and
   - evaluating the incorporation of Low Impact Development (LID) site planning and design strategies, unless such practices are infeasible.
2. The site inspection and enforcement procedures shall include:
   - who is responsible for site inspections and the necessary qualifications for performing inspections, as well as who has authority to implement enforcement procedures;
   - the requirement that inspections of BMPs occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans
   - the use of mandated inspection forms, if appropriate; and
   - procedure for tracking the number of site reviews, inspections, and enforcement actions. This tracking information shall be included as part of each annual report required by part 4.4.

iii. Requirements for construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4 to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site. The program may include references to the requirements of EPA's Construction General Permit (including the development of a SWPPP) to the extent they are consistent with the program requirements of this part. The program may include references to BMP design standards in state manuals, such as the 2008 Massachusetts Stormwater Handbook[9], or design standards developed by the

[9] The handbook is available at: https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards

MS4. EPA supports and encourages the use of design standards in local programs. Examples of appropriate sediment and erosion control measures for construction sites include local requirements to:

1. Minimize the amount of disturbed area and protect natural resources;
2. Stabilize sites when projects are complete or operations have temporarily ceased;
3. Protect slopes on the construction site;
4. Protect all storm drain inlets and armor all newly constructed outlets;
5. Use perimeter controls at the site;
6. Stabilize construction site entrances and exits to prevent off-site tracking;
7. Control wastes that may be discharged, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes (these wastes may not be discharged to the MS4); and
8. Inspect stormwater controls at consistent intervals.

2.3.6. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management)

Objective: The objective of this control measure is to reduce the discharge of pollutants found in stormwater through the retention or treatment of stormwater after construction on new or redeveloped sites. For the purposes of this part (2.3.6.), the following definitions apply:

site is defined as the area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover (e.g. repaving not covered by 2.3.6.a.ii.4.b.)

new development is defined as any construction activities or land alteration resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover.

redevelopment is defined as any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances equal to or greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

a. Permittees shall develop, implement, and enforce a program to address post-construction stormwater runoff from all new development and redevelopment sites that disturb one or more acres and discharge into the permittees MS4 at a minimum. Permittees authorized under the MS4-2003 permit shall continue to implement and enforce their program and modify as necessary to meet the requirements of this part.

i. The permittee's new development/ redevelopment program shall include sites less than one acre if the site is part of a larger common plan of development or redevelopment which disturbs one or more acre.

ii. The permittee shall develop or modify, as appropriate, an ordinance or other regulatory mechanism within three (3) years of the effective date of the permit to contain provisions that are at least as stringent as the following:

1. Low Impact Development (LID) site planning and design strategies must be implemented unless infeasible in order to reduce the discharge of stormwater from development sites..

.

2. Stormwater management systems design shall be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook.
:

3. Stormwater management systems on new development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site[10].

a) Average annual pollutant removal requirements in 2.3.6.a.ii.3 are achieved through one of the following methods:
   1. installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
   2. retaining the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
   3. meeting a combination of retention and treatment that achieves the above standards; or
   4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

4. Stormwater management systems on redevelopment sites shall be designed to meet an average annual pollutant removal equivalent to 80% of the average annual post-construction load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 50% of the average annual load of Total Phosphorus (TP) related to the total post-construction impervious surface area on the site[11].

a) Average annual pollutant removal requirements in 2.3.6.a.ii.4 above are

[10] Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event

[11] Pollutant removal is calculated based on average annual loading and not on the basis of any individual storm event

achieved through one of the following methods:

1. installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
2. retaining the volume of runoff equivalent to, or greater than, 0.8 inch multiplied by the total post-construction impervious surface area on the redeveloped site; or
3. meeting a combination of retention and treatment that achieves the above standards; or
4. utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the redevelopment site.

b) Redevelopment activities that are exclusively limited to maintenance and improvement of existing roadways, (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects) shall improve existing conditions unless infeasible and are exempt from part 2.3.6.a.ii.4. Roadway widening or improvements that increase the amount of impervious area on the redevelopment site by greater than or equal to a single lane width shall meet the requirements of part 2.3.6.a.ii.4..

iii. The permittee shall require, at a minimum, the submission of as-built drawings no later than two (2) years after completion of construction projects. The as-built drawings must depict all on site controls, both structural and non-structural, designed to manage the stormwater associated with the completed site (post construction stormwater management). The new development/redevelopment program shall have procedures to ensure adequate long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project. These procedures may include the use of dedicated funds or escrow accounts for development projects or the acceptance of ownership by the permittee of all privately owned BMPs. These procedures may also include the development of maintenance contracts between the owner of the BMP and the permittee. Alternatively, these procedures may include the submission of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. The procedures to require submission of as-built drawings and ensure long term operation and maintenance shall be a part of the SWMP. The permittee shall report in the annual report on the measures that the permittee has utilized to meet this requirement.

b. Within four (4) years of the effective date of this permit, the permittee shall develop a report assessing current street design and parking lot guidelines and other local requirements that affect

the creation of impervious cover. This assessment shall be used to provide information to allow the permittee to determine if changes to design standards for streets and parking lots can be made to support low impact design options. If the assessment indicates that changes can be made, the assessment shall include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The local planning board and local transportation board should be involved in this assessment. This assessment shall be part of the SWMP. The permittee shall report in each annual report on the status of this assessment including any planned or completed changes to local regulations and guidelines.

c. Within four (4) years from the effective date of the permit, the permittee shall develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following practices allowable when appropriate site conditions exist:
    i. Green roofs;
    ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and
    iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses.

    The assessment should indicate if the practices are allowed in the MS4 jurisdiction and under what circumstances are they allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The permittee shall report in each annual report on its findings and progress towards making the practices allowable.(Information available at: http://www.epa.gov/region1/npdes/stormwater/assets/pdf/AddressingBarrier2LID.pdf and http://www.mapc.org/resources/low-impact-dev-toolkit/local-codes-lid)

d. Four (4) years from the effective date of this permit, the permittee shall identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area. Properties and infrastructure for consideration shall include those with the potential for reduction of on-site impervious area (IA) as well as those that could provide reduction of off-site IA. At a minimum, the permittee shall consider municipal properties with significant impervious cover (including parking lots, buildings, and maintenance yards) that could be modified or retrofitted. MS4 infrastructure to be considered includes existing street right-of-ways, outfalls and conventional stormwater conveyances and controls (including swales and detention practices) that could be readily modified or retrofitted to provide reduction in frequency, volume or pollutant loads of such discharges through reduction of impervious cover.

    In determining the potential for modifying or retrofitting particular properties, the permittee shall consider factors such as access for maintenance purposes; subsurface geology; depth to water table; proximity to aquifers and subsurface infrastructure including sanitary sewers and septic systems; and opportunities for public use and education. In determining its priority ranking, the permittee shall consider factors such as schedules for planned capital improvements to storm and

sanitary sewer infrastructure and paving projects; current storm sewer level of service; and control of discharges to water quality limited waters, first or second order streams, public swimming beaches, drinking water supply sources and shellfish growing areas.

Beginning with the fifth year annual report and in each subsequent annual report, the permittee shall identify additional permittee owned sites and infrastructure that could be retrofitted such that the permittee maintains a minimum of 5 sites in their inventory, until such a time as when the permittee has less than 5 sites remaining. In addition, the permittee shall report on all properties that have been modified or retrofitted with BMPs to mitigate IA that were inventoried in accordance with this part. The permittee may also include in its annual report non-MS4 owned property that has been modified or retrofitted with BMPs to mitigate IA.

2.3.7. Good House Keeping and Pollution Prevention for Permittee Owned Operations

Objective: The permittee shall implement an operations and maintenance program for permittee-owned operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all permittee-owned operations.

a. Operations and Maintenance Programs

i. Within two (2) years from the effective date of the permit, the permittee shall develop, if not already developed, written (hardcopy or electronic) operations and maintenance procedures for the municipal activities listed below in part 2.3.7.a.ii. These written procedures shall be included as part of the SWMP.

ii. Within two (2) year of the effective date of this permit, the permittee shall develop an inventory of all permittee owned facilities within the categories listed below. The permittee shall review this inventory annually and update as necessary.

1. Parks and open space: Establish procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction. Evaluate lawn maintenance and landscaping activities to ensure practices are protective of water quality. Protective practices include reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting). Establish pet waste handling collection and disposal locations at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste. Establish procedures to address waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4. Establish procedures for management of trash containers at parks and open space (scheduled cleanings; sufficient number). Establish procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.

2. Buildings and facilities where pollutants are exposed to stormwater runoff: This includes schools (to the extent they are permittee-owned or operated), town offices, police, and fire stations, municipal pools and parking garages and other permittee-owned or operated buildings or facilities. Evaluate the use, storage, and disposal of petroleum products and other potential stormwater pollutants. Provide employee training as necessary so that those responsible for handling these products know proper procedures. Ensure that Spill Prevention Plans are

in place, if applicable, and coordinate with the fire department as necessary. Develop management procedures for dumpsters and other waste management equipment. Sweep parking lots and keep areas surrounding the facilities clean to reduce runoff of pollutants.

3. Vehicles and Equipment: Establish procedures for the storage of permittee vehicles. Vehicles with fluid leaks shall be stored indoors or containment shall be provided until repaired. Evaluate fueling areas owned or operated by the permittee. If possible, place fueling areas under cover in order to minimize exposure. Establish procedures to ensure that vehicle wash waters are not discharged to the municipal storm sewer system or to surface waters. This permit does not authorize such discharges.

iii. Infrastructure Operations and Maintenance

1. The permittee shall establish within two (2) year of the effective date of the permit a written (hardcopy or electronic) program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. If the permittee has an existing program to maintain its MS4 infrastructure in a timely manner to reduce or eliminate the discharge of pollutants from the MS4, the permittee shall document the program in the SWMP.

2. The permittee shall optimize routine inspections, cleaning and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located near construction activities (roadway construction, residential, commercial, or industrial development or redevelopment). Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at anytime will be more than 50 percent full.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, the permittee shall document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. The permittee shall describe any actions taken in its annual report.
- For the purposes of this part, an excessive sediment or debris loading is a catch basin sump more than 50 percent full. A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.
- The permittee shall document in the SWMP and in the first annual report its plan for optimizing catch basin cleaning, inspection plans, or its schedule for gathering information to develop the optimization plan. Documentation shall include metrics and other information used to reach the determination that the established plan for cleaning and maintenance is optimal for the MS4. The permittee shall keep a log of catch basins cleaned or inspected.

- The permittee shall report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.

3. The permittee shall establish and implement procedures for sweeping and/or cleaning streets, and permittee-owned parking lots. All streets with the exception of rural uncurbed roads with no catch basins or high speed limited access highways shall be swept and/or cleaned a minimum of once per year in the spring (following winter activities such as sanding). The procedures shall also include more frequent sweeping of targeted areas determined by the permittee on the basis of pollutant load reduction potential, based on inspections, pollutant loads, catch basin cleaning or inspection results, land use, water quality limited or TMDL waters or other relevant factors as determined by the permittee. The permittee shall report in each annual report the number of miles cleaned or the volume or mass of material removed.

   For rural uncurbed roadways with no catch basins and limited access highways, the permittee shall either meet the minimum frequencies above, or develop and implement an inspection, documentation and targeted sweeping plan within two (2) years of the effective date of the permit, and submit such plan with its year one annual report.

4. The permittee shall ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse such that they do not discharge to receiving waters. These materials should be managed in compliance with current MassDEP policies:

   - For catch basins cleanings: http://www.mass.gov/eea/agencies/massdep/recycle/regulations/management-of-catch-basin-cleanings.html
   - For street sweepings: http://www.mass.gov/eea/docs/dep/recycle/laws/stsweep.pdf.

5. The permittee shall establish and implement procedures for winter road maintenance including the use and storage of salt and sand; minimize the use of sodium chloride and other salts, and evaluate opportunities for use of alternative materials; and ensure that snow disposal activities do not result in disposal of snow into waters of the United States. For purposes of this MS4 Permit, salt shall mean any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

6. The permittee shall establish and implement inspection and maintenance frequencies and procedures for all stormwater treatment structures such as water quality swales, retention/detention basins, infiltration structures, proprietary treatment devices or other similar structures. All permittee-owned stormwater treatment structures (excluding catch basins) shall be inspected annually at a minimum.

iv. The permittee shall report in the annual report on the status of the inventory required by this part and any subsequent updates; the status of the O&M programs for the permittee-owned facilities and activities in part 2.3.7.a.ii; and the maintenance activities associated with each.

v. The permittee shall keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance activities, inspections and training required by part 2.3.7.a. The permittee shall maintain, consistent with part 4.2.a, all records associated with maintenance and inspection activities required by part 2.3.7.a.

b. Stormwater Pollution Prevention Plan (SWPPP)

The permittee shall develop and fully implement a SWPPP for each of the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater as determined by the permittee. If facilities are located at the same property, the permittee may develop one SWPPP for the entire property. The SWPPP is a separate and different document from the SWMP required in part 1.10. A SWPPP does not need to be developed for a facility if the permittee has either developed a SWPPP or received a no exposure certification for the discharge under the Multi-Sector General Permit or the discharge is authorized under another NPDES permit.

i. No later than two (2) years from the effective date of the permit, the permittee shall develop and implement a written (hardcopy or electronic) SWPPP for the facilities described above. The SWPPP shall be signed in accordance with the signatory requirements of Appendix B – Subparagraph 11.

ii. The SWPPP shall contain the following elements:

1. Pollution Prevention Team
Identify the staff on the team, by name and title. If the position is unstaffed, the title of the position should be included and the SWPPP updated when the position is filled. The role of the team is to develop, implement, maintain, and revise, as necessary, the SWPPP for the facility.

2. Description of the facility and identification of potential pollutant sources
The SWPPP shall include a map of the facility and a description of the activities that occur at the facility. The map shall show the location of the stormwater outfalls, receiving waters, and any structural controls. Identify all activities that occur at the facility and the potential pollutants associated with each activity including the location of any floor drains. These may be included as part of the inventory required by part 2.3.7.a.

3. Identification of stormwater controls
The permittee shall select, design, install, and implement the control measures detailed in paragraph 4 below to prevent or reduce the discharge of pollutants from the permittee owned facility.

The selection, design, installation, and implementation of the control measures shall be in accordance with good engineering practices and manufacturer's specifications. The permittee shall also take all reasonable steps to control or

address the quality of discharges from the site that may not originate at the facility.

If the discharge from the facility is to a water quality limited water and the facility has the potential to discharge the pollutant identified as causing the water quality limitation, the permittee shall identify the control measures that will be used to address this pollutant at the facility so that the discharge meets applicable water quality standards.

4. The SWPPP shall include the following management practices:
   a) Minimize or Prevent Exposure: The permittee shall to the extent practicable either locate materials and activities inside, or protect them with storm-resistant coverings in order to prevent exposure to rain, snow, snowmelt and runoff (although significant enlargement of impervious surface area is not recommended). Materials do not need to be enclosed or covered if stormwater runoff from affected areas will not be discharged directly or indirectly to surface waters or to the MS4 or if discharges are authorized under another NPDES permit.

   b) Good Housekeeping: The permittee shall keep clean all exposed areas that are potential sources of pollutants, using such measures as sweeping at regular intervals. Ensure that trash containers are closed when not in use, keep storage areas well swept and free from leaking or damaged containers; and store leaking vehicles needing repair indoors.

   c) Preventative Maintenance: The permittee shall regularly inspect, test, maintain, and repair all equipment and systems to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater to receiving waters. Inspections shall occur at a minimum once per quarter.

   d) Spill Prevention and Response: The permittee shall minimize the potential for leaks, spills, and other releases that may be exposed to stormwater and develop plans for effective response to such spills if or when they occur. At a minimum, the permittee shall have procedures that include:

      - Preventive measures such as barriers between material storage and traffic areas, secondary containment provisions, and procedures for material storage and handling.
      - Response procedures that include notification of appropriate facility personnel, emergency agencies, and regulatory agencies, and procedures for stopping, containing, and cleaning up leaks, spills and other releases. Measures for cleaning up hazardous material spills or leaks shall be consistent with applicable Resource Conservation and Recovery Act (RCRA) regulations at 40 CFR section 264 and 40 CFR section 265. Employees

who may cause, detect, or respond to a spill or leak shall be trained in these procedures and have necessary spill response equipment available. If possible, one of these individuals should be a member of the Pollution Prevention Team; and

- Contact information for individuals and agencies that shall be notified in the event of a leak, spill, or other release. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under 40 CFR section 110, 40 CFR section 117, or 40 CFR section 302, occurs during a 24-hour period, the permittee shall notify the National Response Center (NRC) at (800) 424-8802 in accordance with the requirements of 40 CFR section 110, 40 CFR section 117, and 40 CFR section 302 as soon as the permittee has knowledge of the discharge. State or local requirements may necessitate reporting spills or discharges to local emergency, public health or drinking water supply agencies, and owners of public drinking water supplies. Contact information shall be in locations that are readily accessible and available.

e) Erosion and Sediment Control: The permittee shall use structural and non-structural control measures at the facility to stabilize and contain runoff from exposed areas and to minimize or eliminate onsite erosion and sedimentation. Efforts to achieve this may include the use of flow velocity dissipation devices at discharge locations and within outfall channels where necessary to reduce erosion.

f) Management of Runoff: The permittee shall manage stormwater runoff from the facility to prevent or reduce the discharge of pollutants. This may include management practices which divert runoff from areas that are potential sources of pollutants, contain runoff in such areas, or reuse, infiltrate or treat stormwater to reduce the discharge of pollutants.

g) Salt Storage Piles or Piles Containing Salt: For storage piles of salt or piles containing salt used for deicing or other purposes (including maintenance of paved surfaces) for which the discharge during precipitation events discharges to the permittee's MS4, any other storm sewer system, or to a Water of the US, the permittee shall prevent exposure of the storage pile to precipitation by enclosing or covering the storage piles. Such piles shall be enclosed or covered within two (2) years of the permit effective date. The permittee shall implement appropriate measures (e.g., good housekeeping, diversions, containment) to minimize exposure resulting from adding to or removing materials from the pile. The permittee is encouraged to store piles in such a manner as not to impact surface water resources, ground water resources, recharge areas, and wells.

h) Employee Training: The permittee shall regularly train employees who work in areas where materials or activities are exposed to stormwater, or who are responsible for implementing activities identified in the SWPPP

(e.g., inspectors, maintenance personnel), including all members of the Pollution Prevention Team. Training shall cover both the specific components and scope of the SWPPP and the control measures required under this part, including spill response, good housekeeping, material management practices, any best management practice operation and maintenance, etc. EPA recommends annual training.

The permittee shall document the following information for each training:

- The training date, title and training duration;
- List of municipal attendees;
- Subjects covered during training

i) Maintenance of Control Measures: The permittee shall maintain all control measures, required by this permit in effective operating condition. The permittee shall keep documentation onsite that describes procedures and a regular schedule for preventative maintenance of all control measures and discussions of back-up practices in place should a runoff event occur while a control measure is off-line. Nonstructural control measures shall also be diligently maintained (e.g., spill response supplies available, personnel trained).

iii. The permittee shall conduct the following inspections:

1. Site Inspections: Inspect all areas that are exposed to stormwater and all stormwater control measures. Inspections shall be conducted at least once each calendar quarter. More frequent inspections may be required if significant activities are exposed to stormwater. Inspections shall be performed when the facility is in operation. At least one of the quarterly inspections shall occur during a period when a stormwater discharge is occurring.

The permittee shall document the following information for each facility inspection:

- The inspection date and time;
- The name of the inspector;
- Weather information and a description of any discharge occurring at the time of the inspection;
- Identification of any previously unidentified discharges from the site;
- Any control measures needing maintenance or repair;
- Any failed control measures that need replacement.
- Any SWPPP changes required as a result of the inspection.

If during the inspections, or any other time, the permittee identifies control measures that need repair or are not operating effectively, the permittee shall repair or replace them before the next anticipated storm event if possible, or as soon as practicable following that storm event. In the interim, the permittee shall have back-up measures in place.

The permittee shall report the findings from the Site Inspections in the annual report.

iv. The permittee must keep a written (hardcopy or electronic) record of all required activities including but not limited to maintenance, inspections, and training required by part 2.3.7.b.The permittee shall maintain all records associated with the development and implementation of the SWPPP required by this part consistent with the requirements of part 4.2.

3.0. Additional Requirements for Discharges to Surface Drinking Water Supplies and Their Tributaries

a. Permittees which discharge to public surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries should consider these waters a priority in the implementation of the SWMP.

b. Permittees should provide pretreatment and spill control measures to stormwater discharges to public drinking water supply sources or their tributaries to the extent feasible.

c. Direct discharges to Class A waters should be avoided to the extent feasible.

4.0. Program Evaluation, Record Keeping, and Reporting

4.1. Program Evaluation

a. The permittee shall annually self-evaluate its compliance with the terms and conditions of this permit and submit each self-evaluation in the Annual Report. The permittee shall also maintain the annual evaluation documentation as part of the SWMP.

b. The permittee shall evaluate the appropriateness of the selected BMPs in achieving the objectives of each control measure and the defined measurable goals. Where a BMP is found to be ineffective the permittee shall change BMPs in accordance with the provisions below. In addition, permittees may augment or change BMPs at any time following the provisions below:

- Changes adding (but not subtracting or replacing) components or controls may be made at any time.
- Changes replacing an ineffective or infeasible BMP specifically identified in the SWMP with an alternative BMP may be made as long as the basis for the changes is documented in the SWMP by, at a minimum:
    - An analysis of why the BMP is ineffective or infeasible;
    - Expectations on the effectiveness of the replacement BMP; and
    - An analysis of why the replacement BMP is expected to achieve the defined goals of the BMP to be replaced.

The permittee shall indicate BMP modifications along with a brief explanation of the modification in each Annual Report.

c. EPA or MassDEP may request the permittee to add, modify, repair, replace or change BMPs or other measures described in the annual reports as needed to satisfy the conditions of this permit.

Any changes requested by EPA or MassDEP will be in writing and may set forth the schedule for the permittee to develop the changes and may offer the permittee the opportunity to propose alternative program changes to satisfy the permit conditions..

4.2. Record Keeping

a. The permittee shall keep all records required by this permit for a period of at least five years. EPA may extend this period at any time. Records include information used in the development of any written (hardcopy or electronic) program required by this permit, any monitoring results, copies of reports, records of screening, follow-up and elimination of illicit discharges; maintenance records; inspection records; and data used in the development of the notice of intent, SWMP, SWPPP, and annual reports. This list provides examples of records that should be maintained, but is not all inclusive.

b. Records other than those required to be included in the annual report, part 4.4, shall be submitted only when requested by the EPA or the MassDEP.

c. The permittee shall make the records relating to this permit, including the written (hardcopy or electronic) stormwater management program, available to the public. The public may view the records during normal business hours. The permittee may charge a reasonable fee for copying requests. The permittee is encouraged to satisfy this requirement by posting records online.

4.3. Outfall Monitoring Reporting

a. The permittee shall monitor and sample its outfalls at a minimum through sampling and testing at the frequency and locations required in connection with IDDE screening under part 2.3.4.7.b. and 2.3.4.8.c.ii.2. The monitoring program may also include additional outfall and interconnection monitoring as determined by the permittee in connection with assessment of SWMP effectiveness pursuant to part 4.1; evaluation of discharges to water quality limited waters pursuant to part 2.2; assessment of BMP effectiveness pursuant to part 2.2 or 2.3; or otherwise.

b. The permittee shall document all monitoring results each year in the annual report. The report shall include the date, outfall or interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results of all analyses. The annual report shall include all of this information and data for the current reporting period and for the entire permit period.

c. The permittee shall also include in the annual report results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period where that data is being used by the permittee to inform permit compliance or program effectiveness. If such monitoring or studies were conducted on behalf of the permittee, or if monitoring or studies conducted by other entities were reported to the permittee, a brief description of the type of information gathered or received shall be included in the annual report(s) covering the time period(s) the information was received.

4.4. Annual Reports

a. The permittee shall submit annual reports each year of the permit term. The reporting period will be a one year period commencing on the permit effective date, and subsequent anniversaries thereof, except that the first annual report under this permit shall also cover the period from May 1, [year of

final permit effective date] to the permit effective date. The annual report is due ninety days from the close of each reporting period.

b. The annual reports shall contain the following information:

i. A self-assessment review of compliance with the permit terms and conditions.

ii. An assessment of the appropriateness of the selected BMPs.

iii. The status of any plans or activities required by part 2.1 and/ or part 2.2, including:

- Identification of all discharges that do not meet applicable water quality standards;
- For discharges subject to TMDL related requirements, identification of specific BMPs used to address the pollutant identified as the cause of impairment and assessment of the BMPs effectiveness at controlling the pollutant (part 2.2.1. and Appendix F) and any deliverables required by Appendix F;
- For discharges to water quality limited waters a description of each BMP required by Appendix H and any deliverables required by Appendix H.

iv. An assessment of the progress towards achieving the measurable goals and objectives of each control measure in part 2.3 including:

- Evaluation of the public education program including a description of the targeted messages for each audience; method of distribution and dates of distribution; methods used to evaluate the program; and any changes to the program.
- Description of the activities used to promote public participation including documentation of compliance with state public notice regulations.
- Description of the activities related to implementation of the IDDE program including: status of the map; status and results of the illicit discharge potential ranking and assessment; identification of problem catchments; status of all protocols described in part 2.3.4.(program responsibilities and systematic procedure); number and identifier of catchments evaluated; number and identifier of outfalls screened; number of illicit discharges located; number of illicit discharges removed; gallons of flow removed; identification of tracking indicators and measures of progress based on those indicators; and employee training.
- Evaluation of the construction runoff management including number of project plans reviewed; number of inspections; and number of enforcement actions.
- Evaluation of stormwater management for new development and redevelopment including status of ordinance development (2.3.6.a.ii.), review and status of the street design assessment(2.3.6.b.), assessments to barriers to green infrastructure (2.3.6.c), and retrofit inventory status (2.3.6.d.)
- Status of the O&M Programs required by part 2.3.7.a.
- Status of SWPPP required by part 2.3.7.b. including inspection results.
- Any additional reporting requirements in part 3.0.

v. All outfall screening and monitoring data collected by or on behalf of the permittee during the reporting period and cumulative for the permit term, including but not limited to all data collected pursuant to part 2.3.4. The permittee shall also provide a description of any additional monitoring data received by the permittee during the reporting period.

vi. Description of activities for the next reporting cycle.

vii. Description of any changes in identified BMPs or measurable goals.

viii. Description of activities undertaken by any entity contracted for achieving any measurable goal or implementing any control measure.

c. Reports shall be submitted to EPA at the following address:

United State Environmental Protection Agency
Stormwater and Construction Permits Section (OEP06-1)
Five Post Office Square, Suite 100
Boston, MA 02109

Massachusetts Department of Environmental Protection
One Winter Street – 5th Floor
Boston, MA 02108
ATTN: Frederick Civian

Or submitted electronically to EPA at the following email address: stormwater.reports@epa.gov. After December 21, 2020 all Annual Reports must be submitted electronically.

5.0. Non-Traditional MS4s

Non-traditional MS4s are MS4s owned and operated by the Commonwealth of Massachusetts, counties or other public agencies within the Commonwealth of Massachusetts, and properties owned and operated by the United States (Federal Facilities) within the Commonwealth of Massachusetts. This part addresses all non-traditional MS4s except MS4s that are owned or operated by transportation agencies, which are addressed in part 6.0 below.

5.1. Requirements for Non-Traditional MS4s

All requirements and conditions of parts 1 – 4 above apply to all Non-traditional MS4s, except as specifically provided below:

5.1.1. Public education

For the purpose of this permit, the audiences for a Non-traditional MS4 include the employees, clients and customers (including students at education MS4s), visitors to the property, tenants, long term contractors and any other contractors working at the facility where the MS4 is located. The permittee may use some of the educational topics included in part 2.3.2.d. as appropriate, or may focus on topics specific to the MS4. The permittee shall document the educational topics for each target audience in the SWMP and annual reports.

5.1.2. Ordinances and regulatory mechanisms

Some Non-traditional MS4s may not have authority to enact an ordinance, by-law, or other regulatory mechanisms. MS4s without the authority to enact an ordinance shall ensure that written policies or procedures are in place to address the requirements of part 2.3.4.5., part 2.3.4.6 and part 2.3.6.a.

5.1.3. Assessment of Regulations

Non-traditional MS4s do not need to meet the requirements of part 2.3.6.c.

5.1.4. New Dischargers

New MS4 facilities are subject to additional water quality-based requirements if they fall within the definition of "new discharger" under 40 CFR § 122.2: "A new discharger is any building, structure, facility or installation (a) from which there is or may be a 'discharge of pollutants' (b) that did not commence the 'discharge of pollutants' at a particular 'site' prior to August 13, 1979; (c) which is not a 'new source'; and (d) which never received a finally effective NPDES permit for discharges at that 'site.' The term "site" is defined in § 122.2 to mean "the land or water area where any 'facility or activity' is physically located or conducted including adjacent land used in connection with the facility or activity."

Consistent with these definitions, a Non-traditional MS4 is a "new discharger" if it discharges stormwater from a new facility with an entirely new separate storm sewer system that is not physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

Any Non-traditional MS4 facility that is a "new discharger" and discharges to a waterbody listed in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride (Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants, is not eligible for coverage under this permit and shall apply for an individual permit.

Any Non-traditional MS4 facility that is a "new discharger" and discharges to a waterbody that is in attainment is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for new discharges where appropriate[12]. Any authorization of new discharges by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies additional conditions or requirements, then those requirements are incorporated into this permit by reference. The permittee must comply with all such requirements.

5.1.5 Dischargers Subject to Appendix F Part A.I

Those dischargers not identified in Appendix F Table F-2 or Table F-3 discharging to waterbodies in the Charles River Watershed or to an MS4 that discharges to a waterbody in the Charles River Watershed shall coordinate with the municipality in which they are located to facilitate compliance

[12] Contact MassDEP for guidance on compliance with 314 CMR 4.04

with the phosphorus reduction applicable to the municipality. In each annual report the permittee shall indicate planned phosphorus reduction activities on site and coordination progress with the municipality. In addition, the year 4 annual report shall contain the following information:

a. Estimated current impervious area of permittee owned property,
b. Land Use information for permittee owned property,
c. Phoshorus removal in pounds per year for any structural BMP owned by the permittee, calculated in accordance with Appendix F Attachment 3
d. Date of last maintenance activity for all structural BMPs for which phosphorus removal is calculated

6.0 Requirements for MS4s Owned or Operated by Transportation Agencies

This part applies to all MS4s owned or operated by any state or federal transportation agency (except Massachusetts Department of Transportation –MassDOT- Highway Division, which is subject to a separate individual permit). All requirements and conditions of this permit apply with the following exceptions:

6.1 Public education

For the purpose of this permit, the audiences for a transportation agency education program include the general public (users of the roadways), employees, and any contractors working at the location. The permittee may use some of the educational topics included in part 2.3.2.d. as appropriate, or may focus on topics specific to the agency. The permittee shall document the educational topics for each target audience.

6.2 Ordinances and regulatory mechanisms

The transportation agency may not have authority to enact an ordinance, by-law or other regulatory mechanisms. The agency shall ensure that written agency policies or procedures are in place to address the requirements of part 2.3.4.5., part 2.3.4.6 and part 2.3.6.a.

6.3 Assessment of regulations

Non-traditional MS4s do not need to meet the requirements of part 2.3.6.c.

6.4 New Dischargers

New MS4 facilities are subject to additional water quality-based requirements if they fall within the definition of "new dischargers" under 40 CFR § 122.2: "A new discharger is any building, structure, facility or installation (a) from which there is or may be a 'discharge of pollutants' (b) that did not commence the 'discharge of pollutants' at a particular 'site' prior to August 13, 1979; (c) which is not a 'new source'; and (d) which never received a finally effective NPDES permit for discharges at that 'site.' The term "site" is defined in § 122.2 to mean "the land or water area where any 'facility or activity' is physically located or conducted including adjacent land used in connection with the facility or activity."

Consistent with these definitions, a new transportation MS4 is a "new discharger" if it discharges stormwater from a new facility with an entirely new separate storm sewer system that is not physically located on the same or adjacent land as an existing facility and associated system operated by the same MS4.

Any transportation MS4 facility that is a "new discharger" and discharges to a waterbody listed as impaired in category 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b) due to nutrients (Total Nitrogen or Total Phosphorus), metals (Cadmium, Copper, Iron, Lead or Zinc), solids (TSS or Turbidity), bacteria/pathogens (E. Coli, Enteroccus or Fecal Coliform), chloride

(Chloride) or oil and grease (Petroleum Hydrocarbons or Oil and Grease), or discharges to a waterbody with an approved TMDL for any of those pollutants, is not eligible for coverage under this permit and shall apply for an individual permit.

Any transportation MS4 facility that is a "new discharger" and discharges to a waterbody that is in attainment is subject to Massachusetts antidegradation regulations at 314 CMR 4.04. The permittee shall comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for new discharges where appropriate[13]. Any authorization of new discharges by MassDEP shall be incorporated into the permittee's SWMP. If an applicable MassDEP approval specifies additional conditions or requirements, then those requirements are incorporated into this permit by reference. The permittee must comply with all such requirements.

6.5 Dischargers Subject to Appendix F Part A.I

Those dischargers not identified in Appendix F Table F-2 or Table F-3 discharging to waterbodies in the Charles River Watershed or to an MS4 that discharges to a waterbody in the Charles River Watershed shall coordinate with the municipality in which they are located to facilitate compliance with the phosphorus reduction applicable to the municipality. In each annual report the permittee shall indicate planned phosphorus reduction activities on site and coordination progress with the municipality. In addition, the year 4 annual report shall contain the following information:

a. Estimated current impervious area of permittee owned property,
b. Land Use information for permittee owned property,
c. Phosphorus removal in pounds per year for any structural BMP owned by the permittee, calculated in accordance with Appendix F Attachment 3,
d. Date of last maintenance activity for all structural BMPs for which phosphorus removal is calculated

[13] Contact MassDEP for guidance on compliance with 314 CMR 4.04

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 11

(1) PROJECT NAME: Priority Drainage Headwall Replacements FY24 and FY27

PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

This project will fund the repair and rehabilitation of drainage headwalls. This is anticipated to be a multi-year project and this funding request is for the first phase of work which focuses on the damaged headwalls with the highest consequences of failure. The DPW plans to repair or replace 6 to 9 headwalls per year, prioritized by highest risk of structural failure and largest need for improved water quality. The headwalls that are intended to be included in this project are: in the vicinity of the Framingham High School, Simpson Dr, and Fenway Dr which directly discharge to the Sudbury River; in the vicinity of Edgewater Dr which direcltly discharge to Framingham Reservoir #1; near Hollis St which directly discharges to Lake Waushakum; and in the vicinity of Maple Lane which directly discharges to Baiting Brook. Repairing and replacing failing headwalls will improve public safety. Failing headwalls are not just unsightly, the damaged infrastructure can result in drainage problems that can cause localized flooding and property damage. Additionally, erosion around failing headwalls can also cause property damage and are a source of water pollution. Over 16 headwalls were identified by recent field investigation as currently failing and over a dozen more need significant repair.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) PURPOSE OF PROJECT:

x	Replace existing infrastructure
x	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
x	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	100,000			162,000		
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	100,000	-	-	162,000	-	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							

Operating							

(7) PROPOSED FUNDING SOURCE(S):

1) **Bond**
2)
3)

(10) PROJECT OR EQUIPMENT LOCATION:

See description

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

Priority Drainage Headwalls – FY24 Capital Project Submission – Framingham Public Works



Existing structure conditions at Maple Lane.



Headwall on Simpson Drive at Saxonville Pond.



Headwall near Framingham High School at the Sudbury River.



Headwall at Reservoir 1 at Edgewater Drive.

Culvert Assessment and Prioritization Report

Framingham, MA

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MARCH 2021

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Executive Summary

The City of Framingham (the City) contracted VHB to perform an assessment of city-owned culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. The project was deemed necessary because culvert failures have the potential to significantly impact traffic, public safety, and cause property damage. In addition, many culverts throughout the City do not meet the latest environmental standards for stream crossing, resulting in poor aquatic passage and environmental health, as well as insufficient hydraulic capacity which can cause flooding impacts. While there are privately-owned culverts and culverts owned by other government agencies within the city's boundary, the project evaluated only city-owned culverts, as the City of Framingham is responsible for their maintenance as well as impacts associated with culvert failures.

VHB performed the field assessments of city-owned culverts from January 2020 through March 2021 evaluating various culvert criteria. The City created electronic work orders for each culvert, via the VUEworks asset management software and VHB performed field assessments and desktop review at each culvert location. All assessment data and pictures were collected electronically using the City's work order system. As part of the field and office review, VHB identified specific culverts that were difficult to evaluate due to poor visibility. These poor visibility culverts were then revisited and evaluated using CCTV in order to collect additional assessment data.

VHB and the City created a scoring matrix to assist in the prioritization of culverts. This scoring matrix created a "Risk Score" for each culvert assessed that incorporated the data collected as well as additional criteria including roadway classification and watershed area. High-level cost estimates were then developed for the ten (10) culverts which received the highest risk score.

- In summary, VHB evaluated a total of 98 culverts and gave them overall ratings of "adequate", "poor," or "critical" based on the conditions of individual culvert components and the potential impact of culvert failure at each location. The ratings generally were defined as:
  - Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.
  - Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
  - Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

› As previously stated, the evaluation included 98 city-owned culverts. Of the evaluated culverts, the following results were found:

Condition	Number of Culverts
Critical	9
Poor	33
Adequate*	56
Total (City-owned Culverts)	98

*Millwood Street culvert (Asset ID 2511576) was recently replaced and is assumed to be adequate.

Culverts rated poor and critical have the potential to impact adjacent infrastructure or property. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway.

- Culvert conditions, risk scores and locations are viewable in an ArcGIS Online dashboard (https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a) and Figure 7 in the report.

› Culverts were evaluated for actions that require immediate action including debris and vegetation blockage, critical scour and erosion, and unstable structures. The following results were found:

Immediate Action Item	Number of Culverts
Debris/Vegetation Blockage*	22
Critical Scour/Erosion	0
Unstable Structure	8

*There were 5 culverts where blockage was the only issue

› The conditions of the culvert and the culvert parts, such as footings, joints and seams, and headwalls, were used to develop a risk score for all evaluated culverts to determine culverts with the highest risk of failure. High-level cost estimates, which can be seen in Appendix 4, were then developed for the ten (10) culverts which received the highest risk score. The ten culverts which received the highest risk scores were the 9 critical culverts and the Fountain St (Asset ID:2506913) culvert, which was rated poor.

› The highest scored culverts and their associated cost estimates are:

High Risk Culverts and Cost Estimates

Risk Score	Asset ID	Approximate Location	Summary of Condition	Approximate Replacement Cost and Resolution	
83.0	2505652	172 Hartford St	Collapsed stone culvert causing blockage	$755,000	Concrete culvert
77.0	2511942	82 Herbert St	Collapsed stone culvert and sediment causing blockage	$285,000	Concrete culvert
76.2	2515114	65 Bates Rd	Severe deterioration and crushing of corrugated metal pipes	$1,067,000 $273,000	20’ Bridge or Open Channel
75.1	2506907	15 Gates St	Severe deterioration of corrugated metal pipe and outlet control structure	$988,000	Concrete culvert
74.3	2511788	38 Wayside Inn Rd	Unstable stone structure and embankment erosion	$303,000	Concrete culvert
71.3	2511831	704 Salem End Rd	Unstable stone structure with partial roof collapse	$964,000	Concrete culvert
71.1	2511778	93 Parmenter Rd	Collapsed stone culvert causing blockage	$244,000	Concrete culvert
69.2	2506912	14 Badger Rd	Severe blockage caused by collapsed stone headwalls	$449,000	Concrete culvert
61.5	2506913	250 Fountain St	Significant debris blockage and unstable headwall	$412,000	Concrete culvert
60.3	2511728	43 Garvey Rd	Displaced outlet control structure	$228,000	Outlet control structure only

› Flooding occurs in areas throughout the City:

- Several culverts and channels need routine maintenance. This includes channel clearing, dredging and blockage removal. These maintenance items are likely contributing to flooding issues.
- In other areas flooding is complex and likely requires further evaluation and study to evaluate alternatives for improvements

› VHB provides the following recommendations:

- The City should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- The City should develop a city-specific inspection frequency of culverts; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City’s Department of Public Works should address “immediate actions” flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity.
- For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

1

Introduction

The City of Framingham (the City) contracted VHB to perform an assessment of culverts to evaluate their condition and create a prioritization for repairs in order to extend the service life of these culverts and prevent potential failures. The project's goals are to identify culverts with poor structural integrity, create a scoring matrix to identify risk of each culvert, prioritize culverts for improvements, and develop cost estimates for high priority culverts.

In summary this report will:

- Describe background information including the City's GIS database, culvert evaluation methodology, data collection methods, and CCTV evaluation,
- Present data from field evaluations,
- Identify locations with known flooding issues,
- Provide a prioritization of improvements of culverts based on their risk score, and
- Provide cost estimates to perform repairs and replacements for high risk culverts.

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2

Background Information

A culvert is defined as a structure that conveys a stream, river, or channel under a road or railway to allow the stream to maintain its natural flow path without flooding or damaging the surrounding roadway infrastructure. For the purposes of this assessment, a stream crossing was considered a culvert if the span of the crossing was less than 10 feet in width. Crossings with spans of 10 feet or greater are considered bridges by the Massachusetts Chapter 85 regulations and are subject to additional regulations and require certified bridge inspectors. Bridges were not included in this report.

This section details the City's existing GIS data, the culvert evaluation criteria, and field collection processes used for the culvert assessments.

City of Framingham GIS Database

The City of Framingham's culvert and stormwater drainage data is currently stored electronically in a Geographic Information Systems (GIS) geodatabase. The City's geodatabase stores the culvert and drainage data geospatially, based on their location. Each culvert, catch basin, pipe, manhole and outlet are stored as unique assets in the geodatabase. Each unique asset has attributes associated with it, providing details on the structure's characteristics such as length, shape, material, year installed, and a unique identifier. VHB found that some culverts are further broken up into separate assets depending on length, layout, or material changes in the culverted segment. An example is a culvert that is stone at the upstream opening and concrete in the downstream section. Such a culvert may be in GIS as two separate assets, one for the upstream segment, with the material described as "Stone" and one for the downstream segment, with the material as

"Concrete". For culvert evaluations at a location with multiple assets, this report names the asset whose AssetID was populated in the associated work order. VHB did a high-level review of the culvert data confirming no duplicate work orders, culverts were city-owned, and assets were associated with each work order, though VHB relied on the accuracy of culvert asset attributes provided by the City to complete the culvert assessments.

The data is accessible to VHB through the City's VUEWorks web application and the VUEWorks MobileVue mobile application. VHB was assigned 98 work orders by the City in VUEWorks to evaluate 155 of the City's culvert assets. Each work order has an associated culvert asset or assets, depending on potential segmentation in the GIS data, as described above. For example, one work order may have 3 culvert assets associated with it because the culvert is composed of 3 segments with different materials and there is a separate asset for each material segment. Because the three assets compose one culvert crossing, they are included in the same work order. The work order evaluation considers the condition of each asset that composes the total culvert and bases the overall culvert condition on the condition of the multiple parts of the culvert. The notes section of the work order was used to describe conditions of the individual assets if the conditions varied significantly. While the culvert asset includes attributes to describe constant characteristics, the work orders are where the field assessment data is recorded. The work order data records condition information at the time of the field visit. Fifteen assessment locations were initially included in the assigned work orders but were found to be previously included in the 2013 Bridge Master Plan. Prior to learning the locations were bridges and were included in the Bridge Master Plan, VHB completed field inspections on 9 of the locations. These locations were not included in the findings of this report as they have been previously evaluated. VHB also did not include a potentially collapsed culvert (Asset ID 2511576) on Millwood Street, directly south of Callahan State Park South Entrance. This culvert was evaluated by the developer of a nearby development and has been replaced as of September 29, 2020.

Culvert Evaluation Methodology

Prior to the start of VHB's culvert assessments, the City of Framingham had completed 37 culvert assessments within the City. The City's assessments and their workorder template were based upon the "Culvert Condition Assessment Manual"[1] 2017 Edition. Since the development of this 2017 Assessment Manual, subsequent culvert assessment guidance has been developed by Massachusetts Department of Transportation (MassDOT) and the recently released (August 2020) American Association of State Highway and Transportation Officials (AASHTO) Culvert and Storm Drain System Inspection Guide[2]. VHB and the City of Framingham project manager and stormwater engineer worked with the City's GIS group to update the previously used rating system to incorporate the applicable evaluation criteria

1 The Center for Agriculture, Food, and the Environment, North Atlantic Aquatic Connectivity Collaborative, The Nature Conservancy, and UMass Amherst Transportation Center. "Culvert Condition Assessment Manual". https://streamcontinuity.org/sites/streamcontinuity.org/files/pdf-doc-ppt/CulvertManual_2019_082919.pdf

2 AASHTO, Culvert and Storm Drain System Inspection Guide, 1st Edition, 2020. https://aashtojournal.org/2020/08/14/aashto-releases-culvert-storm-drain-inspection-guide/

from the new MassDOT and initial AASHTO guidance into a new work order template. The fields that were added to the new work order template include:

Features

- Channel Width Upstream
- Channel Width Downstream
- Depth to Roadway

Condition

- Evidence of flooding
- Embankment erosion

Immediate Action Items

- Debris/Vegetation Blockage
- Structure Unstable
- Critical Scour/Erosion

The new work order template was created in VUEWorks (Appendix 5) to balance the need to efficiently evaluate nearly one hundred culverts while obtaining sufficient condition information in order to properly prioritize culvert repairs. VHB reevaluated the 37 previously evaluated culverts as part of the city-wide assessments using the updated assessment criteria to create consistency across all evaluated culverts and allow for a consistent ranking methodology. VHB evaluated the following criteria of each culvert:

General Criteria

- **Channel Width Downstream/Upstream:** These fields document the average width of the stream channel, in feet, upstream and downstream of the culvert.
- **Culvert Shape:** The shape of the culvert
- **Culvert Size:** Size of the culvert. For circular culverts, the width field was used to document the diameter, in inches. For rectangular or ellipse culverts, height and width were documented in the appropriate field
- **Culvert Material:** Material the length of culvert is composed of.
- **Number of Culvert Crossings:** Number of culvert pipes at the crossing location.
- **Depth to Roadway:** Depth from the top of the culvert opening to the roadway surface above.
- **Inlet Grade:** Describes if the upstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Outlet Grade:** Describes if the downstream end of the culvert invert is buried under sediment, debris, or vegetation, level to the streambed, or perched above the streambed with separation between with culvert invert and the streambed.
- **Inlet Type:** Describes the type of structure present at the upstream end of the culvert.

- **Outlet Type:** Describes the type of structure present at the downstream end of the culvert.
- **Roadway Condition:** Describes the condition of the roadway directly above the culvert through visual evaluation of cracking or sinking.
- **Overall Culvert Condition:** Overall condition of the culvert considering the condition of all individual parts of the culvert evaluated

Structural Criteria

- **Headwall/Wingwall:** Condition of the headwall/wingwall, if present, structure depending on visual evidence of cracking, spalling, exposed rebar, and settlement of structure.
- **Footings:** Condition of the culvert footing, if present.
- **Invert Deterioration:** Condition of the culvert's bottom material, if not an open bottom culvert. Condition assessment considers evidence of corrosion, perforations, spalling, etc. depending on visual evidence of cracking, weathering, settlement or undermining.
- **Buoyancy or Crushing:** Degree to which the culvert has been deformed by the weight of the pipe, weight of the fill material above the pipe or the weight of the water in the pipe.
- **Cross-Section Deformation:** Degree to which the culvert is deformed or distorted resulting in flattening of the invert and/or crown of the pipe.
- **Structural Integrity of Barrel:** Condition of the culvert barrel depending on the presence of cracking and deterioration around bolts and seam or tearing of material.
- **Level of Blockage:** Degree of debris, sediment, or vegetation blockage of the interior of the culvert.
- **Utility Encroachment:** If other utilities are within or adjacent to the culvert crossing that would require additional coordination if work was to be performed on the culvert.
- **Joints and Seams:** Condition of the joints and seams, if present, based on visual evidence of separation of joints and seams.

Hydrology/Hydraulic Criteria

- **Longitudinal Alignment:** the angle measured from the upstream channel to the centerline of the culvert barrel at the culvert opening.
- **Embankment Erosion:** If there is evidence of erosion from the ground material surrounding the culvert.
- **Embankment Piping:** If there is presence of water seeping through the culvert barrel into the surrounding embankment material
- **Evidence of Flooding:** If there is evidence the stream bank has flooded, including debris lines or discoloration on trees.
- **Apron/Scour Protection:** Condition of the apron or scour protection, if present, based on evidence of undermining of culvert, deterioration of joint between apron and headwall, and presence of a scour hole downstream of the apron.

- **Armoring:** This field was used in the field evaluation to document the presence of scour at the culvert.

Immediate Maintenance Items

Evidence of the following are noted to require immediate action:

- **Critical Scour/Erosion:** Presence of scour or erosion that creates an immediate hazard.
- **Debris/Vegetation Blockage:** Presence of vegetation or debris that blocks the culvert opening, creating an immediate flooding hazard.
- **Structure Unstable:** If the structure's condition is unstable and could cause an immediate collapse of the culvert.

Culvert shape, size, and material fields required text or numerical descriptions for their responses. All other criteria above utilized set domains for responses with either a check box for a "yes" or "no" domain or a domain of "adequate", "poor", "critical", and "N/A" to describe the culvert criteria's condition. To create consistency across all culvert assessments and with varying team members performing the assessments, VHB followed the Culvert Assessment Manual Methodology to assign ranking to each criteria included in the field assessments.

Collection Methods

The City of Framingham created and assigned work orders for each assessment location using the City's VUEWorks account. VHB collected data in the field using the VUEWorks MobileVue mobile application (Figure 1). Utilizing the mobile application allowed for streamlined data management, with data, both evaluations and photographs, being loaded directly from the mobile application into the City's geodatabase and associated with the culvert assets.

All culvert assessments were evaluated by two-person teams consisting of one water resource engineer and one structural engineer to evaluate the culverts for performance and functionality from both the hydrologic and structural perspectives. Culvert assessments were completed between January 2020 and March 2021. VHB's field teams provided details about criteria rated poor or critical in the "notes" field of the culvert's assessment and included additional pictures to show the poor or critical feature.

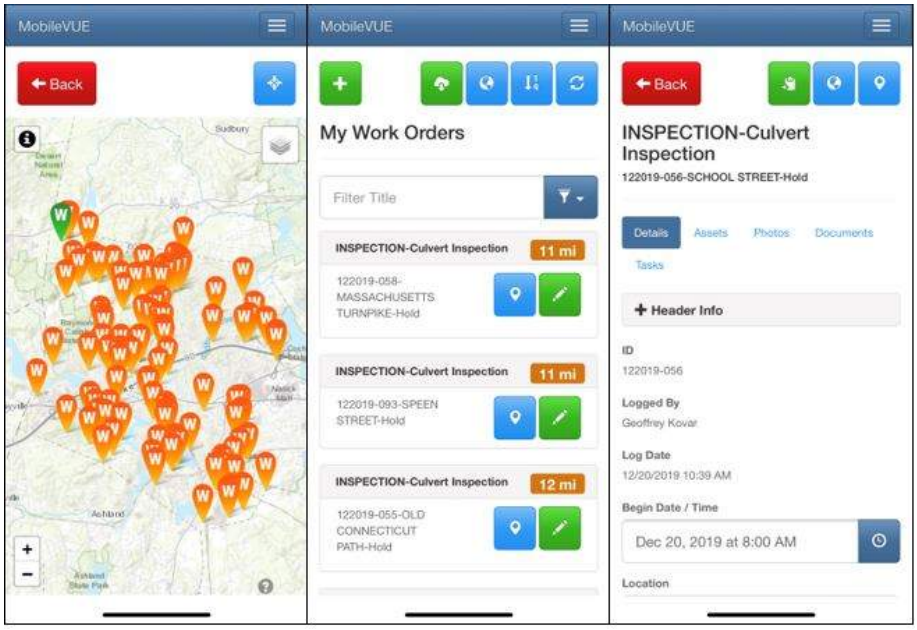


Figure 1 Screenshots of the VUEWorks MobileVUE application

In addition to the above criteria evaluated in the field, VHB also found the watershed area to each culvert using U.S. Geological Survey (USGS) StreamStats[3] web application for available streams and the roadway functional classification at each culvert using the MassDOT Roadway Inventory[4] web application. Both the criteria collected in the field and the criteria supplemented through the above web applications were used in ranking the risk of failure for each culvert.

At the completion of each field assessment, VHB's field staff updated the culvert's work order status from "Open" to "Hold" to signify the field evaluation was completed and allow VHB's office staff to perform a quality review of the data collected. The quality reviewers utilized the photos attached to the culvert assessment in the VUEWorks web application to determine if the assigned criteria aligned with what was visible in the photos. Once final review was complete, the work order statuses were set to "Closed". In the VUEWorks web application, users can access the work orders by selecting "Find / Manage / Report" under "Work Orders" in the left pane of the map viewer. Once the "Manage Work Order" pop-up appears, the user can filter by setting Department to be "Engineering", Program to "Inspection", Activity Description to "Culvert Inspection" and Status to "Closed". Once the filter is applied, the list of work orders is shown under the "Table View" tab. When a work order is selected in the "Table View" tab the details of the work order are viewable under the "Form View" tab, photos are saved under the "Documents" subtab. A specific asset can also be viewed by selecting "Find/Manage/Report" under "GIS Assets" in the left pane of the map viewer. Once the "GIS Assets" pop-up appears populated the field "Table / Layer" with "Drain Pipe", set "Field" to "ASSETID", "Operator" to "Equal To" and type the culvert's Asset ID

3 U.S. Geological Survey (USGS). StreamStats: Streamflow Statistics and Spatial Analysis Tools for Water Resource Applications. https://www.usgs.gov/mission-areas/water-resources/science/streamstats-streamflow-statistics-and-spatial-analysis-tools?qt-science_center_objects=0#qt-science_center_objects

4 Massachusetts Department of Transportation. Roadway Inventory Web Application. https://gis.massdot.state.ma.us/roadinventory/

referenced in this report into the fourth box and "Apply Filter". The reviewers noted if additional data or photos were needed from the field. If additional information was needed, VHB's field staff revisited the culvert location and updated the evaluation form with the additional information. In addition to revisiting structures for additional information, all critical structures were revisited with a senior engineer and utility engineer to review potential constructability issues.

CCTV Evaluation

Through field culvert evaluations and office review, VHB identified culvert locations where the inside of the culvert couldn't be fully evaluated due to length, alignment, or high-water levels. These culverts were identified as locations to perform video evaluations using closed circuit television (CCTV) cameras to record the inside of the culvert where the structure's condition was not visible in the field. Twenty-one culverts were identified to have a CCTV evaluation be performed (Table 1). Nine (9) of the culverts were identified as having high-water levels that would require dewatering of the culvert prior to performing the CCTV evaluation.

Table 1 Culvert Locations for CCTV Evaluation

Culvert Work Order	Asset ID	Nearby Address	Dewatering Needed
122019-087	2511831	704 Salem End Road	No
122019-088	2511840	635 Salem End Road	No
122019-054	2508317	121 A Street	No
122019-045	2517849	45 Leland Street	Yes
122019-078	2511681	132 Millwood Street	No
122019-080	2511778	68 Parmenter Road	No
122019-060	2506913	250 Fountain Street	No
122019-052	2508663	118 Howe Street	Yes
122019-051	2508218	183 Wilson Street	Yes
122019-113	2511638	3 Chicatawbut Road.	No
122019-032	2501693	106 Dudley Road	Yes
122019-102	2511205	7 Sloane Drive	Yes
122019-070	2511187	20 Knight Road	Yes
122019-077	2511660	33 Grove Street	Yes
122019-120	2511130	4 Frost Street	Yes
122019-119	2511122	10 Scott Drive	No
122019-083	2511788	689 Edmands Road	No
122019-095	2511577	155 Millwood Street	No
122019-114	2520964	6 Lyman Way	No
122019-124	2508880	26 Hickory Hill Lane	No
122019-027	2505652	172 Hartford Street	Yes
		Total # of Culverts =	21

VHB coordinated with the City of Framingham Conservation Commission and was administratively approved for CCTV evaluations to be performed within jurisdictional areas. VHB subcontracted Truax Corporation to complete the CCTV evaluations. All CCTV evaluation were completed between July and September 2020 by Truax with a VHB engineer present. Once CCTV video was collected in the field, Truax provided VHB with the culvert videos and summary of the evaluations. The CCTV evaluations resulted in some minor updates to culvert dimensions and material as well as providing additional information about the culvert condition that allowed VHB to more accurately evaluate the culvert. The final condition ratings and risk scores for culverts which received CCTV incorporate the conditions found during CCTV.

3

Culvert Evaluation Summary

VHB completed the field assessments of culverts at 98 locations in the City from January 2020 to March 2021. The data collected during the field evaluations was reviewed in the office by VHB to confirm completeness of the evaluation and accuracy of the conditions assigned to each culvert and its parts. CCTV video evaluation was performed on culverts which were not able to be fully evaluated during the initial field evaluation due to inability to see the interior condition of the culvert.

Findings of Assessment

Upon review of the collected data, 56 culverts were rated and received overall culvert conditions of "Adequate", 33 culverts were rated as "Poor", and 9 culverts were rated as "Critical" (Figure 2). As noted above, the Millwood Street culvert (Asset ID 2511576) has been replaced as of September 2020. The new culvert is assumed to be in adequate condition. For the individual parts of the culvert that were evaluated, the differences between adequate, poor, and critical were defined in the NAACC Culvert Condition Assessment Manual. The overall condition ratings used for the field assessments were determined based on the condition of the individual parts and engineering judgment. The overall condition ratings are defined as:

- Adequate: The overall condition of the culvert is an acceptable condition exhibiting no observed significant deficiencies and the culvert is performing adequately. Regular inspection frequency is recommended to monitor changes in condition.

- Poor: The culvert is exhibiting significant deficiencies of one or more of its components and its performance may be partially impaired, but the findings were not critical. Increased inspection frequency is necessary.
- Critical: One or more key components of the culvert are exhibiting partial or complete failures that significantly impair the culvert's performance or impact adjacent infrastructure or property. Maintenance and repair efforts are required to mitigate current and potential impacts. Frequent inspections and monitoring is necessary until mitigations are completed.

All culverts and their evaluation results are detailed in the following graphics and are also available in to view interactively via the ArcGIS Online Dashboard at https://vhb.maps.arcgis.com/apps/opsdashboard/index.html#/d78585b8a8454c069d1647d166036e9a. The online Dashboard allows the data to be shown geospatially, allowing the user to see where the culvert is located within the city. The Dashboard also symbolizes culverts by their overall condition and allows you to click on the culvert to view the complete results from the field evaluation as well as their final risk scores.

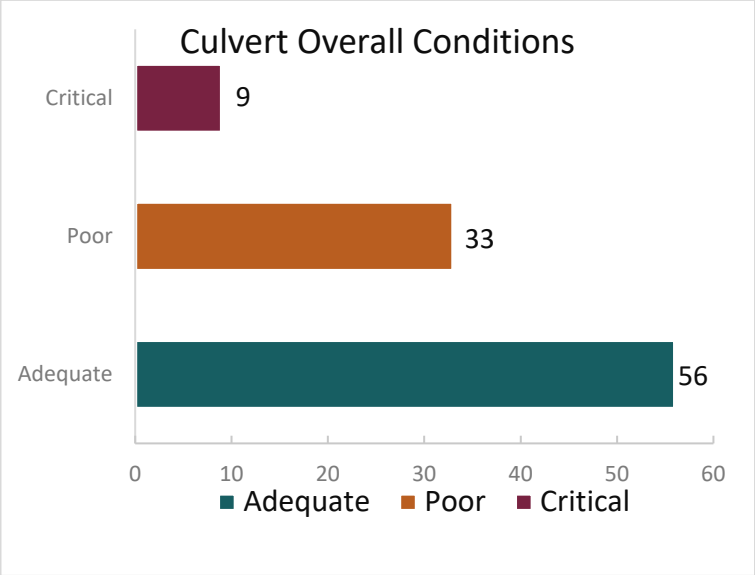


Figure 2 Culvert Overall Conditions

In addition to culverts receiving an overall condition rating, the culverts were evaluated for condition of 12 individual parts of each culvert, if applicable to the culvert. Overall, the City's culverts were found to be mostly in adequate condition. Condition ratings for "Headwall/Wingwalls" and "Level of Blockage" had the most poor and critical conditions of the culvert parts. Debris and vegetation blockage was also found to be the most needed immediate action item.

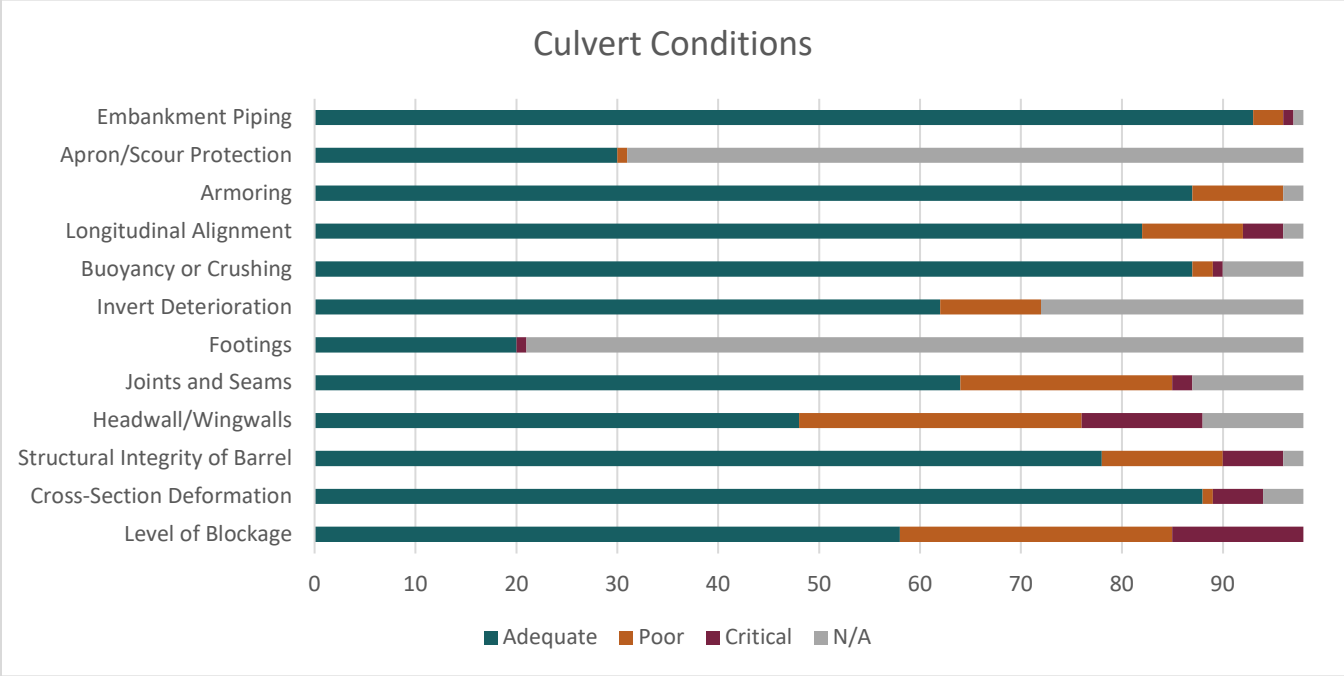


Figure 3 Culvert Conditions

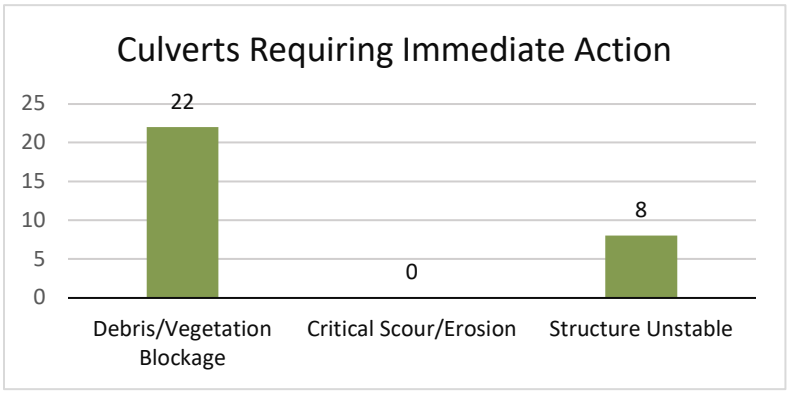


Figure 4 Culverts Requiring Immediate Action

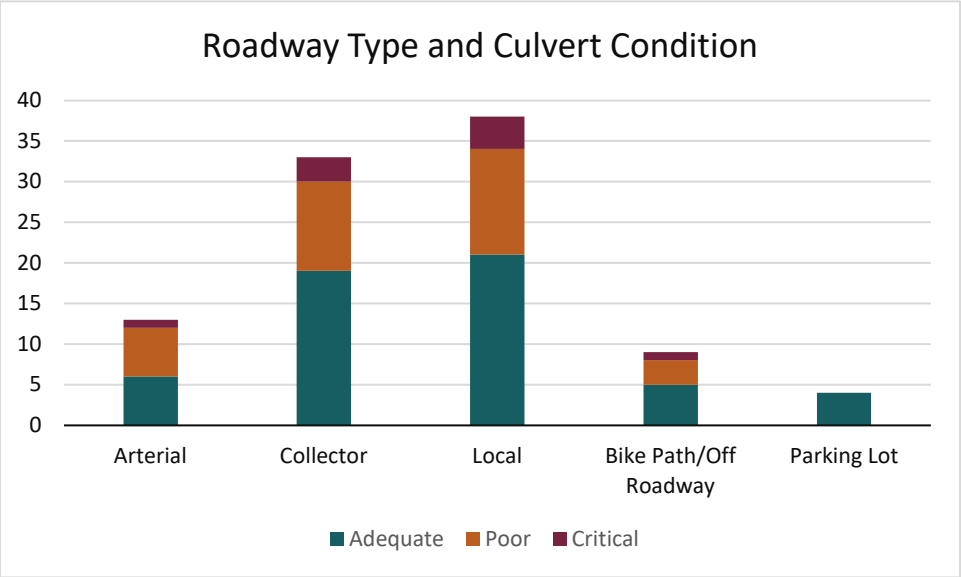


Figure 5 Culvert Condition by Roadway Type

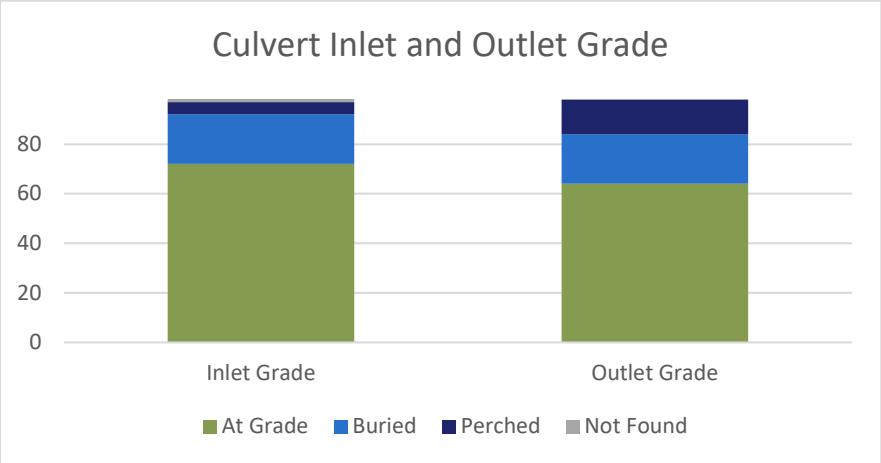
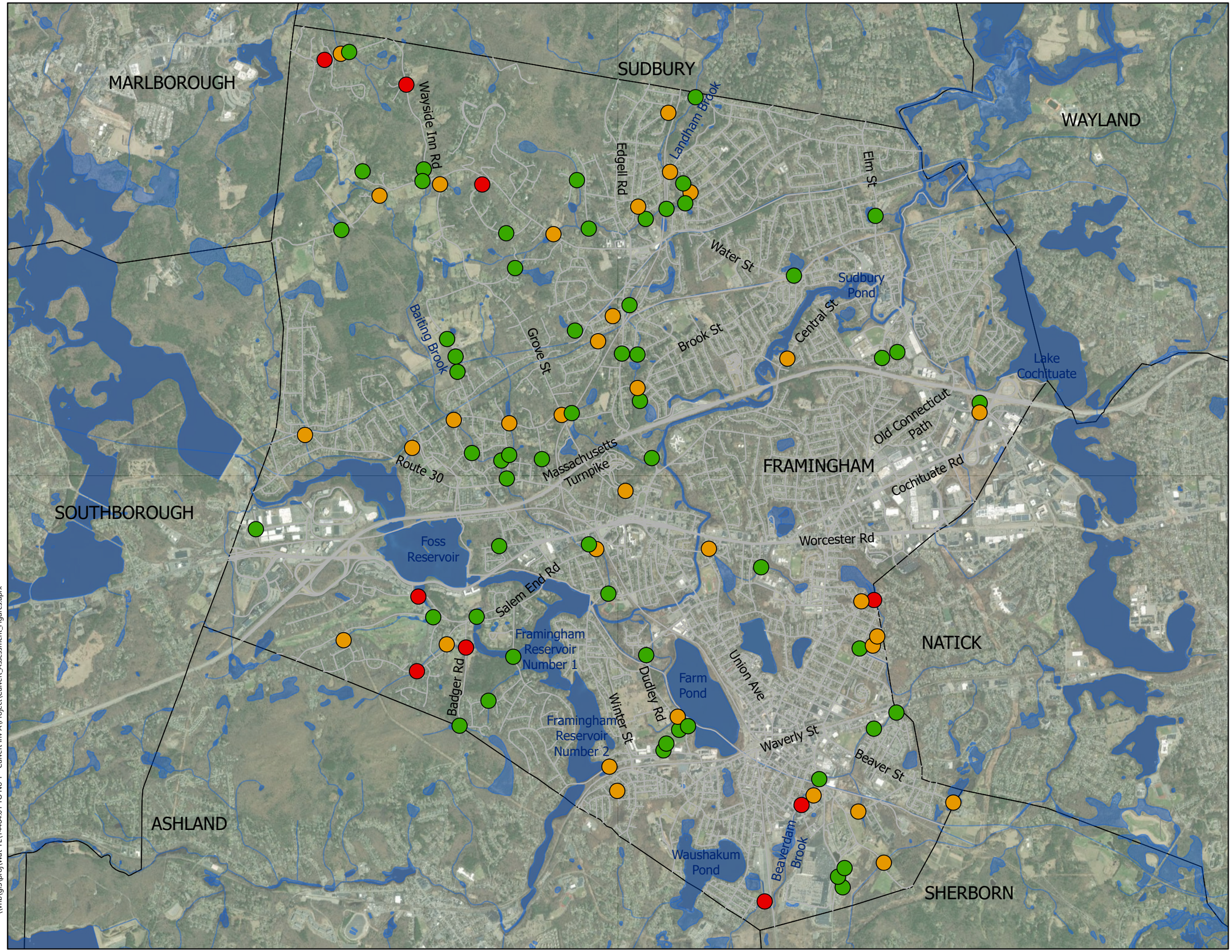


Figure 6 Culvert Inlet and Outlet Grades

FIGURE 1



Culvert Condition

- Adequate
- Poor
- Critical
- Municipal Boundary
- Roadways
- Waterbodies

N

0 1,500 3,000 6,000 Feet

City-Owned Culvert Assessment
Culvert Condition Ratings

Framingham, MA

March 18, 2021

Source: City of Framingham VueWorks Culvert Work Order Data

\\vhbgis\proj\Wat-TE\14484.01 TO No 1 - Culvert Inv A\Project\Culvert_Assessment_Figures.aprx

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Locations with Known Flooding Issues

Part of the culvert evaluations included assessing if there was visible evidence of flooding. VHB's field team spoke with Framingham residents who lived near some of the culvert locations to learn if the residents were aware of any flooding issues at the culverts. These conversations with residents helped provide experiential knowledge of the culvert over time. VHB documented these occasions of resident-reported flooding, as well as visual evidence, in the comments section of the associated work order. Visual flooding evidence was documented with photos, if possible. The cause of flooding at culverts is often complex, with multiple factors influencing the flooding. Further study of the locations noted below is needed before mitigation methods can be recommended. The following culvert locations were noted to have flooding issues by resident's anecdote. While this list includes culverts where residents noted flooding during the field evaluation, this list is not comprehensive of all culverts with flooding issues throughout the City.

Asset ID: 2515114 - CC Beaver Dam Brook

Flooding reported by neighbor when culvert is not maintained. Flooding is likely the result of culvert blockage and failure.

Asset ID: 2511184 - Knight Road

Flooding reported by neighbor. Neighbor routinely clears debris from culvert. Poor alignment upstream. Stagnant water is present downstream of the culvert indicate downstream backwater conditions which is likely resulting in flooding.

Asset ID: 2511840 - Salem End Road

Flooding on roadway at catch basin reported by neighbor. Based on a preliminary desktop review, this catch basin is not connected to the culvert. Further evaluation is required to determine the cause of flooding at this location.

Asset ID:2508898 - Willowbrook Road

Resident says upstream area does not drain well and backs up into the yards. Upstream channel is littered with tree debris. Based on field evaluation, flooding may be result of low point in the area. Further evaluation is required to determine the cause of flooding.

Neighborhood Flooding – Tributary to Beaverdam Brook

Asset ID: 2508218 - Wilson Street and Asset ID: 2508663 - Howe Street

Stagnant water is present at both culvert locations, likely due to backwater conditions. Downstream channel is overgrown and filled with sediment.

Neighborhood Flooding – Landham Brook

Asset ID: 2511207 Gregory Road and Asset ID: 2511205 - Sloane Drive

Flooding along this segment of Landham Brook was noted in discussion with the City's Conservation Agent. Additional discussion with the Conservation Agent is recommended to further identify the flooding source and potential fixes.

In addition to the culvert location listed above, which had experiential knowledge of flooding, there were other culverts where VHB's field staff noted potential evidence of flooding. These locations are noted in the completed work orders by "Flooding Evidence" being marked "Yes". The work order notes and pictures also help document potential evidence of flooding. Further evaluation is needed for these culverts to better understand the flooding risk of the culvert locations and potential mitigation.

4

Prioritization of Culvert Improvements

VHB developed a method for assigning a risk score to each culvert based on the various culvert characteristics. The risk score of culverts based on various conditions allows the City to evaluate and prioritize improvements for culverts with the highest risk score. The following sections describe the process used to develop the risk score methodology and subsequent findings.

Risk Score Methodology

After completion of all field culvert assessments, VHB compiled the results in order to compare the culvert conditions and develop a methodology for scoring the risk of the culverts to assist the City in future capital planning efforts. To develop the scores, VHB took the raw data exported from the VUEWorks assessment forms and simplified it to only the fields using the condition rating domain of Adequate, Poor, Critical, and N/A and inlet and outlet grade which used the domain of Perched, At Grade, and Buried. Each field received a certain weight to determine the influence the criteria would have on the overall score of the culvert. In addition to the weight allotted to each field, each individual condition rating was designated a percentage to determine what percent of the criteria weight the culvert would receive. A criteria which received a condition rating of "Critical" receives the highest percentage of weight possible for the criteria, "Poor" and "Adequate" each received an increasingly smaller percentage. A criteria that received a rating of "N/A" or was left blank did not received any percentage of weight for that criteria and the total possible weight was removed from the total potential risk score for that asset. Removing the N/A or blank fields from the overall total potential weight for the asset helped more accurately show how the applicable criteria effects the culvert's overall condition.

The City reviewed and commented on the proposed risk score points prior to their finalization. The final risk score points used were updated based on the discussion with the City.

In addition to the fields which use the condition domain, the risk scoring considered roadway functional classification, and drainage area to the culvert. Roadway functional classification was determined by VHB using the MassDOT Roadway Inventory web application. The roadways were broken into the classes of: Freeway, Major Collector, Minor Arterial, Local, Parking Lot, and Bike Path. No culverts evaluated were on freeways, but the classification was kept in the possible domain for consistency with the MassDOT Roadway layer and to be adaptable if the risk scoring methodology is used in the future. The scoring shows freeways receiving the highest percentage of weight due to the high traffic of the roadway, followed by collectors, and each classification after receiving a smaller percentage of weight as they receive less traffic. Drainage area to each culvert was determined for available streams using USGS Stream Stats web application. For condition weight percentage groupings, the drainage areas were broken into thirds, with culverts in the top third, with the largest drainage area, receiving the highest percentage of the weight. Larger drainage areas were given a higher percentage of weight because a culvert failure could potentially cause more damage than for a culvert with a smaller drainage area.

The final weights for each criteria and percentages of weight associated with each condition are as follows:

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Overall Culvert Condition	40	Critical – 100% Poor – 70% Adequate – 0 N/A – 0
Roadway Classification	10	Freeway – 100% Arterial – 80% Collector – 60% Local – 40% Parking Lot – 20% Bike Path – 20%
Structural Integrity of Barrel	10	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Watershed Area	5	Largest 1/3 of watershed areas – 100% Middle 1/3 of watershed areas – 50% Smallest 1/3 of watershed areas - 0
Blockage	5	Critical – 100 % Poor – 50% Adequate – 0 N/A – 0
Headwalls	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0

Culvert Criteria	Criteria Weight	Condition Percentage of Weight
Footings	5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Cross Section Deformation	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Joints and Seems	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Invert Deterioration	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Buoyancy or Crushing	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Armoring (Scour)	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Embankment Piping	2.5	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Longitudinal Alignment	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Apron/Scour Protection	1.25	Critical – 100% Poor – 50% Adequate – 0 N/A – 0
Inlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Outlet Grade	1.25	Perched – 100% Buried – 50% At Grade– 0
Total Possible Risk Score	**100.00**	

The final culvert risk scores were found by dividing total score of the asset by the total potential score, removing the weight for any criteria rated N/A or blank. The culvert risk scores can range from zero to 100. The risk scoring methodology used gives culverts with the highest risk the highest score. The lower the score, the better condition the culvert, and the less risk associated with it. For example, a culvert with a risk score of 100 implies the highest potential risk, while a culvert with a risk score of 0 implies the lowest potential risk.

Risk Scoring Results

While the available range of risk is from zero to 100, the risk scores for the evaluated culverts ranged from 0.0 to 83.0.

In accordance with the scope of work VHB performed a detailed review of the 10 culverts with the highest risk scores. The following list provides notable details about the ratings of these culverts and includes cost estimates. Construction cost estimates are conceptual and generally include culvert/headwall replacement and incidental costs. See Appendix 4 for construction cost estimate breakdowns.

1. **Hartford Street, Asset ID: 2505652, Associated Work Order: 122019-027**

- Total Risk Score: 83.0
- Cost Estimate for Construction: $755,000

  Assumptions for Cost Estimate: Replacement of culvert with a 6′ x 3′ concrete box culvert, replacement of headwalls, dredging adjacent property
- Roadway Classification: Arterial
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Buoyancy or Crushing
- Summary of Culvert Condition: The culvert is half stone and half reinforced concrete. CCTV indicates a collapse in center of the stone culvert blocking flow though the culvert (Photo 1). Downstream headwall and wingwall have loose stones and are leaning outward.



Photo 1 Hartford Street culvert, interior collapse

2. **Herbert Street, Asset ID: 2511942, Associated Work Order: 122019-034**

- Total Risk Score: 77.0
- Cost Estimate for Construction: $285,000

  Assumptions for Cost Estimate: Replacement of culvert with 42″ x 24″ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Level of Blockage, Cross-Section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: Stone collapse within culvert blocking flow through the culvert (Photo 2). The upstream invert is completely buried causing stagnant water at the upstream headwall (Photo 3).



Photo 2 Herbert Street culvert, interior collapse



Photo 3 Herbert Street culvert, upstream blockage

3. **Bates Road Extension, Asset ID: 2515114, Associated Work Order: 122019-030**

- Total Risk Score: 76.2
- Cost Estimate for Construction: $1,067,000 (Bridge) or $273,000 (Removal of crossing, restoration of Waushakum Brook)

  Cost Estimate Assumptions: Costs were estimated for 2 scenarios- replacement of the culvert with a 20' Bridge or removal of crossing and restoration of Waushakum Brook with a rip rap lined open channel. Both estimates include FEMA no-rise certificate permitting.
- Roadway Classification: Bike Path/Off Roadway
- Criteria Rated Critical: Level of Blockage, Cross-section Deformation, Structural Integrity of Barrel, and Joints and Seams
- Summary of Culvert Condition: The culvert is composed of four (4) corrugated metal pipes (CMP). The culvert, second from left, is partially deformed, reducing hydraulic capacity (Photo 4). The upstream left-most pipe is completely collapsed and filled with sediment and debris (Photo 5). All CMP is significantly rusted, and there is cracking in the downstream headwall. Residents have noted flooding.
- Additional Notes:
  - It is our understanding, an 8" insulated ductile iron water main is present above the culverts. Replacement or removal of the culvert will require reconstruction of the water main.
  - According to City officials, the upstream Washakum Pond ecosystem supports a rare form of sedge that requires controlled water levels in the pond. Updates to the culvert will need to include water level control measures to maintain the sedge species.
  - The open channel cost estimate is provided for reference if the City identifies another access route for the adjacent sewer system.



Photo 4 Waushakum Brook, deformation, second from left culvert



Photo 5 Waushakum Brook, interior collapse in left culvert

4. **Gates Street, Asset ID: 2506907, Associated Work Order: 122019-059**

- Total Risk Score: 75.1
- Cost Estimate for Construction: $988,000

  Assumptions for Cost Estimate: Replacement of culvert with 12′ x 6′ concrete box culvert, replacement of headwalls, replacement of outlet control, hydraulic study and flood analysis
- Roadway Classification: Collector
- Criteria Rated Critical: Structural Integrity of Barrel
- Summary of Culvert Condition: The CMP culvert has significant rusting throughout entire barrel (Photo 6). The upstream headwall includes an outlet control structure (OCS) with gate and a 6″ opening at the bottom of gate (Photo 7). The gate opening tracks are significantly deteriorated. Some exposed rebar is visible on the structure. On the downstream side, the top of projecting CMP is completely deteriorated. The downstream end of culvert is submerged in stagnant water. The Massachusetts Water Resources Authority (MWRA) operates the downstream reservoir, so upgrades to this culvert may require MWRA approval.



Photo 6 Gates Street culvert, interior deterioration



Photo 7 Gates Street culvert, rusted OCS gate

5. **Wayside Inn Road, Asset ID: 2511788, Associated Work Order: 122019-083**

- Total Risk Score: 74.3
- Cost Estimate for Construction: $303,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of upstream headwall
- Roadway Classification: Collector
- Criteria Rated Critical: Footings
- Summary of Culvert Condition: Many stones in the culvert have fallen out of place (Photo 8). Although the culvert is currently functioning, the fallen stones have left voids in the wall which reduces the structural stability of the stone culvert. Embankment erosion is present along downstream headwall (Photo 9).



Photo 8 Wayside Inn Road culvert, fallen interior stones



Photo 9 Wayside Inn Road culvert, downstream embankment erosion

6. **Salem End Road, Asset ID: 2511831, Associated Work Order: 122019-087**

- Total Risk Score: 71.3
- Cost Estimate for Construction: $964,000

  Assumptions for Cost Estimate: Replacement of culvert is 12′ x 6′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The stone culvert is lined with a concrete pipe in the upstream section. There is a failure near the downstream end of the culvert, where there is a collapse of the roof of the stone culvert (appears to be located on private property) (Photo 10). A hole, approximately a foot in diameter, can be seen at the surface (Photo 11). The downstream stone headwall has portions of loose mortar.



Photo 10 Salem End Road culvert, interior stone roof collapse



Photo 11 Salem End Road culvert, exterior hole in culvert roof

7. **Parmenter Road, Asset ID: 2511778, Associated Work Order: 122019-080**

- Total Risk Score: 71.1
- Cost Estimate for Construction: $244,000

  Assumptions for Cost Estimate: Replacement of culvert with 7′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Local
- Criteria Rated Critical: Cross-section Deformation and Structural Integrity of Barrel
- Summary of Culvert Condition: The upstream headwall is composed of wood being held in place by a steel post. The downstream headwall is stone that shows beginning signs of settlement. CCTV indicates the stone culvert is beginning to collapse internally (Photo 12). The small hydraulic opening creates high potential for blockage to occur.

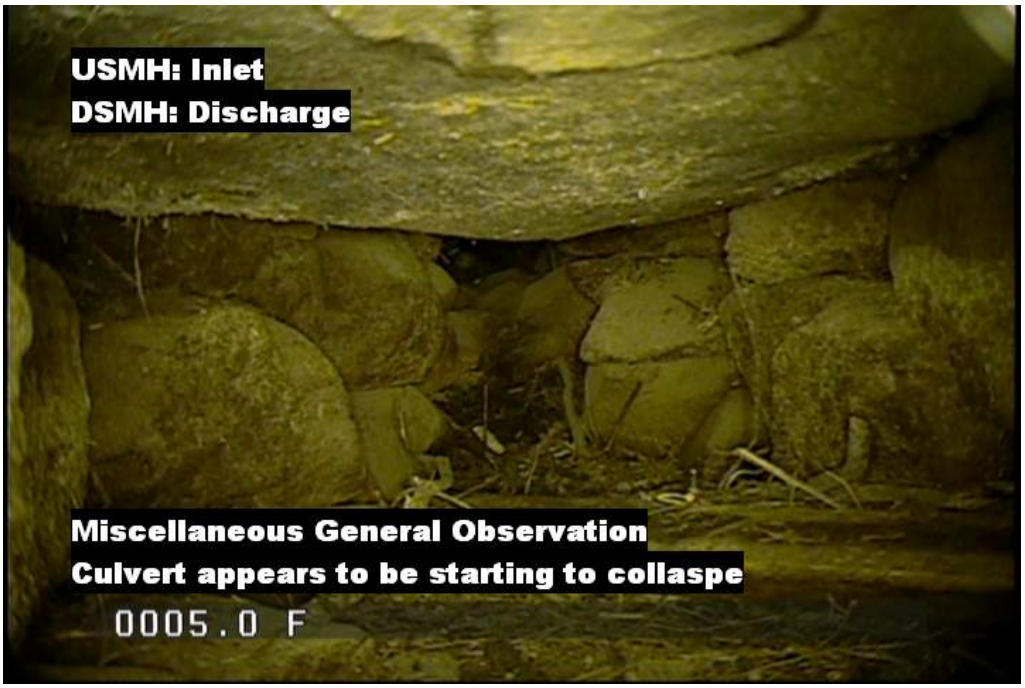

Photo 12 Parmenter Road culvert, interior collapse (CCTV)

8. **Badger Road, Asset ID: 2506912, Associated Work Order: 122019-094**

- Total Risk Score: 69.2
- Cost Estimate for Construction: $449,000

  Assumptions for Cost Estimate: Replacement of culvert with 9′ x 5′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage and Headwall/Wingwalls
- Summary of Culvert Condition: The upstream stone headwall is collapsed, causing a small hydraulic opening. Erosion is present from the roadway at the upstream headwall (Photo 13). The stream runs parallel to the roadway before entering the stone culvert and flowing perpendicular under the roadway. The downstream stone headwall has a major failure (Photo 14).



Photo 13 Badger Road culvert, upstream headwall collapse and erosion



Photo 14 Badger Road culvert, downstream headwall collapse

9. **Fountain Street, Asset ID: 2506913, Associated Work Order: 122019-060**

- Total Risk Score: 61.5
- Cost Estimate for Construction: $412,000

  Assumptions for Cost Estimate: Replacement of culvert with 8′ x 4′ concrete box culvert, replacement of headwalls
- Roadway Classification: Collector
- Criteria Rated Critical: Level of Blockage, Headwall/Wingwalls
- Summary of Culvert Condition: The upstream invert of the stone culvert is buried. The upstream channel is dry and filled with debris (Photo 15). The downstream invert has backwater from the downstream lake. The downstream headwall has loose stones. The downstream wingwall has missing stones which have fallen into the channel.



Photo 15 Fountain Street culvert, upstream headwall

10. **Garvey Road, Asset ID: 2511728, Associated Work Order: 122019-115**

- Total Risk Score: 60.3
- Cost Estimate for Construction: $228,000

  Assumptions for Cost Estimate: Replacement of outlet control structure
- Roadway Classification: Local
- Criteria Rated Critical: Headwall/Wingwall
- Summary of Culvert Condition: The outlet control structure at the inlet superstructure has dislodged outward, approximately one foot from the substructure with minimal headwall backfill (Photo 16). It is our understanding that proposed nearby roadway improvements or pump station project can be coupled with the culvert repair, which would likely reduce the cost of replacement.



Photo 16 Garvey Road culvert, inlet dislodged OCS superstructure

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5

Recommendations and Conclusions

VHB completed field and desktop evaluations of 98 culverts owned by the City of Framingham. VHB worked with the City to develop a methodology for scoring the risk of each culvert. The findings of the evaluations and the associated risk scores can help the City develop a better understanding of the condition and functionality of their culverts. The evaluation results and risk scores identify culverts with the highest potential of failure. The following section provides conclusions reached from the culvert evaluation and risk scoring and VHB's recommendations for the City moving forward.

The evaluation findings show that majority of the City's culverts (55 culverts out of 98 evaluated) are in overall adequate condition. Thirty-three culverts were deemed to be in poor condition and nine (9) were rated as critical, requiring maintenance or reconstruction to prevent failure.

The field evaluations considered the condition of various individual parts of the culvert in determining the culverts overall condition (Figure 3). The criteria that received the most poor and critical ratings was "Level of Blockage", with 13 culverts rating critical in this category and 27 rating poor. Culverts which have high levels of blockages have a reduced hydraulic capacity which can cause flooding during major storm events. The criteria that receive the second-most poor and critical ratings was "Headwall/Wingwalls" with 12 culverts rating critical and 28 culverts rating poor. Failing headwalls and wingwalls has the potential to block the culvert's openings, creating a risk of flooding. Collapsed headwalls and wingwalls also creates the potential for significant erosion and potentially undermining the roadway above.

VHB developed risk scores for each evaluated culvert, factoring in the overall condition of culvert, individual parts of the culvert, drainage area and roadway classification. This risk

scoring identified the culverts with the greatest risk associated with them. VHB further evaluated the ten culverts with the highest risk scores, scores of 60.3 to 83.0, to determine the estimated cost associated with the replacement of the culverts or the culvert parts. In total, the estimated costs for the top 10 culverts is $5,695,000.

To address the conditions and risk identified during the culvert evaluations, VHB provides the following recommendations:

- The city should develop a capital program to improve priority culverts. Critical culverts should be replaced as soon as possible in order to reduce the risk of adverse effects. These impacts can include flooding of adjacent properties and roadways, damage to other utilities, roadway collapse, more frequent and costly maintenance/repairs, traffic impacts, and reduced longevity of roadway. These culvert improvements should be coupled with other projects/efforts to achieve cost efficiencies where possible.
- Culverts that are rated poor or critical require continued monitoring to evaluate further degradation of the culvert. The City should develop a city-specific inspection frequency of culverts, especially those rated poor or critical that are not upgraded; at a minimum, critical culverts should be evaluated yearly, and poor culverts should be evaluated every two years.
- The City's Department of Public Works should address "immediate actions" flagged during the inspections and then develop a routine channel and culvert maintenance program for culverts and channels to reduce blockages and increase hydraulic capacity. For areas with known flooding issues, the City should complete a site-specific evaluation of each area to determine if maintenance and/or further evaluation is needed.

Implementation of these recommendations can assist the City with improving culverts that are currently high risk and allow the city to maintain all culverts to reduce the deterioration of the infrastructure in the future. While there are upfront costs associated with the recommendations, improving culvert maintenance can help reduce likelihood of expensive culvert repairs and replacements in the future.

Appendices

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Appendix 1 – List of Risk Scores

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-027*	2505652	CC HARTFORD STREET	03 - Critical	83.0
122019-034	2511942	HERBERT STREET	03 - Critical	77.0
122019-030	2515114	CC BEAVER DAM BROOK	03 - Critical	76.2
122019-059	2506907	GATES STREET	03 - Critical	75.1
122019-083	2511788	WAYSIDE INN ROAD	03 - Critical	74.3
122019-087*	2511831	SALEM END ROAD	03 - Critical	71.3
122019-080*	2511778	PARMENTER ROAD	03 - Critical	71.1
122019-094	2506912	BADGER ROAD	03 - Critical	69.2
122019-060*	2506913	FOUNTAIN STREET	02 - Poor	61.5
122019-115	2511728	GARVEY ROAD	03 - Critical	60.3
122019-040	2511895	KENDALL AVENUE	02 - Poor	56.8
122019-072	2511192	BELKNAP ROAD	02 - Poor	55.9
122019-052*	2508663	HOWE STREET	02 - Poor	54.5
122019-081	2511783	PARMENTER ROAD	02 - Poor	54.5
122019-099	2511613	CC RUTHELLEN ROAD	02 - Poor	52.7
122019-106	2511214	HEMENWAY SCH FT PATH	02 - Poor	52.7
022421-025	2512189	MAIN STREET	02 - Poor	52.3
122019-074	2511558	GROVE STREET	02 - Poor	52.3
122019-028	2506893	BELKNAP ROAD	02 - Poor	51.8
122019-127	2508334	CENTRAL STREET	02 - Poor	51.8
122019-045*	2517849	LELAND STREET	02 - Poor	51.0
122019-118	2511120	BROOK STREET	02 - Poor	50.3
122019-041	2506936	MERCHANT ROAD	02 - Poor	50.1
122019-053	2506896	WAVENEY ROAD	02 - Poor	50.1
122019-033	2511947	HERBERT STREET	02 - Poor	49.4
122019-067	2511171	BELKNAP ROAD	02 - Poor	49.0
122019-075	2511569	GROVE STREET	02 - Poor	48.9
122019-051*	2508218	CC WILSON DRIVE	02 - Poor	48.7
122019-107	2511486	HEMENWAY ROAD	02 - Poor	48.2
122019-079	2511735	EDMANDS ROAD	02 - Poor	47.7
122019-093	2508594	SPEEN STREET	02 - Poor	47.7
042320-027	2508898	WILLOWBROOK ROAD	02 - Poor	47.5
122019-049	2508225	UNDERWOOD AVENUE	02 - Poor	47.4
122019-097	2509452	LYMAN ROAD	02 - Poor	47.4
122019-077*	2511660	GROVE STREET	02 - Poor	46.2
122019-101	2511055	EDMANDS ROAD	02 - Poor	45.7
122019-032*	2501693	CC DUDLEY ROAD	02 - Poor	45.7
122019-086	2511811	SALEM END ROAD	02 - Poor	45.6
122019-102*	2511205	SLOANE DRIVE	02 - Poor	44.7

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-061	2508141	VICTORY STREET	02 - Poor	44.3
122019-098	2511200	NOB HILL DRIVE	02 - Poor	44.0
122019-088*	2511840	SALEM END ROAD	02 - Poor	38.9
122019-121	2511139	EDGELL ROAD	01 - Adequate	26.2
122019-078*	2511681	MILLWOOD STREET	01 - Adequate	25.5
122019-125	2511816	WINTER STREET	01 - Adequate	21.9
122019-065	2510409	EDGELL ROAD	01 - Adequate	21.0
122019-084	2511798	NIXON ROAD	01 - Adequate	21.0
122019-124*	2508880	HICKORY HILL LANE	01 - Adequate	20.8
122019-120*	2511130	FROST STREET	01 - Adequate	19.5
122019-071	2511190	BERKELEY ROAD	01 - Adequate	18.8
122019-026	2502862	DUDLEY ROAD	01 - Adequate	18.2
122019-031	2512689	DUDLEY ROAD	01 - Adequate	17.8
122019-048	2508221	BISHOP STREET	01 - Adequate	16.8
122019-073	2511557	EDMANDS ROAD	01 - Adequate	16.8
122019-047	2518282	CC FRASER ROAD	01 - Adequate	16.7
122019-029	2509026	WAYSIDE INN ROAD	01 - Adequate	16.2
122019-085	2511802	EDMANDS ROAD	01 - Adequate	16.2
122019-057	2506849	ELM STREET	01 - Adequate	15.8
122019-090	2511887	SINGLETARY LANE	01 - Adequate	15.4
122019-054*	2508317	CC A STREET	01 - Adequate	14.9
122019-066	2511169	MILL STREET	01 - Adequate	14.9
122019-104	2511209	HEMENWAY ROAD	01 - Adequate	14.8
122019-070*	2511187	KNIGHT ROAD	01 - Adequate	14.7
122019-063	2508339	WATER STREET	01 - Adequate	14.2
122019-095*	2511577	MILLWOOD STREET	01 - Adequate	14.1
122019-062	2508274	OLD WORCESTER ROAD	01 - Adequate	14.0
122019-082	2511788	PARMENTER ROAD	01 - Adequate	14.0
122019-089	2511864	BADGER ROAD	01 - Adequate	14.0
122019-112	2511560	WINCH STREET	01 - Adequate	13.4
122019-116	2511729	GARVEY ROAD	01 - Adequate	13.4
122019-096	2521199	CONCORD STREET	01 - Adequate	13.0
122019-100	2508280	NEW YORK AVENUE	01 - Adequate	12.6
122019-103	2511207	GREGORY ROAD	01 - Adequate	12.6
122019-043	2515102	IRVING STREET	01 - Adequate	12.4
122019-039	2514070	SECOND STREET	01 - Adequate	12.3
122019-123	2506908	SALEM END ROAD	01 - Adequate	12.2
122019-092	2511669	MAPLE STREET	01 - Adequate	11.9
122019-119*	2511122	SCOTT DRIVE	01 - Adequate	11.5
122019-111	2511546	JUNIPER LANE	01 - Adequate	11.3
122019-069	2511186	LITTLE TREE LANE	01 - Adequate	11.2
122019-064	2508881	PARKER ROAD	01 - Adequate	11.0
122019-114*	2520964	LYMAN WAY	01 - Adequate	10.8

WorkOrderID	ASSETID	Location	Culvert Condition	Total Risk Score
122019-068	2511184	KNIGHT ROAD	01 - Adequate	10.5
122019-036	2515315	CC DUDLEY ROAD	01 - Adequate	10.4
122019-105	2511212	CC APPLEDO'R ROAD	01 - Adequate	10.4
122019-109	2511495	GREGORY ROAD	01 - Adequate	10.1
122019-108	2511488	COLONIAL DRIVE	01 - Adequate	9.9
122019-042	2515095	TARALLI TERRACE	01 - Adequate	9.6
122019-113*	2511638	CHICATAWBUT ROAD	01 - Adequate	9.5
122019-117	2511116	MCLEAN DRIVE	01 - Adequate	9.5
122019-091	2511571	CC GROVE STREET	01 - Adequate	8.1
042320-028	2522006	CC FOUNTAIN STREET	01 - Adequate	8.0
042320-029	2522007	CC FOUNTAIN STREET	01 - Adequate	7.8
122019-058	2506853	MASSACHUSETTS TURNPIKE	01 - Adequate	7.5
122019-122	2521337	CC WESTERN AVENUE	01 - Adequate	7.4
122019-038	2517767	CC WESTERN AVENUE	01 - Adequate	0.0
122019-046	2518019	CC WESTERN AVENUE	01 - Adequate	0.0

* Asterisks next to the work order ID notes that the culvert received CCTV evaluation

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Appendix 2 – Inspection Results Table

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WorkOrderID	ASSETID	Culvert Condition	Roadway Classification	Drainage Area (sq mi)	Level of Blockage	Cross-Section Deformation	Structural Integrity of Barrel	Headwall/Wingwalls	Joints and Seams	Footings	Invert Deterioration	Buoyancy or Crushing	Longitudinal Alignment	Armoring	Apron/Scour Protection	Embankment Piping	Inlet Grade	Outlet Grade	Location
031821-042	2512189	02 - Poor	Collector	0.75	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	1 - Perched	2 - At Grade	MAIN STREET
122019-026	2502862	01 - Adequate	Collector		03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	DUDLEY ROAD
122019-027*	2505652	03 - Critical	Arterial	0.04	03 - Critical	03 - Critical	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC HARTFORD STREET
122019-028	2506893	02 - Poor	Arterial	0.14	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-029	2509026	01 - Adequate	Collector	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	WAYSIDE INN ROAD
122019-030	2515114	03 - Critical	Bike Path	1.73	03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC BEAVER DAM BROOK
122019-031	2512689	01 - Adequate	Collector	0.082	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	DUDLEY ROAD
122019-032*	2501693	02 - Poor	0	0	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	CC DUDLEY ROAD
122019-033	2511947	02 - Poor	Local	0	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	3 - Buried	HERBERT STREET
122019-034	2511942	03 - Critical	Local		03 - Critical	03 - Critical	03 - Critical	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HERBERT STREET
122019-036	2515315	01 - Adequate	Parking Lot		02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC DUDLEY ROAD
122019-038	2517767	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC WESTERN AVENUE
122019-039	2514070	01 - Adequate	Local	5.66	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SECOND STREET
122019-040	2511895	02 - Poor	Arterial	0.076	03 - Critical	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	KENDALL AVENUE
122019-041	2506936	02 - Poor	Local	1.42	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MERCHANT ROAD
122019-042	2515095	01 - Adequate	Local	5.51	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	TARALLI TERRACE
122019-043	2515102	01 - Adequate	Collector	4.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	IRVING STREET
122019-045*	2517849	02 - Poor	Collector	0.053	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LELAND STREET
122019-046	2518019	01 - Adequate	0	0	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-047	2518282	01 - Adequate	Local	0.51	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC FRASER ROAD
122019-048	2508221	01 - Adequate	Collector	0.25	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BISHOP STREET
122019-049	2508225	02 - Poor	Local		02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	UNDERWOOD AVENUE
122019-051*	2508218	02 - Poor	Local	0.15	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	0	0	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	CC WILSON DRIVE
122019-052*	2508663	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	04 - N/A	0	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	HOWE STREET
122019-053	2506896	02 - Poor	Local	1.46	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	WAVENEY ROAD
122019-054*	2508317	01 - Adequate	Collector		01 - Adequate	0	0	01 - Adequate	0	04 - N/A	0	0	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	2 - At Grade	CC A STREET
122019-057	2506849	01 - Adequate	Arterial	0.08	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	ELM STREET
122019-058	2506853	01 - Adequate	Bike Path	1.7	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MASSACHUSETTS TURNPIKE
122019-059	2506907	03 - Critical	Collector	0.45	02 - Poor	01 - Adequate	03 - Critical	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GATES STREET
122019-060*	2506913	02 - Poor	Collector	0.19	03 - Critical	01 - Adequate	0	03 - Critical	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	FOUNTAIN STREET
122019-061	2508141	02 - Poor	Local	0.12	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	VICTORY STREET
122019-062	2508274	01 - Adequate	Local	0.13	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	OLD WORCESTER ROAD
122019-063	2508339	01 - Adequate	Arterial	0.53	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WATER STREET
122019-064	2508881	01 - Adequate	Collector	0.41	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARKER ROAD
122019-065	2510409	01 - Adequate	Arterial	0.76	02 - Poor	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	EDGELL ROAD
122019-066	2511169	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	2 - At Grade	1 - Perched	MILL STREET
122019-067	2511171	02 - Poor	Arterial	0.63	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-068	2511184	01 - Adequate	Local	2.94	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	KNIGHT ROAD
122019-069	2511186	01 - Adequate	Local	2.92	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	LITTLE TREE LANE
122019-070*	2511187	01 - Adequate	Local	0.69	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	KNIGHT ROAD
122019-071	2511190	01 - Adequate	Local	2.1	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	BERKELEY ROAD
122019-072	2511192	02 - Poor	Arterial	2.02	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	BELKNAP ROAD
122019-073	2511557	01 - Adequate	Collector	0.16	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	EDMANDS ROAD
122019-074	2511558	02 - Poor	Collector	0.16	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	1 - Perched	1 - Perched	GROVE STREET
122019-075	2511569	02 - Poor	Collector	0.069	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GROVE STREET
122019-077*	2511660	02 - Poor	Collector	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	3 - Buried	GROVE STREET
122019-078*	2511681	01 - Adequate	Collector	0.098	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	04 - N/A	2 - At Grade	0	MILLWOOD STREET
122019-079	2511735	02 - Poor	Collector	0.58	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	03 - Critical	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-080*	2511778	03 - Critical	Local	0.085	02 - Poor	03 - Critical	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-081	2511783	02 - Poor	Local	0.065	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	PARMENTER ROAD
122019-082	2511788	01 - Adequate	Local	0.46	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	PARMENTER ROAD
122019-083	2511788	03 - Critical	Collector	0.12	01 - Adequate	04 - N/A	02 - Poor	04 - N/A	04 - N/A	03 - Critical	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WAYSIDE INN ROAD
122019-084	2511798	01 - Adequate	Collector	0.07	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	1 - Perched	NIXON ROAD
122019-085	2511802	01 - Adequate	Collector	0.11	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	EDMANDS ROAD
122019-086	2511811	02 - Poor	Collector	3.32	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-087*	2511831	03 - Critical	Local	0.4	01 - Adequate	03 - Critical	03 - Critical	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-088*	2511840	02 - Poor	Local	0.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-089	2511864	01 - Adequate	Local	0.12	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	BADGER ROAD
122019-090	2511887	01 - Adequate	Collector	0.79	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	0	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	SINGLETARY LANE
122019-091	2511571	01 - Adequate	Bike Path	0.069	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	CC GROVE STREET
122019-092	2511669	01 - Adequate	Collector	3.43	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MAPLE STREET
122019-093	2508594	02 - Poor	Arterial	1.69	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	SPEEN STREET
122019-094	2506912	03 - Critical	Collector	0.57	03 - Critical	04 - N/A	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	BADGER ROAD
122019-095*	2511577	01 - Adequate	Collector		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	MILLWOOD STREET

122019-096	2521199	01 - Adequate	Arterial		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CONCORD STREET
122019-097	2509452	02 - Poor	Local	0.11	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	LYMAN ROAD
122019-098	2511200	02 - Poor	Local	0.28	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	NOB HILL DRIVE
122019-099	2511613	02 - Poor	Bike Path	0.12	03 - Critical	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	2 - At Grade	2 - At Grade	CC RUTHELLEN ROAD
122019-100	2508280	01 - Adequate	Local	0.04	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	NEW YORK AVENUE
122019-101	2511055	02 - Poor	Collector	1.5	01 - Adequate	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	EDMANDS ROAD
122019-102*	2511205	02 - Poor	Local	1.64	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	3 - Buried	SLOANE DRIVE
122019-103	2511207	01 - Adequate	Local	1.4	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-104	2511209	01 - Adequate	Collector	1.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-105	2511212	01 - Adequate	Bike Path	1.33	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CC APPLEDO'R ROAD
122019-106	2511214	02 - Poor	Bike Path		02 - Poor	02 - Poor	02 - Poor	01 - Adequate	02 - Poor	04 - N/A	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	3 - Buried	2 - At Grade	HEMENWAY SCH FT PATH
122019-107	2511486	02 - Poor	Collector	1.8	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HEMENWAY ROAD
122019-108	2511488	01 - Adequate	Local	2.32	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	COLONIAL DRIVE
122019-109	2511495	01 - Adequate	Local	1.66	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	GREGORY ROAD
122019-111	2511546	01 - Adequate	Local	1.16	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	JUNIPER LANE
122019-112	2511560	01 - Adequate	Collector	0.07	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINCH STREET
122019-113*	2511638	01 - Adequate	Local	0.39	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CHICATAWBUT ROAD
122019-114*	2520964	01 - Adequate	Local	0.1	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	1 - Perched	LYMAN WAY
122019-115	2511728	03 - Critical	Local		02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	1 - Perched	GARVEY ROAD
122019-116	2511729	01 - Adequate	Local	0.06	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	1 - Perched	2 - At Grade	GARVEY ROAD
122019-117	2511116	01 - Adequate	Local	0.89	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	MCLEAN DRIVE
122019-118	2511120	02 - Poor	Collector	0.87	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	BROOK STREET
122019-119*	2511122	01 - Adequate	Local	0.42	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SCOTT DRIVE
122019-120*	2511130	01 - Adequate	Collector	0.26	02 - Poor	01 - Adequate	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	FROST STREET
122019-121	2511139	01 - Adequate	Arterial	0.38	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	02 - Poor	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	3 - Buried	2 - At Grade	EDGELL ROAD
122019-122	2521337	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC WESTERN AVENUE
122019-123	2506908	01 - Adequate	Collector	0.086	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	SALEM END ROAD
122019-124*	2508880	01 - Adequate	Local	0.47	02 - Poor	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	HICKORY HILL LANE
122019-125	2511816	01 - Adequate	Arterial	3.29	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	2 - At Grade	2 - At Grade	WINTER STREET
122019-127	2508334	02 - Poor	Arterial	0.064	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	02 - Poor	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	02 - Poor	04 - N/A	01 - Adequate	2 - At Grade	1 - Perched	CENTRAL STREET
042320-027	2508898	02 - Poor	Local	0.14	02 - Poor	01 - Adequate	01 - Adequate	03 - Critical	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	3 - Buried	WILLOWBROOK ROAD
042320-028	2522006	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	04 - N/A	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET
042320-029	2522007	01 - Adequate	Parking Lot		01 - Adequate	01 - Adequate	01 - Adequate	04 - N/A	01 - Adequate	04 - N/A	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	01 - Adequate	2 - At Grade	2 - At Grade	CC FOUNTAIN STREET

Appendix 3 – Immediate Action Culverts

Number of Structures Requiring Immediate Action Type

Debris/Vegetation Blockage	Critical Scour/Erosion	Structure Unstable
22	0	8

Culverts with Debris/Vegetation Blockage

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-030	2515114	CC BEAVER DAM BROOK
122019-032	2501693	CC DUDLEY ROAD
122019-047	2518282	CC FRASER ROAD
122019-027	2505652	CC HARTFORD STREET
122019-051	2508218	CC WILSON DRIVE
122019-026*	2502862	DUDLEY ROAD
122019-031*	2512689	DUDLEY ROAD
122019-060	2506913	FOUNTAIN STREET
122019-106	2511214	HEMENWAY SCH FT PATH
122019-034	2511942	HERBERT STREET
122019-052	2508663	HOWE STREET
122019-040	2511895	KENDALL AVENUE
122019-070	2511187	KNIGHT ROAD
122019-045	2517849	LELAND STREET
122019-076	2511576	MILLWOOD STREET
122019-100*	2508280	NEW YORK AVENUE
122019-039	2514070	SECOND STREET
122019-093*	2508594	SPEEN STREET
122019-049	2508225	UNDERWOOD AVENUE
122019-061*	2508141	VICTORY STREET
122019-029	2509026	WAYSIDE INN ROAD

Culverts in blue appear in both immediate action lists.

*Culverts marked with an asterisk have debris/vegetation blockage as the only issue.

Culverts with Unstable Structure

Work Order ID	Asset ID	Street Name
122019-094	2506912	BADGER ROAD
122019-028	2506893	BELKNAP ROAD
122019-027	2505652	CC HARTFORD STREET
122019-099	2511613	CC RUTHELLEN ROAD
122019-034	2511942	HERBERT STREET
122019-097	2509452	LYMAN ROAD
122019-080	2511778	PARMENTER ROAD
122019-087	2511831	SALEM END ROAD

Culverts in blue appear in both immediate action lists.

Appendix 4 – Cost Estimate

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101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 10/13/2020

Project: Hartford St Culvert Replacement

Job Number: 14484.01

Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	400	CY	CLASS A TRENCH EXCAVATION	$45	$18,000.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350.00	$7,000.00
151.	1	CY	GRAVEL BORROW	$45	$45.00
151.1	145	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$7,250.00
151.2	45	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$2,565.00
156.1	120	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$6,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	60	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$180.00
482.3	60	FT	SAWCUTTING ASHALT PAVEMENT	$4	$210.00
580.	20	FT	CURB REMOVED AND RESET	$27	$530.00
631.	20	FT	GUARDRAIL	$30	$600.00
657.	260	FT	TEMPORARY FENCE	$19	$4,940.00
657.5	260	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,900.00
698.1	270	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$1,485.00
701.	1	TON	HMA SIDEWALK	$210	$210.00
767.121	260	FT	SEDIMENT CONTROL BARRIER	$7	$1,778.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	115	TON	RIP RAP	$65	$7,475.00
995.011	1	LS	CULVERT STRUCTURE	$159,000	$159,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$80,000	$80,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00

Subtotal	$344,326
Mobilization (Assumed 5%)	$17,216
Police Detail & Traffic Control (Assumed 10%)	$34,433
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$34,433
Contingency (35%)	$120,514
Subtotal	$550,922
Permitting & Design (Assumed 25%)	$137,730
Construction Observation (Assumed 12%)	$66,111
Total	$754,763
SAY	**$755,000**

Assumptions:

- Replacement of culvert with 6' x 3' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 5.5-feet
- Headwalls to be installed on upstream and downstream ends
- Assume dredgling limits to back of adjacent property (75-feet long) by 1-foot deep by 6-feet wide

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Date: 8/18/2020
Job Number: 14484.01

Project: Herbert St Culvert Replacement
Location: Framinham, MA
Estimator: JAD
Checked By: MAC

Item No.	Qty	Unit	Description	Unit Price	Amount
101.	0.1	A	CLEARING AND GRUBBING	$34,000	$3,400.00
103.	10	EA	TREE REMOVED - DIAMETER UNDER 24 INCHES	$1,500	$15,000.00
120.1	200	CY	UNCLASSIFIED EXCAVATION	$40	$8,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	100	CY	CLASS A TRENCH EXCAVATION	$45	$4,500.00
148.	20	CY	DREDGING AND DISPOSING OF MATERIAL	$350	$7,000.00
151.	2	CY	GRAVEL BORROW	$45	$90.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	60	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$5,400.00
415.1	45	SY	PAVEMENT MILLING STANDARD	$8	$337.50
451.	20	TON	HMA FOR PATCHING	$225	$4,536.00
482.01	70	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$210.00
482.3	70	FT	SAWCUTTING ASHALT PAVEMENT	$4	$245.00
580.	30	FT	CURB REMOVED AND RESET	$27	$795.00
631.	30	FT	GUARDRAIL REMOVED AND RESET	$23	$690.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
701.	15	SY	CEMENT CONCRETE SIDEWALK	$61	$915.00
765.	15	SY	SEEDING	$2	$30.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	20	TON	RIP RAP	$65	$1,300.00
995.01	1	LS	CULVERT STRUCTURE	$30,000	$30,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL	$20,000	$20,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
				Subtotal	$129,654
				Mobilization (Assumed 5%)	$6,483
				Police Detail & Traffic Control (Assumed 10%)	$12,965
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$12,965
				Contingency (35%)	$45,379
				Subtotal	$207,446
				Permitting & Design (Assumed 25%)	$51,862
				Construction Observation (Assumed 12%)	$24,894
				Total	$284,201
				SAY	**$285,000**

Assumptions:

- Given existing culvert is clogged and does not carry dry weather flow no control of water costs included
- Culvert size to match existing culvert (42-inch x 24-inch)
- Headwalls to be installed on upstream and downstream ends

101 Walnut Street
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

Preliminary Construction Cost Estimate

Option A

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	100	CY	UNCLASSIFIED EXCAVATION	$40	$4,000.00
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
151.1	60	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$3,000.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
631.	60	FT	GUARDRAIL	$30	$1,800.00
657.	85	FT	TEMPORARY FENCE	$19	$1,615.00
657.5	85	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,275.00
698.1	95	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$522.50
767.121	85	FT	SEDIMENT CONTROL BARRIER	$7	$581.40
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	70	TON	RIP RAP	$65	$4,550.00
995.01	1	LS	BRIDGE STRUCTURE (includes walls)	$380,000	$380,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$486,333
				Mobilization (Assumed 5%)	$24,317
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$97,267
				Contingency (35%)	$170,216
				Subtotal	$778,132
				Permitting & Design (Assumed 25%)	$194,533
				Construction Observation (Assumed 12%)	$93,376
				Total	$1,066,041
				SAY	**$1,067,000**

Assumptions:

- Replacement of culvert with 20' Bridge
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 20-feet
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

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Preliminary Construction Cost Estimate

Option B

Date: 12/8/2020

Job Number: 14484.01

Project: Waushakum Brook Culvert Replacement
Location: Framingham, MA
Estimator: JAD, KMS
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	235	CY	UNCLASSIFIED EXCAVATION	$40	$9,400.00
125.	15	CY	TOPSOIL EXCAVATED AND STACKED	$30	$450.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
302.08	122	FT	8" DUCTILE IRON WATER PIPE	$128	$15,616.00
657.	110	FT	TEMPORARY FENCE	$19	$2,090.00
657.5	110	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,650.00
698.1	110	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$605.00
767.121	140	FT	SEDIMENT CONTROL BARRIER	$7	$957.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	100	TON	RIP RAP	$65	$6,500.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	MISCELLANEOUS PIPE FITTINGS	$3,000	$3,000.00
	1	LS	CONTROL OF WATER	$25,000	$25,000.00
	1	LS	NO RISE CERTIFICATE PERMITTING	$25,000	$25,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
				Subtotal	$117,201
				Mobilization (Assumed 5%)	$5,860
				Police Detail & Traffic Control (Assumed 10%)	$11,720
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$23,440
				Contingency (35%)	$41,020
				Subtotal	$199,242
				Permitting & Design (Assumed 25%)	$49,811
				Construction Observation (Assumed 12%)	$23,909
				Total	$272,962
				SAY	**$273,000**

Assumptions:

- Removal of crossing and restoration of Beaver Dam Brook with a rip rap lined open channel
-Control of water is necessary
-Located within FEMA Floodway, No-rise certificate required.
-Assume no cost for police detail or traffic control as project is not within a roadway.

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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Gates St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	20	CY	TOPSOIL EXCAVATED AND STACKED	$30	$600.00
141	420	CY	CLASS A TRENCH EXCAVATION	$45	$18,900.00
151.	170	CY	GRAVEL BORROW	$45	$7,650.00
151.1	50	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,500.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	40	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	30	TON	HMA FOR PATCHING	$225	$6,750.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	120	FT	TEMPORARY FENCE	$19	$2,280.00
657.5	120	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,800.00
698.1	90	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$495.00
631.	55	FT	GUARDRAIL REMOVED AND RESET	$23	$1,265.00
767.121	120	FT	SEDIMENT CONTROL BARRIER	$7	$820.80
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	135	TON	RIP RAP	$65	$8,775.00
995.011	1	LS	CULVERT STRUCTURE	$135,000	$135,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$5,000	$5,000.00
	1	LS	REPLACEMENT OF OUTLET CONTROL	$20,000	$20,000.00
	1	LS	COFFERDAM- CONTROL OF WATER	$50,000	$50,000.00
	1	LS	H&H STUDY	$50,000	$50,000.00
				Subtotal	$423,850
				Mobilization (Assumed 5%)	$21,193
				Police Detail & Traffic Control (Assumed 10%)	$42,385
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 20%)	$84,770
				Contingency (35%)	$148,348
				Subtotal	$720,546
				Permitting & Design (Assumed 25%)	$180,136
				Construction Observation (Assumed 12%)	$86,465
				Total	$987,147
				SAY	**$988,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet. This assumes need to meet Stream Crossings Standards for grant funding, however proposed culvert could be smaller if Citv-funded.
- Headwalls to be installed on upstream and downstream ends

-The replacement of this culvert will likely require coordination of a hydrologic and hydraulic study and a flood analysis. An approximate cost of $50,000 is carried for this analysis

-Additional contigency was provided for potential utility relocations (Assumed 20% of costs) given the proximity of the sewer force main, water main, and sewer pump station to the culvert

Preliminary Construction Cost Estimate

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Date: 10/13/2020

Job Number: 14484.01

Project: Wayside Inn Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	115	CY	CLASS A TRENCH EXCAVATION	$45	$5,175.00
151.	6	CY	GRAVEL BORROW	$45	$270.00
151.1	55	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,750.00
151.2	20	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,140.00
156.1	45	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$2,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
631.	15	FT	GUARDRAIL REMOVED AND RESET	$23	$345.00
657.	100	FT	TEMPORARY FENCE	$19	$1,900.00
657.5	100	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,500.00
698.1	100	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$550.00
767.121	100	FT	SEDIMENT CONTROL BARRIER	$7	$684.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	50	TON	RIP RAP	$65	$3,250.00
995.011	1	LS	CULVERT STRUCTURE	$50,000	$50,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$25,000	$25,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$1,500	$1,500.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
				Subtotal	$138,124
				Mobilization (Assumed 5%)	$6,906
				Police Detail & Traffic Control (Assumed 10%)	$13,812
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$13,812
				Contingency (35%)	$48,343
				Subtotal	$220,998
				Permitting & Design (Assumed 25%)	$55,249
				Construction Observation (Assumed 12%)	$26,520
				Total	$302,767
				SAY	**$303,000**

Assumptions:

- Replacement of the culvert with a 8' x 4' concrete box culvert
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream end only

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Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Salem End Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	690	CY	UNCLASSIFIED EXCAVATION	$40	$27,600.00
125.	30	CY	TOPSOIL EXCAVATED AND STACKED	$30	$900.00
151.	15	CY	GRAVEL BORROW	$45	$675.00
151.1	270	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$13,500.00
151.2	80	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$4,560.00
156.1	200	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$10,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	50	TON	HMA FOR PATCHING	$225	$11,250.00
482.01	80	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$240.00
482.3	80	FT	SAWCUTTING ASHALT PAVEMENT	$4	$280.00
657.	290	FT	TEMPORARY FENCE	$19	$5,510.00
657.5	290	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$4,350.00
691.	50	FT	STONE WALL REMOVED AND REBUILT	$150	$7,500.00
698.1	460	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$2,530.00
767.121	290	FT	SEDIMENT CONTROL BARRIER	$7	$1,983.60
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	255	TON	RIP RAP	$65	$16,575.00
995.011	1	LS	CULVERT STRUCTURE	$251,000	$251,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$82,000	$82,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$7,500	$7,500.00
			Subtotal		$439,753
			Mobilization (Assumed 5%)		$21,988
			Police Detail & Traffic Control (Assumed 10%)		$43,975
			Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)		$43,975
			Contingency (35%)		$153,914
			Subtotal		$703,605
			Permitting & Design (Assumed 25%)		$175,901
			Construction Observation (Assumed 12%)		$84,433
			Total		$963,939
			SAY		**$964,000**

Assumptions:

- Replacement of culvert with 12' x 6' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 12-feet, assumes grant funding. If project is City-funded proposed replacement culvert could be smaller to save cost.

- Headwalls to be installed on upstream and downstream ends
-Pavement restoration assumes road and driveway restoration

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Preliminary Construction Cost Estimate

Date: 10/13/2020

Job Number: 14484.01

Project: Parmenter Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
141	95	CY	CLASS A TRENCH EXCAVATION	$45	$4,275.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.1	45	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$2,250.00
151.2	15	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$855.00
156.1	35	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$1,750.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	15	TON	HMA FOR PATCHING	$225	$3,375.00
482.01	35	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$105.00
482.3	35	FT	SAWCUTTING ASHALT PAVEMENT	$4	$122.50
657.	90	FT	TEMPORARY FENCE	$19	$1,710.00
657.5	90	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,350.00
698.1	80	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$440.00
767.121	90	FT	SEDIMENT CONTROL BARRIER	$7	$615.60
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	35	TON	RIP RAP	$65	$2,275.00
995.011	1	LS	CULVERT STRUCTURE	$39,000	$39,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALL/WINGWALLS	$24,000	$24,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$110,931
				Mobilization (Assumed 5%)	$5,547
				Police Detail & Traffic Control (Assumed 10%)	$11,093
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$11,093
				Contingency (35%)	$38,826
				Subtotal	$177,489
				Permitting & Design (Assumed 25%)	$44,372
				Construction Observation (Assumed 12%)	$21,299
				Total	$243,160
				SAY	**$244,000**

Assumptions:

- Replacement of culvert with 7' x 4' concrete box culvert
- Given existing culvert does not carry dry weather flow no control of water costs included
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 7-feet
- Headwalls to be installed on upstream and downstream ends

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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Badger Rd Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	200	CY	CLASS A TRENCH EXCAVATION	$45	$9,000.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	85	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,250.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	65	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	20	TON	HMA FOR PATCHING	$225	$4,500.00
482.01	40	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$120.00
482.3	40	FT	SAWCUTTING ASHALT PAVEMENT	$4	$140.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
691.	15	FT	STONE WALL REMOVED AND REBUILT	$150	$2,250.00
698.1	150	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$825.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	70	TON	RIP RAP	$65	$4,550.00
995.011	1	LS	CULVERT STRUCTURE	$76,000	$76,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALL	$64,000	$64,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00
				Subtotal	$204,769
				Mobilization (Assumed 5%)	$10,238
				Police Detail & Traffic Control (Assumed 10%)	$20,477
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$20,477
				Contingency (35%)	$71,669
				Subtotal	$327,630
				Permitting & Design (Assumed 25%)	$81,907
				Construction Observation (Assumed 12%)	$39,316
				Total	$448,853
				SAY	**$449,000**

Assumptions:

- Replacement of culvert with 9' x 5' concrete box culvert
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 9-feet

- Headwalls to be installed on upstream and downstream ends

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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Fountain St Culvert Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
125.	10	CY	TOPSOIL EXCAVATED AND STACKED	$30	$300.00
141	160	CY	CLASS A TRENCH EXCAVATION	$45	$7,200.00
151.	10	CY	GRAVEL BORROW	$45	$450.00
151.1	80	CY	GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	$50	$4,000.00
151.2	25	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$1,425.00
156.1	60	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$3,000.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
451.	25	TON	HMA FOR PATCHING	$225	$5,625.00
482.01	50	FT	HOT APPLIED ASPHALTIC CRACK SEALER	$3	$150.00
482.3	50	FT	SAWCUTTING ASHALT PAVEMENT	$4	$175.00
631.	25	FT	GUARDRAIL REMOVED AND RESET	$23	$575.00
657.	130	FT	TEMPORARY FENCE	$19	$2,470.00
657.5	130	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$1,950.00
698.1	140	SY	GEOTEXTILE FABRIC FOR STABILIZATION	$6	$770.00
767.121	130	FT	SEDIMENT CONTROL BARRIER	$7	$889.20
767.9	20	SY	MATTING FOR EROSION CONTROL	$7	$132.60
983.1	65	TON	RIP RAP	$65	$4,225.00
995.011	1	LS	CULVERT STRUCTURE	$68,000	$68,000.00
996.03	1	LS	REINFORCED CONCRETE HEADWALLS/WINGWALLS	$48,000	$48,000.00
996.04	1	LS	SUPPORT OF EXCAVATION	$10,000	$10,000.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES, SEEDING)	$1,500	$1,500.00

Subtotal	$187,637
Mobilization (Assumed 5%)	$9,382
Police Detail & Traffic Control (Assumed 10%)	$18,764
Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$18,764
Contingency (35%)	$65,673
Subtotal	$300,219
Permitting & Design (Assumed 25%)	$75,055
Construction Observation (Assumed 12%)	$36,026
Total	$411,300
SAY	**$412,000**

Assumptions:

- Replacement of culvert with 8' x 4'
-Control of water is necessary
- Culvert sized to meet Stream Crossing Standards (1.2 x bankfull width) = Approximately 8-feet
- Headwalls to be installed on upstream and downstream ends

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Preliminary Construction Cost Estimate

Date: 10/13/2020
Job Number: 14484.01

Project: Garvey Rd OCS Replacement
Location: Framingham, MA
Estimator: JAD
Checked By: MC, SK

Item No.	Qty	Unit	Description	Unit Price	Amount
120.1	20	CY	UNCLASSIFIED EXCAVATION	$40	$800.00
125.	5	CY	TOPSOIL EXCAVATED AND STACKED	$30	$150.00
151.	5	CY	GRAVEL BORROW	$45	$225.00
151.2	2	CY	GRAVEL BORROW FOR BRIDGE FOUNDATION	$57	$114.00
156.1	5	TON	CRUSHED STONE FOR BRIDGE FOUNDATIONS	$50	$250.00
180.1	1	LS	HEALTH AND SAFETY PLAN	$6,000	$6,000.00
180.2	120	HR	IMPLEMENTATION OF HEALTH AND SAFETY PLAN	$90	$10,800.00
657.	200	FT	TEMPORARY FENCE	$19	$3,800.00
657.5	200	FT	TEMPORARY FENCE REMOVED AND RESET	$15	$3,000.00
767.121	200	FT	SEDIMENT CONTROL BARRIER	$7	$1,368.00
767.9	15	SY	MATTING FOR EROSION CONTROL	$7	$99.50
983.1	10	TON	RIP RAP	$65	$650.00
	1	LS	CONTROL OF WATER	$10,000	$10,000.00
	1	LS	VARIOUS SITE WORK (CLEARING & GRUBBING, LANDSCAPING, TREES,	$7,500	$7,500.00
	1	LS	OUTLET CONTROL STRUCTURE	$60,000	$60,000.00
				Subtotal	$103,957
				Mobilization (Assumed 5%)	$5,198
				Police Detail & Traffic Control (Assumed 10%)	$10,396
				Potential Utility Relocations (Water, Sewer, Gas, etc. - Assumed 10%)	$10,396
				Contingency (35%)	$36,385
				Subtotal	$166,330
				Permitting & Design (Assumed 25%)	$41,583
				Construction Observation (Assumed 12%)	$19,960
				Total	$227,873
				SAY	**$228,000**

Assumptions:

- Replacement of outlet control structure
-Control of water is necessary
-Replacement of outlet control structure only, existing 2-foot by 2-foot culvert to remain
-Assume approx. quantity 20 cubic yards of excavation

Appendix 5 – VUEWork MobileVue App

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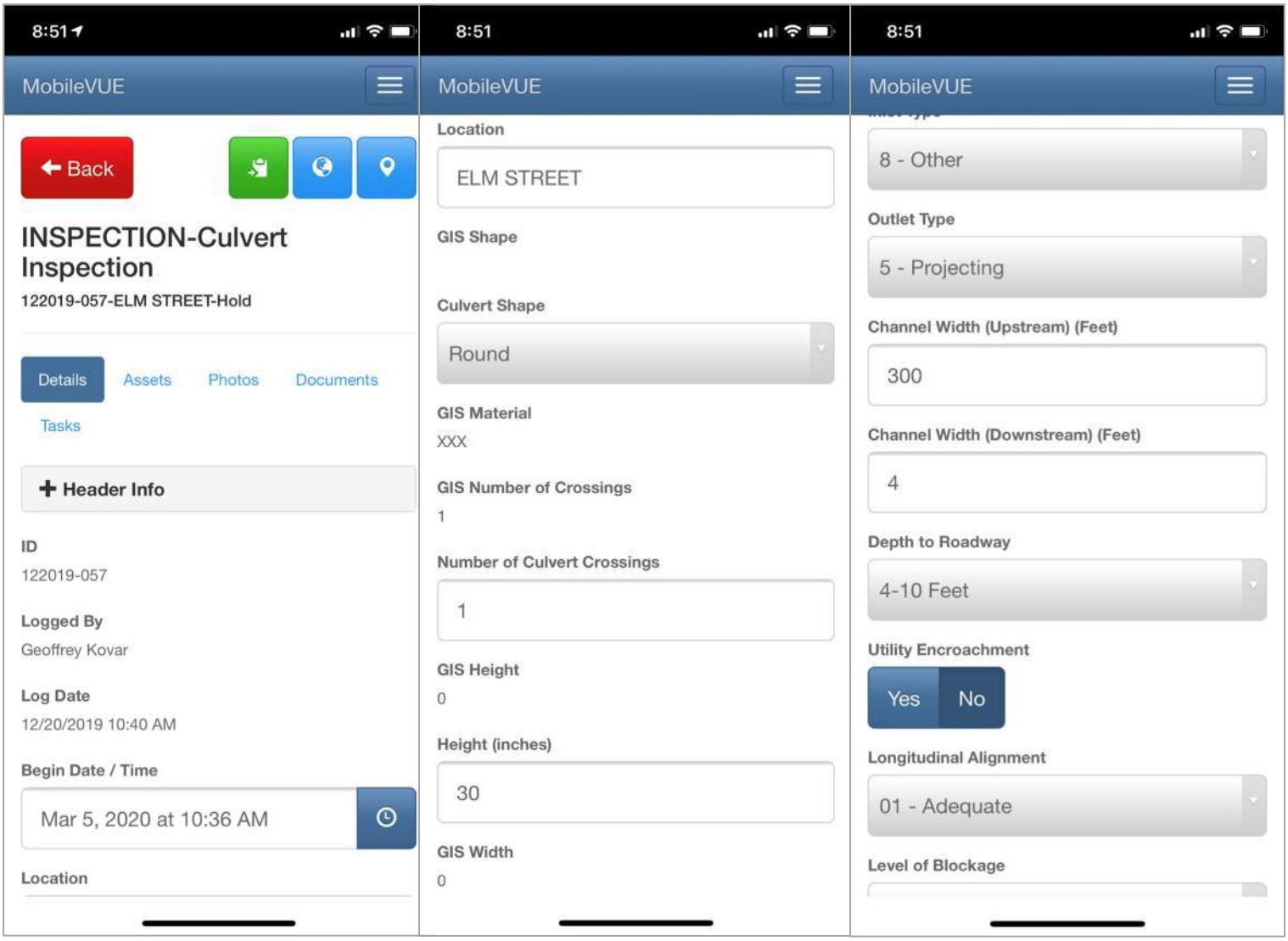
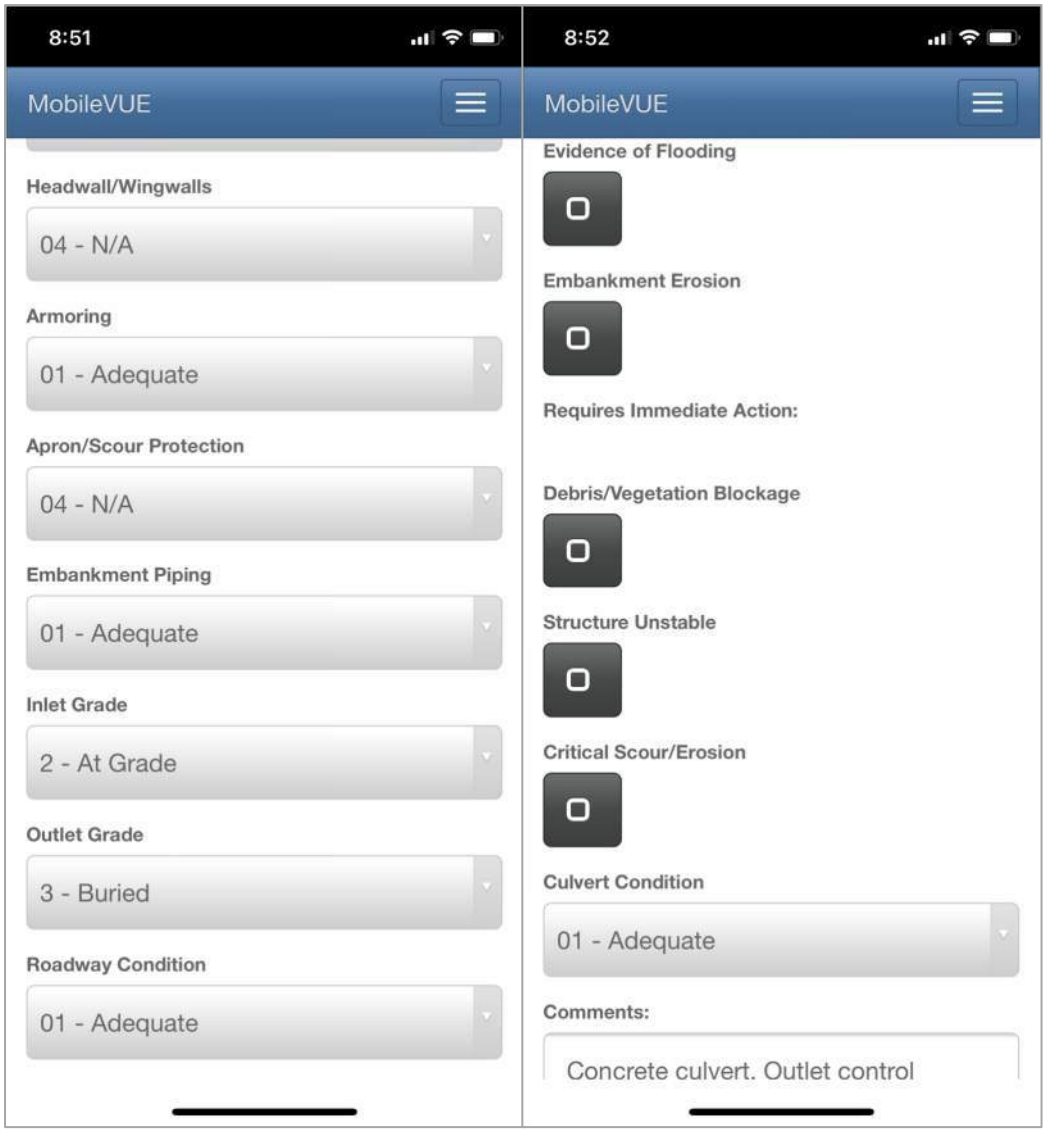

8:51
MobileVUE
Back
INSPECTION-Culvert Inspection
122019-057-ELM STREET-Hold
Details
Assets
Photos
Documents
Tasks
+ Header Info
ID
122019-057
Logged By
Geoffrey Kovar
Log Date
12/20/2019 10:40 AM
Begin Date / Time
Mar 5, 2020 at 10:36 AM
Location
8:51
MobileVUE
Location
ELM STREET
GIS Shape
Culvert Shape
Round
GIS Material
XXX
GIS Number of Crossings
1
Number of Culvert Crossings
1
GIS Height
0
Height (inches)
30
GIS Width
0
8:51
MobileVUE
8 - Other
Outlet Type
5 - Projecting
Channel Width (Upstream) (Feet)
300
Channel Width (Downstream) (Feet)
4
Depth to Roadway
4-10 Feet
Utility Encroachment
Yes
No
Longitudinal Alignment
01 - Adequate
Level of Blockage


8:51
MobileVUE
Headwall/Wingwalls
04 - N/A
Armoring
01 - Adequate
Apron/Scour Protection
04 - N/A
Embankment Piping
01 - Adequate
Inlet Grade
2 - At Grade
Outlet Grade
3 - Buried
Roadway Condition
01 - Adequate
8:52
MobileVUE
Evidence of Flooding
Embankment Erosion
Requires Immediate Action:
Debris/Vegetation Blockage
Structure Unstable
Critical Scour/Erosion
Culvert Condition
01 - Adequate
Comments:
Concrete culvert. Outlet control

City of Framingham, Massachusetts

Buffer Analysis

Tier A - 1 Mile

N
W
E
S

Potter Road Elem.
Cameron MS
Hemenway Elem.
Stapleton Elem.
King Elem.
Walsh MS
Dunning Elem.
Framingham HS
BLOCKS FHS
BLOCKS Juniper
Brophy Elem.
Fuller MS
McCarthy Elem.
Thayer Campus
Barbieri Elem.
Woodrow Wilson Elem.

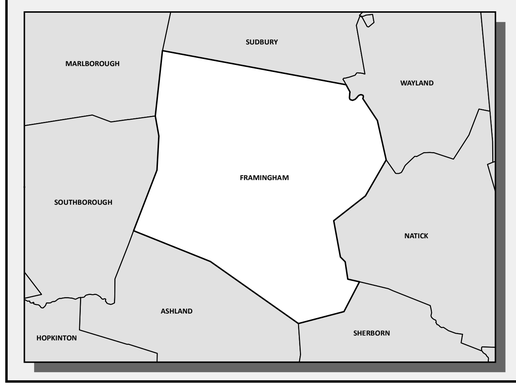
126
135
30
90
9

Distance (FT)

5,280
4,000
2,640
1,500
750
0

Legend

Schools



DRAFT

Issue Date: June 17, 2021

This Map is Intended for Planning Purposes Only

0 0.25 0.5 Miles

BETA
IMPROVING COMMUNITIES TOGETHER

Curb Ramp Inventory & Assessment

Final Report

City of Framingham, Massachusetts

Date: February 10, 2019

Date of Inspections: Summer 2019

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

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Curb Ramp Inventory Reports

Perpendicular Ramps

- Ramp Totals by Street
- Ramp Totals by Street with Inspection Data
- Ramp Locations with Obstructions
- Ramps Sorted by Street with Inspections Data and Picture
- Ramp Compliance Summary
    - Compliance By Street with Inspection Data
    - Non-Compliance By Street with Inspection Data
    - Retrofit Candidates

Parallel Ramps

- Ramp Totals by Street
- Ramp Totals by Street with Inspection Data
- Ramp Locations with Obstructions
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- Ramp Compliance Summary
    - Compliance By Street with Inspection Data
    - Non-Compliance By Street with Inspection Data
    - Retrofit Candidates

Potential Ramps

- Intersections with Sidewalks and Potential Ramps Summary
- Intersections with Sidewalks and No Ramps - By Location

Maps:

- *Curb Ramp Inventory & Assessment – Existing Conditions (36”x48“)*

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals

Street	Number of Ramps
A STREET	2
ANDERSON ROAD	4
APPLE D'OR ROAD	2
AUBURN STREET	2
BACON ROAD	2
BALDWIN AVENUE	1
BEACON STREET	16
BEAVER STREET	17
BELKNAP ROAD	6
BETHANY ROAD	4
BEULAH STREET	2
BIRCH ROAD	4
BLANDIN AVENUE	1
BRADFORD ROAD	2
BRIDGES STREET	5
BRIDGES STREET EXTENSION	2
BRIGATI TERRACE	2
BROOK STREET	21
BROOKFIELD AVENUE	2
BROWNLEA ROAD	2
BURR STREET	4
CAMPELLO ROAD	2
CEDAR STREET	4
CENTRAL STREET	6
CHERRY STREET	2
CLEARVIEW DRIVE	2
CLIFFORD STREET	4
COBURN STREET	6
COCHITUATE ROAD	7
CONANT ROAD	2
CONCORD STREET	26
COSTA CIRCLE	2
COTTAGE STREET	2
COVE AVENUE	2

Street	Number of Ramps
CYPRESS STREET	2
DANFORTH STREET	23
DAYTONA AVENUE	2
DONOVAN DRIVE	2
DOTTY ANN DRIVE	2
DOW STREET	2
EATON ROAD	2
EDGELL ROAD	10
EISENHOWER ROAD	2
ELIOT STREET	2
ELLIS STREET	2
ELM STREET	3
ELMFIELD ROAD	2
EMILY ROAD	2
FAIRBROOK ROAD	2
FAIRFIELD ROAD	2
FAY ROAD	4
FENWICK STREET	5
FENWOOD STREET	2
FLAGG DRIVE	2
FOUNTAIN STREET	2
FRANKLIN STREET	4
GARVEY ROAD	2
GIBSON DRIVE	2
GIL LEONARD LANE	1
GILBERT STREET	2
GOODNOW LANE	1
GRANT STREET	2
GREENLEAF CIRCLE	2
GREGORY ROAD	2
HADLEY ROAD	2
HAMILTON STREET	4
HARDY STREET	3
HARTFORD STREET	18
HEMENWAY ROAD	2
HIALEAH LANE	2
HILTON STREET	4

Street	Number of Ramps
INDIAN HEAD ROAD	10
IRVING STREET	2
JOHN J BRADY DRIVE	2
JOHN J. GALLAGHER DRIVE	2
JOHN MCQUINN CIRCLE	1
JOSEPH ROAD	2
JOYCE LUNDBERG DRIVE	2
JOYCE ROAD	1
KELLOGG STREET	2
KENDALL AVENUE	14
KNIGHT ROAD	2
KNOX AVENUE	2
LANCASTER DRIVE	2
LANEWOOD AVENUE	2
LARRABEE AVENUE	2
LEGGATT MCCALL	9
LELAND STREET	2
LEO CHASSE WAY	2
LIBERTY STREET	2
LINDA AVENUE	2
LITTLE TREE LANE	2
LOCKLAND AVENUE	1
MAIN STREET	4
MAJOR HALE DRIVE	1
MARY AGNES ROAD	2
MAYNARD ROAD	5
MELLEN STREET	4
MERRIAM ROAD	2
MICHAUD DRIVE	2
MILL STREET	2
MONTEREY LANE	1
MURPHY CIRCLE	2
NAPLES STREET	4
NEWBURY STREET	5
NICHOLAS ROAD	4
NORMANDY ROAD	2
NORMANDY ROAD	7

Street	Number of Ramps
OAK CREST DRIVE	2
OAK STREET	4
OAKWOOD COURT	2
OLD CONNECTICUT PATH	24
OLD WOOD ROAD	2
OLD WORCESTER ROAD	3
PALMETTO AVENUE	2
PAMELA ROAD	2
PARKING LOT	5
PERSHING AVENUE	4
PLEASANT STREET	5
POTTER ROAD	12
PROSPECT STREET	6
RESERVOIR RIDGE	2
RHUBENA STREET	2
RIVERPATH DRIVE	2
RON'S WAY	2
ROSE KENNEDY LANE	1
ROYAL MEADOW LANE	1
SAGE LANE	1
SALEM END ROAD	4
SAUCIER STREET	2
SAVOY ROAD	2
SAXONY ROAD	2
SCHOOL ENTRANCE	4
SCHOOL STREET	7
SECOND STREET	6
SHEFFIELD ROAD	2
SLOANE DRIVE	1
SPEEN STREET	4
SPRING LANE	2
STATE STREET	2
SUDBURY LANDING	2
SUMMER STREET	2
SUN VALLEY DRIVE	1
SWANSON ROAD	2
TEMI ROAD	2

Street	Number of Ramps
TEMPLE STREET	4
THELMA ROAD	2
THIRD STREET	4
TREELAND DRIVE	2
UPTON ROAD	2
VERNON STREET	13
WALKERS WAY	2
WARREN PLACE	2
WATER STREET	31
WAVENEY ROAD	2
WAVERLEY STREET	35
WESLEY ROAD	2
WEST STREET	2
WHITING ROAD	2
WHITTIER STREET	6
WILDE AVENUE	2
WILSON AVENUE	2
WINTER STREET	7
WINTHROP STREET	11
WINTHROP TERRACE	2
WOODLEIGH ROAD	6
WOODMERE ROAD	2
WOODSIDE COTTAGE WAY	2
WYNDSTONE WAY	2
Total:	**693**

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals - By Street With Inspection Data

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
A STREET		**2 Ramps**				
At CONCORD STREET		2 Ramps				
222.4	Yes	Yes	Good	Concrete	Yes	Utillity Pole
222.5	Yes	No	Good	Concrete	Yes	Gate
ANDERSON ROAD		**4 Ramps**				
At BROOK STREET		4 Ramps				
90.1	No	No	Fair	Asphalt	Yes	Man Hole
90.2	No	No	Fair	Concrete	No	None
90.3	No	No	Fair	Concrete	No	None
90.4	No	No	Poor	Asphalt	No	None
APPLE D'OR ROAD		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
126.1	No	No	Fair	Asphalt	No	None
126.2	No	No	Fair	Asphalt	No	None
AUBURN STREET		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
316.1	Yes	No	Good	Concrete	No	None
316.2	Yes	No	Good	Concrete	No	None
BACON ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
118.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
118.2	Yes	No	Good	Concrete	No	None
BALDWIN AVENUE		**1 Ramps**				
At APPLE D'OR ROAD		1 Ramps				
131.1	No	No	Fair	Asphalt	No	None
BEACON STREET		**16 Ramps**				
At CAVANAUGH ROAD		2 Ramps				
275.1	No	No	Fair	Asphalt	No	None
275.2	No	No	Fair	Asphalt	No	None
At COCHITUATE ROAD		4 Ramps				
295.1	Yes	No	Good	Concrete	No	None
295.2	Yes	No	Good	Concrete	No	None
295.4	Yes	No	Good	Concrete	No	None
295.5	Yes	No	Good	Concrete	No	None
At FAIRBANKS WAY		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
265.1	No	No	Fair	Asphalt	No	None
265.2	No	No	Poor	Asphalt	No	None
At HASTINGS STREET		2 Ramps				
260.1	No	No	Fair	Asphalt	No	None
260.2	No	No	Fair	Asphalt	No	None
At LOHNES ROAD		2 Ramps				
279.1	No	No	Fair	Asphalt	No	None
279.2	No	No	Fair	Asphalt	No	None
At MAGNOLIA STREET		2 Ramps				
277.1	No	No	Fair	Asphalt	No	None
277.2	No	No	Fair	Asphalt	No	None
At WORCESTER ROAD		2 Ramps				
297.1	Yes	No	Good	Concrete	No	None
297.2	Yes	No	Good	Concrete	No	None
BEAVER STREET		**17 Ramps**				
At BEAVER COURT		2 Ramps				
500.1	Yes	No	Good	Concrete	No	None
500.2	Yes	No	Fair	Concrete	No	None
At BEAVER PARK ROAD		2 Ramps				
502.1	Yes	Yes	Good	Concrete	No	None
502.2	Yes	No	Good	Concrete	No	None
At FIRST STREET		2 Ramps				
502.3	Yes	No	Good	Concrete	No	None
502.4	Yes	No	Good	Concrete	No	None
At MARIAN ROAD		2 Ramps				
501.1	Yes	No	Good	Concrete	No	None
501.2	Yes	No	Good	Concrete	No	None
At PARKING LOT		6 Ramps				
499.1	Yes	No	Good	Concrete	No	None
499.2	Yes	No	Good	Concrete	No	None
577.1	Yes	No	Good	Concrete	No	None
577.2	Yes	No	Good	Concrete	No	None
578.1	Yes	No	Good	Concrete	No	None
578.2	Yes	No	Good	Concrete	Yes	Curbing
At SECOND STREET		1 Ramps				
503.3	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
498.3	Yes	No	Good	Concrete	No	None
498.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
BELKNAP ROAD		**6 Ramps**				
At CLEARVIEW DRIVE		2 Ramps				
22.3	Yes	No	Good	Concrete	No	None
22.4	Yes	No	Good	Concrete	No	None
At FLANAGAN DRIVE		2 Ramps				
30.1	Yes	No	Good	Concrete	Yes	Curbing
30.2	Yes	No	Fair	Concrete	No	None
At PLEASANT STREET		2 Ramps				
23.1	Yes	No	Good	Concrete	No	None
23.2	Yes	No	Good	Concrete	No	None
BETHANY ROAD		**4 Ramps**				
At WAVERLEY STREET		2 Ramps				
535.1	Yes	No	Good	Concrete	No	None
535.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
553.1	Yes	No	Good	Concrete	No	None
553.2	Yes	No	Good	Concrete	No	None
BEULAH STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
322.1	Yes	No	Fair	Concrete	No	None
322.2	Yes	No	Fair	Concrete	No	None
BIRCH ROAD		**4 Ramps**				
At OLD CONNECTICUT PATH		4 Ramps				
199.2	No	No	Fair	Asphalt	No	None
199.3	No	No	Fair	Asphalt	No	None
200.1	No	No	Fair	Asphalt	No	None
200.2	No	No	Fair	Asphalt	No	None
BLANDIN AVENUE		**1 Ramps**				
At BEAVER STREET		1 Ramps				
499.4	Yes	No	Fair	Asphalt	No	None
BRADFORD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
171.3	Yes	Yes	Good	Concrete	No	None
171.4	Yes	No	Good	Concrete	No	None
BRIDGES STREET		**5 Ramps**				
At COBURN STREET		2 Ramps				
564.3	Yes	No	Good	Concrete	No	None
564.4	Yes	No	Fair	Concrete	No	None
At NAPLES STREET		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
570.2	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
534.1	Yes	No	Good	Concrete	No	None
534.2	Yes	No	Good	Concrete	No	None
BRIDGES STREET EXTENSION		**2 Ramps**				
At COBURN STREET		2 Ramps				
564.1	Yes	No	Good	Concrete	No	None
564.2	Yes	No	Good	Concrete	No	None
BRIGATI TERRACE		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
191.3	Yes	No	Good	Concrete	No	None
191.4	Yes	No	Good	Concrete	No	None
BROOK STREET		**21 Ramps**				
At BROOKBURY CIRCLE		2 Ramps				
94.1	No	No	Good	Concrete	No	None
94.2	Yes	No	Good	Concrete	No	None
At FROST STREET		3 Ramps				
89.1	No	No	Fair	Concrete	No	None
89.2	No	No	Fair	Concrete	No	None
89.3	No	No	Fair	Concrete	No	None
At LEIGH STREET		2 Ramps				
88.3	No	No	Fair	Concrete	No	None
88.4	No	No	Fair	Concrete	No	None
At MEREDITH CIRCLE		2 Ramps				
88.1	No	No	Fair	Concrete	Yes	Vegetation
88.2	No	No	Fair	Concrete	No	None
At PERRY H. HENDERSON DRIVE		2 Ramps				
87.3	No	No	Fair	Concrete	No	None
87.4	No	No	Fair	Concrete	No	None
At SALVI DRIVE		2 Ramps				
94.3	No	No	Good	Concrete	No	None
94.4	No	No	Good	Concrete	No	None
At SCHOOL ENTRANCE		2 Ramps				
86.3	No	No	Good	Concrete	No	None
86.4	No	No	Good	Concrete	No	None
At WARD FARM CIRCLE		2 Ramps				
87.1	No	No	Fair	Concrete	No	None
87.2	No	No	Fair	Concrete	No	None
At WATER STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
96.1	No	No	Good	Concrete	No	None
96.2	Yes	No	Good	Concrete	No	None
At WILD OAK RISE		2 Ramps				
84.1	No	No	Fair	Concrete	No	None
84.2	No	No	Fair	Asphalt	No	None
BROOKFIELD AVENUE		**2 Ramps**				
At BROOK STREET		2 Ramps				
95.1	No	No	Fair	Concrete	No	None
95.2	No	No	Fair	Concrete	No	None
BROWNLEA ROAD		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
210.1	No	No	Fair	Concrete	No	None
210.2	No	No	Fair	Concrete	No	None
BURR STREET		**4 Ramps**				
At COCHITUATE ROAD		2 Ramps				
243.1	No	No	Fair	Asphalt	No	None
243.2	No	No	Good	Concrete	No	None
At LEGGATT MCCALL CONNECTOR		2 Ramps				
244.1	No	No	Fair	Asphalt	No	None
244.2	No	No	Fair	Asphalt	No	None
CAMPELLO ROAD		**2 Ramps**				
At CONCORD STREET		2 Ramps				
235.1	Yes	No	Good	Concrete	No	None
235.2	Yes	No	Good	Concrete	No	None
CEDAR STREET		**4 Ramps**				
At CYPRESS STREET		2 Ramps				
561.1	Yes	No	Good	Concrete	No	None
561.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
560.1	Yes	Yes	Fair	Concrete	No	None
560.2	Yes	No	Fair	Concrete	No	None
CENTRAL STREET		**6 Ramps**				
At INDIAN HEAD ROAD		2 Ramps				
303.1	Yes	No	Good	Concrete	No	None
303.2	Yes	No	Good	Concrete	No	None
At MICHAUD DRIVE		2 Ramps				
306.3	Yes	No	Good	Concrete	No	None
306.4	Yes	No	Good	Concrete	No	None
At WATER STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
105.1	Yes	No	Good	Concrete	No	None
105.2	Yes	No	Good	Concrete	No	None
CHERRY STREET		**2 Ramps**				
At CONCORD STREET		2 Ramps				
239.1	Yes	No	Fair	Asphalt	No	None
239.2	Yes	No	Good	Concrete	No	None
CLEARVIEW DRIVE		**2 Ramps**				
At BELKNAP ROAD		2 Ramps				
22.1	Yes	No	Good	Concrete	No	None
22.2	Yes	No	Good	Concrete	No	None
CLIFFORD STREET		**4 Ramps**				
At BRIDGES STREET EXTENSION		2 Ramps				
563.1	Yes	No	Good	Concrete	No	None
563.2	Yes	No	Good	Concrete	Yes	Vegetation
At MELLEN STREET		2 Ramps				
562.1	Yes	No	Fair	Concrete	No	None
562.2	Yes	No	Good	Concrete	No	None
COBURN STREET		**6 Ramps**				
At BETHANY ROAD		2 Ramps				
554.1	Yes	No	Good	Concrete	No	None
554.2	Yes	No	Good	Concrete	No	None
At MELLEN STREET		2 Ramps				
566.1	Yes	No	Good	Concrete	No	None
566.2	Yes	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
565.1	Yes	No	Good	Concrete	No	None
565.2	Yes	No	Good	Concrete	Yes	Sign
COCHITUATE ROAD		**7 Ramps**				
At BEACON STREET		2 Ramps				
295.3	Yes	No	Good	Concrete	No	None
295.6	Yes	No	Good	Concrete	No	None
At SPEEN STREET		2 Ramps				
252.6	No	No	Fair	Concrete	No	None
252.7	Yes	No	Good	Concrete	No	None
At WHITTIER STREET		3 Ramps				
242.1	No	No	Good	Concrete	Yes	Excessive Ldg Slope
242.2	No	No	Good	Concrete	No	None
242.3	No	No	Fair	Concrete	No	None
CONANT ROAD		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At WINTHROP STREET		2 Ramps				
536.1	Yes	No	Good	Concrete	No	None
536.2	Yes	No	Good	Concrete	No	None
CONCORD STREET		**26 Ramps**				
At A STREET		6 Ramps				
222.1	Yes	No	Good	Concrete	No	None
222.2	Yes	No	Good	Concrete	No	None
222.3	Yes	No	Good	Concrete	Yes	Curbing
222.6	Yes	No	Good	Concrete	Yes	Utility Access
222.7	Yes	No	Good	Concrete	No	None
222.8	Yes	No	Good	Concrete	No	None
At CHERRY STREET		2 Ramps				
239.3	Yes	No	Good	Concrete	No	None
239.4	Yes	No	Good	Concrete	No	None
At DONLON STREET		2 Ramps				
236.1	Yes	No	Good	Concrete	No	None
236.2	Yes	No	Good	Concrete	No	None
At FEMIA ROAD		2 Ramps				
237.1	Yes	No	Good	Concrete	No	None
237.2	Yes	No	Good	Concrete	No	None
At GIBBS STREET		2 Ramps				
238.1	Yes	No	Good	Concrete	No	None
238.2	Yes	No	Good	Concrete	No	None
At HARTFORD STREET		4 Ramps				
520.1	Yes	No	Good	Concrete	No	None
520.2	Yes	No	Good	Concrete	No	None
520.5	Yes	No	Fair	Concrete	No	None
520.6	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
At NORMANDY ROAD		2 Ramps				
518.3	Yes	No	Good	Concrete	No	None
518.6	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
230.10	Yes	No	Good	Concrete	No	None
230.3	Yes	No	Good	Concrete	No	None
At SCHOOL STREET		2 Ramps				
221.1	Yes	No	Good	Concrete	No	None
221.2	Yes	No	Good	Concrete	No	None
At THELMA ROAD		2 Ramps				
518.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
518.7	Yes	No	Good	Concrete	No	None
COSTA CIRCLE		**2 Ramps**				
At WATER STREET		2 Ramps				
101.1	Yes	No	Good	Concrete	No	None
101.2	Yes	No	Good	Concrete	No	None
COTTAGE STREET		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
185.3	Yes	No	Good	Concrete	No	None
185.4	Yes	No	Good	Concrete	No	None
COVE AVENUE		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
556.1	Yes	No	Good	Concrete	No	None
556.2	Yes	No	Good	Concrete	No	None
CYPRESS STREET		**2 Ramps**				
At MELLEN STREET		2 Ramps				
559.1	Yes	No	Good	Concrete	No	None
559.2	Yes	No	Good	Concrete	No	None
DANFORTH STREET		**23 Ramps**				
At BRIGATI TERRACE		2 Ramps				
191.5	Yes	No	Good	Concrete	No	None
191.6	Yes	No	Good	Concrete	No	None
At COLBY AVENUE		2 Ramps				
189.1	Yes	No	Good	Concrete	No	None
189.2	Yes	No	Good	Concrete	No	None
At CONCORD STREET		2 Ramps				
181.1	No	No	Poor	Concrete	No	None
181.2	No	No	Fair	Concrete	No	None
At COTTAGE STREET		2 Ramps				
185.1	Yes	No	Good	Concrete	No	None
185.2	Yes	No	Good	Concrete	No	None
At DANFORTH COURT		2 Ramps				
182.3	Yes	No	Good	Concrete	No	None
182.4	Yes	No	Good	Concrete	No	None
At DERBY STREET		1 Ramps				
187.1	Yes	No	Good	Concrete	No	None
At FENWOOD STREET		1 Ramps				
187.2	Yes	No	Good	Concrete	No	None
At HIALEAH LANE		1 Ramps				
188.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At KING STREET		2 Ramps				
182.1	Yes	No	Good	Concrete	No	None
182.2	Yes	No	Good	Concrete	No	None
At MEADOW STREET		2 Ramps				
186.1	Yes	No	Good	Concrete	No	None
186.2	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
192.1	Yes	No	Good	Concrete	No	None
192.2	Yes	No	Good	Concrete	No	None
At SAXONY ROAD		2 Ramps				
190.1	Yes	No	Good	Concrete	No	None
190.2	Yes	No	Good	Concrete	No	None
At STEARNS STREET		2 Ramps				
184.1	Yes	No	Good	Concrete	No	None
184.2	Yes	No	Good	Concrete	No	None
DAYTONA AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
543.1	Yes	No	Good	Concrete	No	None
543.2	Yes	No	Good	Concrete	No	None
DONOVAN DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
125.1	No	No	Fair	Asphalt	No	None
125.2	No	No	Fair	Asphalt	No	None
DOTTY ANN DRIVE		**2 Ramps**				
At WATER STREET		2 Ramps				
109.1	Yes	No	Good	Concrete	No	None
109.2	Yes	No	Good	Concrete	No	None
DOW STREET		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
558.5	Yes	No	Good	Concrete	No	None
558.6	Yes	No	Good	Concrete	No	None
EATON ROAD		**2 Ramps**				
At EATON PINES LANE		1 Ramps				
167.1	No	No	Good	Asphalt	No	None
At POTTER ROAD		1 Ramps				
168.1	No	No	Fair	Asphalt	No	None
EDGELL ROAD		**10 Ramps**				
At AUBURN STREET		1 Ramps				
316.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At EDMANDS ROAD		1 Ramps				
121.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
At PARKING LOT		1 Ramps				
316.4	Yes	Yes	Good	Concrete	No	None
At VERNON STREET		3 Ramps				
315.1	Yes	No	Good	Concrete	No	None
315.2	Yes	No	Good	Concrete	No	None
315.7	Yes	No	Good	Concrete	No	None
At WATER STREET		2 Ramps				
121.5	Yes	No	Good	Concrete	No	None
121.6	Yes	No	Good	Concrete	No	None
At WHITING ROAD		2 Ramps				
124.3	Yes	No	Good	Concrete	Yes	Curbing
124.4	Yes	No	Good	Concrete	No	None
EISENHOWER ROAD		**2 Ramps**				
At EATON ROAD		2 Ramps				
157.1	Yes	No	Good	Concrete	No	None
157.2	Yes	No	Good	Concrete	No	None
ELIOT STREET		**2 Ramps**				
At HARTFORD STREET		2 Ramps				
521.1	No	No	Fair	Asphalt	No	None
521.2	No	No	Fair	Asphalt	No	None
ELLIS STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
333.1	Yes	No	Good	Concrete	No	None
333.2	Yes	No	Good	Concrete	No	None
ELM STREET		**3 Ramps**				
At POTTER ROAD		3 Ramps				
175.3	Yes	No	Good	Concrete	No	None
175.5	Yes	Yes	Good	Concrete	No	None
175.6	Yes	Yes	Good	Concrete	No	None
ELMFIELD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
174.1	Yes	No	Good	Concrete	No	None
174.2	Yes	No	Good	Concrete	No	None
EMILY ROAD		**2 Ramps**				
At HARDY STREET		2 Ramps				
233.1	Yes	No	Good	Concrete	No	None
233.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
FAIRBROOK ROAD		**2 Ramps**				
At BROOK STREET		2 Ramps				
92.1	No	No	Fair	Concrete	No	None
92.2	No	No	Fair	Concrete	No	None
FAIRFIELD ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
99.1	Yes	No	Good	Concrete	No	None
99.2	Yes	No	Good	Concrete	No	None
FAY ROAD		**4 Ramps**				
At OLD CENTRAL TURNPIKE		2 Ramps				
551.1	No	No	Fair	Asphalt	No	None
551.2	No	No	Fair	Asphalt	No	None
At WAVERLEY STREET		2 Ramps				
547.1	Yes	No	Good	Concrete	No	None
547.2	Yes	No	Good	Concrete	No	None
FENWICK STREET		**5 Ramps**				
At BROOK STREET		4 Ramps				
83.1	No	No	Fair	Asphalt	No	None
83.2	No	No	Fair	Concrete	No	None
83.3	No	No	Fair	Concrete	No	None
83.4	No	No	Fair	Asphalt	No	None
At WICKFORD ROAD		1 Ramps				
79.1	No	No	Fair	Asphalt	No	None
FENWOOD STREET		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
187.3	Yes	No	Good	Concrete	No	None
187.4	Yes	No	Good	Concrete	No	None
FLAGG DRIVE		**2 Ramps**				
At NORMANDY ROAD EXTENSION		2 Ramps				
515.1	Yes	No	Good	Concrete	No	None
515.2	Yes	No	Good	Concrete	No	None
FOUNTAIN STREET		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
532.5	Yes	No	Good	Concrete	No	None
532.6	Yes	No	Good	Concrete	No	None
FRANKLIN STREET		**4 Ramps**				
At MAIN STREET		2 Ramps				
400.1	Yes	No	Good	Concrete	No	None
400.2	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At MOULTON PARK ROAD		2 Ramps				
407.1	Yes	No	Good	Concrete	No	None
407.2	Yes	Yes	Good	Concrete	No	None
GARVEY ROAD		**2 Ramps**				
At EDMANDS ROAD		2 Ramps				
7.1	No	No	Fair	Asphalt	No	None
9.1	No	No	Fair	Asphalt	No	None
GIBSON DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
128.1	No	No	Poor	Asphalt	Yes	Vegetation
128.2	No	No	Fair	Asphalt	No	None
GIL LEONARD LANE		**1 Ramps**				
At WYNDSTONE WAY		1 Ramps				
312.1	No	No	Fair	Asphalt	No	None
GILBERT STREET		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
560.3	Yes	No	Good	Concrete	No	None
560.4	Yes	No	Good	Concrete	No	None
GOODNOW LANE		**1 Ramps**				
At GATES STREET		1 Ramps				
353.1	No	No	Fair	Asphalt	No	None
GRANT STREET		**2 Ramps**				
At JOHN J. GALLAGHER DRIVE		2 Ramps				
475.1	Yes	No	Good	Concrete	No	None
475.2	Yes	No	Good	Concrete	No	None
GREENLEAF CIRCLE		**2 Ramps**				
At NEWBURY STREET		2 Ramps				
240.1	Yes	No	Good	Concrete	No	None
240.2	Yes	No	Good	Concrete	No	None
GREGORY ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
116.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
116.2	Yes	No	Good	Concrete	No	None
HADLEY ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
165.1	Yes	No	Good	Concrete	No	None
165.2	Yes	No	Good	Concrete	No	None
HAMILTON STREET		**4 Ramps**				
At JACKSON PLACE		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
220.1	No	No	Fair	Concrete	Yes	Curbing
220.2	No	No	Fair	Concrete	No	None
At SCHOOL STREET		2 Ramps				
219.3	No	No	Fair	Concrete	No	None
219.4	No	No	Fair	Concrete	No	None
HARDY STREET		**3 Ramps**				
At CONCORD STREET		2 Ramps				
234.1	Yes	No	Good	Concrete	No	None
234.2	Yes	No	Good	Concrete	No	None
At DEBRA LANE		1 Ramps				
231.3	Yes	No	Good	Concrete	No	None
HARTFORD STREET		**18 Ramps**				
At BELVIDERE ROAD		2 Ramps				
526.1	No	No	Fair	Asphalt	No	None
526.2	No	No	Fair	Asphalt	No	None
At C STREET		2 Ramps				
525.1	No	No	Fair	Asphalt	No	None
525.2	No	No	Fair	Asphalt	No	None
At CONCORD STREET		2 Ramps				
520.3	Yes	No	Good	Concrete	No	None
520.4	Yes	No	Fair	Concrete	No	None
At DYER STREET		2 Ramps				
522.1	Yes	No	Good	Concrete	No	None
522.2	Yes	No	Good	Concrete	No	None
At GRANT STREET		3 Ramps				
526.3	No	No	Fair	Asphalt	No	None
527.1	No	No	Fair	Asphalt	No	None
527.2	No	No	Fair	Asphalt	No	None
At HARRISON STREET		2 Ramps				
524.1	No	No	Fair	Asphalt	No	None
524.2	No	No	Fair	Asphalt	No	None
At HOWE STREET		2 Ramps				
523.1	No	No	Fair	Asphalt	No	None
523.2	No	No	Fair	Asphalt	No	None
At LOKER STREET		2 Ramps				
527.3	No	No	Fair	Asphalt	No	None
527.4	No	No	Fair	Asphalt	No	None
At UNDERWOOD STREET		1 Ramps				
528.1	No	No	Fair	Asphalt	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
HEMENWAY ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
117.1	Yes	No	Good	Concrete	No	None
117.2	Yes	Yes	Good	Concrete	Yes	Excessive Ldg Slope
HIALEAH LANE		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
188.1	Yes	No	Good	Concrete	No	None
188.2	Yes	Yes	Good	Concrete	No	None
HILTON STREET		**4 Ramps**				
At BRIDGES STREET		2 Ramps				
569.1	Yes	No	Good	Concrete	No	None
569.2	Yes	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
567.1	Yes	No	Good	Concrete	No	None
567.2	Yes	No	Good	Concrete	No	None
INDIAN HEAD ROAD		**10 Ramps**				
At CRESTWOOD ROAD		2 Ramps				
302.1	Yes	No	Good	Concrete	No	None
302.2	Yes	No	Good	Concrete	No	None
At DONNA ROAD		2 Ramps				
299.1	Yes	No	Good	Concrete	No	None
299.2	Yes	No	Good	Concrete	No	None
At INDIAN HEAD HEIGHTS		2 Ramps				
301.1	Yes	No	Good	Concrete	No	None
301.2	Yes	No	Good	Concrete	No	None
At LOCKLAND AVENUE		2 Ramps				
300.1	Yes	No	Good	Concrete	No	None
300.2	Yes	Yes	Good	Concrete	No	None
At SUMMER STREET		2 Ramps				
298.1	Yes	Yes	Good	Concrete	No	None
298.2	Yes	No	Good	Concrete	No	None
IRVING STREET		**2 Ramps**				
At HERBERT STREET		1 Ramps				
487.1	Yes	No	Good	Concrete	No	None
At LORING DRIVE		1 Ramps				
487.2	No	No	Fair	Concrete	Yes	Curbing
JOHN J BRADY DRIVE		**2 Ramps**				
At NORMANDY ROAD EXTENSION		2 Ramps				
574.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
574.4	Yes	No	Good	Concrete	No	None
JOHN J. GALLAGHER DRIVE	**2 Ramps**					
At EVERIT AVENUE	2 Ramps					
476.1	Yes	No	Good	Concrete	No	None
476.2	Yes	No	Good	Concrete	No	None
JOHN MCQUINN CIRCLE	**1 Ramps**					
At WAVENEY ROAD	1 Ramps					
57.1	No	No	Fair	Asphalt	No	None
JOSEPH ROAD	**2 Ramps**					
At WATER STREET	2 Ramps					
107.1	Yes	No	Good	Concrete	No	None
107.2	Yes	No	Good	Concrete	No	None
JOYCE LUNDBERG DRIVE	**2 Ramps**					
At WATER STREET	2 Ramps					
110.1	Yes	No	Good	Concrete	No	None
110.2	Yes	Yes	Good	Concrete	No	None
JOYCE ROAD	**1 Ramps**					
At POTTER ROAD	1 Ramps					
163.1	No	No	Good	Asphalt	No	None
KELLOGG STREET	**2 Ramps**					
At CENTRAL STREET	2 Ramps					
309.2	No	No	Poor	Concrete	No	None
309.3	No	No	Poor	Concrete	No	None
KENDALL AVENUE	**14 Ramps**					
At ALLA STREET	2 Ramps					
510.1	Yes	No	Good	Concrete	No	None
510.2	Yes	No	Good	Concrete	No	None
At AMERICA STREET	2 Ramps					
508.1	Yes	No	Good	Concrete	No	None
508.2	Yes	No	Good	Concrete	No	None
At CURTIS STREET	2 Ramps					
507.1	Yes	No	Good	Concrete	No	None
507.2	Yes	No	Good	Concrete	No	None
At GLEN STREET	2 Ramps					
506.1	Yes	No	Good	Concrete	No	None
506.2	Yes	No	Good	Concrete	No	None
At KENDALL LANE	2 Ramps					
510.3	Yes	No	Good	Concrete	No	None
510.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At LELAND STREET		2 Ramps				
505.3	Yes	No	Good	Concrete	No	None
505.4	Yes	No	Good	Concrete	No	None
At STILLMAN STREET		2 Ramps				
509.1	Yes	No	Good	Concrete	No	None
509.2	Yes	No	Good	Concrete	No	None
KNIGHT ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
46.1	Yes	No	Good	Concrete	No	None
46.2	Yes	No	Good	Concrete	No	None
KNOX AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
545.1	Yes	No	Good	Concrete	No	None
545.2	Yes	No	Good	Concrete	No	None
LANCASTER DRIVE		**2 Ramps**				
At POTTER ROAD		2 Ramps				
164.1	Yes	No	Good	Concrete	No	None
164.2	Yes	No	Good	Concrete	No	None
LANEWOOD AVENUE		**2 Ramps**				
At CURRIER DRIVE		1 Ramps				
66.1	No	No	Fair	Asphalt	No	None
At WAVENEY ROAD		1 Ramps				
56.1	No	No	Poor	Asphalt	No	None
LARRABEE AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
539.1	Yes	No	Good	Concrete	No	None
539.2	Yes	No	Good	Concrete	No	None
LEGGATT MCCALL		**9 Ramps**				
At PARKING LOT		9 Ramps				
246.1	No	No	Fair	Asphalt	No	None
246.2	No	No	Fair	Asphalt	No	None
247.1	No	No	Fair	Asphalt	No	None
247.2	No	No	Fair	Asphalt	No	None
247.3	No	No	Fair	Asphalt	No	None
247.4	No	No	Fair	Asphalt	No	None
573.1	No	No	Fair	Concrete	No	None
573.2	No	No	Fair	Asphalt	No	None
573.3	No	No	Fair	Asphalt	No	None
LELAND STREET		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At KENDALL AVENUE		2 Ramps				
505.1	Yes	No	Good	Concrete	No	None
505.2	Yes	No	Good	Concrete	No	None
LEO CHASSE WAY		**2 Ramps**				
At GARVEY ROAD		2 Ramps				
8.1	No	No	Fair	Asphalt	No	None
8.2	No	No	Poor	Asphalt	No	None
LIBERTY STREET		**2 Ramps**				
At OAK STREET		2 Ramps				
318.1	Yes	No	Good	Concrete	No	None
318.2	Yes	No	Good	Concrete	No	None
LINDA AVENUE		**2 Ramps**				
At BROOK STREET		2 Ramps				
93.1	No	No	Fair	Concrete	No	None
93.2	No	No	Fair	Concrete	No	None
LITTLE TREE LANE		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
48.1	No	No	Fair	Asphalt	No	None
48.2	No	No	Fair	Asphalt	No	None
LOCKLAND AVENUE		**1 Ramps**				
At DONNA ROAD		1 Ramps				
289.1	No	No	Fair	Asphalt	No	None
MAIN STREET		**4 Ramps**				
At FRANKLIN STREET		2 Ramps				
400.3	Yes	No	Good	Concrete	No	None
400.4	Yes	No	Good	Concrete	No	None
At MOULTON PARK ROAD		2 Ramps				
399.1	No	No	Fair	Concrete	No	None
399.2	No	No	Fair	Concrete	No	None
MAJOR HALE DRIVE		**1 Ramps**				
At BELKNAP ROAD		1 Ramps				
31.1	No	No	Fair	Asphalt	No	None
MARY AGNES ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
161.1	Yes	No	Good	Concrete	No	None
161.2	Yes	No	Good	Concrete	No	None
MAYNARD ROAD		**5 Ramps**				
At CHURCH STREET		2 Ramps				
380.1	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
380.2	Yes	No	Good	Concrete	No	None
At SALEM END ROAD		3 Ramps				
375.1	Yes	No	Good	Concrete	No	None
375.2	Yes	No	Good	Concrete	No	None
375.3	Yes	No	Good	Concrete	No	None
MELLEN STREET		**4 Ramps**				
At WAVERLEY STREET		2 Ramps				
532.1	Yes	No	Good	Concrete	No	None
532.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		2 Ramps				
558.1	Yes	No	Good	Concrete	Yes	Curbing
558.2	Yes	No	Good	Concrete	No	None
MERRIAM ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
47.1	No	No	Fair	Asphalt	No	None
47.2	No	No	Fair	Asphalt	No	None
MICHAUD DRIVE		**2 Ramps**				
At CENTRAL STREET		2 Ramps				
306.1	Yes	No	Good	Concrete	No	None
306.2	Yes	No	Good	Concrete	No	None
MILL STREET		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
51.1	Yes	No	Good	Concrete	No	None
51.2	Yes	No	Good	Concrete	No	None
MONTEREY LANE		**1 Ramps**				
At BELKNAP ROAD		1 Ramps				
31.2	No	No	Fair	Asphalt	No	None
MURPHY CIRCLE		**2 Ramps**				
At COLONIAL DRIVE		2 Ramps				
152.1	Yes	No	Good	Concrete	Yes	ɛssive Slope & Ldg Sl
152.2	Yes	No	Good	Concrete	Yes	ɛssive Slope & Ldg Sl
NAPLES STREET		**4 Ramps**				
At BRIDGES STREET		2 Ramps				
570.1	Yes	No	Good	Concrete	No	None
570.3	No	No	Good	Concrete	No	None
At SAUCIER STREET		2 Ramps				
568.1	Yes	No	Good	Concrete	No	None
568.2	Yes	No	Good	Concrete	No	None
NEWBURY STREET		**5 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At OLD CONNECTICUT PATH		2 Ramps				
228.1	Yes	No	Good	Concrete	No	None
228.2	Yes	No	Good	Concrete	No	None
At SPEEN STREET		1 Ramps				
251.2	Yes	No	Good	Concrete	No	None
At WHITTIER STREET		2 Ramps				
241.5	Yes	No	Good	Concrete	Yes	Utillity Pole
241.6	Yes	No	Good	Concrete	No	None
NICHOLAS ROAD		**4 Ramps**				
At WATER STREET		4 Ramps				
104.3	Yes	No	Good	Concrete	No	None
104.4	Yes	Yes	Good	Concrete	No	None
104.5	Yes	No	Good	Concrete	No	None
104.6	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**2 Ramps**				
At CONCORD STREET		2 Ramps				
518.4	Yes	No	Good	Concrete	No	None
518.5	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**7 Ramps**				
At ARSENAL ROAD		1 Ramps				
517.2	Yes	No	Good	Concrete	No	None
At FLAGG DRIVE		2 Ramps				
515.3	Yes	No	Good	Concrete	No	None
515.4	Yes	No	Good	Concrete	No	None
At JOHN J BRADY DRIVE		2 Ramps				
574.1	Yes	No	Good	Concrete	No	None
574.2	Yes	No	Good	Concrete	Yes	Utillity Pole
At ROSE KENNEDY LANE		2 Ramps				
516.3	Yes	No	Good	Concrete	No	None
516.4	Yes	No	Good	Concrete	No	None
OAK CREST DRIVE		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
350.1	Yes	No	Good	Concrete	No	None
350.2	Yes	Yes	Good	Concrete	No	None
OAK STREET		**4 Ramps**				
At EDGELL ROAD		2 Ramps				
317.1	Yes	Yes	Good	Concrete	No	None
317.2	Yes	No	Good	Concrete	No	None
At VERNON STREET		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
319.1	Yes	Yes	Good	Concrete	No	None
319.2	Yes	No	Good	Concrete	No	None
OAKWOOD COURT	**2 Ramps**					
At POTTER ROAD	2 Ramps					
170.1	Yes	No	Good	Concrete	No	None
170.2	Yes	No	Good	Concrete	No	None
OLD CONNECTICUT PATH	**24 Ramps**					
At ARLENE ROAD	2 Ramps					
227.1	No	No	Fair	Concrete	No	None
227.2	No	No	Fair	Concrete	No	None
At BIRCH ROAD	2 Ramps					
199.1	No	No	Fair	Asphalt	No	None
199.4	No	No	Fair	Asphalt	No	None
At BROSSI CIRCLE	1 Ramps					
198.1	Yes	No	Good	Concrete	No	None
At BROWNLEA ROAD	1 Ramps					
210.3	No	No	Fair	Concrete	No	None
At CONCORD STREET	10 Ramps					
230.1	Yes	No	Good	Concrete	No	None
230.2	Yes	No	Good	Concrete	No	None
230.4	Yes	No	Good	Concrete	No	None
230.5	Yes	No	Good	Concrete	No	None
230.6	Yes	No	Good	Concrete	No	None
230.7	Yes	No	Good	Concrete	No	None
230.8	Yes	No	Good	Concrete	No	None
230.9	Yes	No	Good	Concrete	No	None
253.1	Yes	No	Good	Concrete	No	None
253.2	Yes	No	Good	Concrete	No	None
At HARDY STREET	2 Ramps					
229.1	Yes	No	Good	Concrete	No	None
229.3	No	No	Fair	Asphalt	No	None
At LAKE ROAD	1 Ramps					
202.2	No	No	Good	Concrete	No	None
At PARKING LOT	5 Ramps					
211.1	No	No	Poor	Concrete	No	None
211.2	Yes	No	Good	Concrete	No	None
211.3	Yes	No	Good	Concrete	No	None
211.4	Yes	No	Good	Concrete	No	None
223.5	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
OLD WOOD ROAD		**2 Ramps**				
At OLD WORCESTER ROAD		2 Ramps				
343.1	Yes	No	Good	Concrete	Yes	Curbing
343.2	Yes	No	Good	Concrete	Yes	Curbing
OLD WORCESTER ROAD		**3 Ramps**				
At OLD WOOD ROAD		2 Ramps				
343.3	Yes	No	Good	Concrete	Yes	Curbing
343.4	Yes	No	Good	Concrete	Yes	Curbing
At TEMPLE STREET		1 Ramps				
341.2	Yes	No	Good	Concrete	No	None
PALMETTO AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
544.1	Yes	No	Good	Concrete	No	None
544.2	Yes	No	Good	Concrete	No	None
PAMELA ROAD		**2 Ramps**				
At WATER STREET		2 Ramps				
111.3	Yes	No	Good	Concrete	No	None
111.4	Yes	No	Good	Concrete	No	None
PARKING LOT		**5 Ramps**				
At EDGELL ROAD		2 Ramps				
316.5	Yes	Yes	Good	Concrete	No	None
316.6	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		1 Ramps				
223.6	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
536.10	Yes	No	Good	Concrete	No	None
536.9	Yes	No	Good	Concrete	No	None
PERSHING AVENUE		**4 Ramps**				
At WAVERLEY STREET		4 Ramps				
549.1	Yes	No	Good	Concrete	No	None
549.2	Yes	No	Good	Concrete	No	None
576.1	Yes	No	Good	Concrete	No	None
576.2	Yes	No	Good	Concrete	No	None
PLEASANT STREET		**5 Ramps**				
At ARNOLD ROAD		1 Ramps				
329.2	Yes	No	Good	Concrete	No	None
At MAYNARD ROAD		2 Ramps				
327.1	Yes	No	Good	Concrete	No	None
327.2	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At VERNON STREET		2 Ramps				
325.1	Yes	No	Good	Concrete	No	None
325.2	Yes	No	Good	Concrete	No	None
POTTER ROAD		**12 Ramps**				
At BRADFORD ROAD		2 Ramps				
171.1	Yes	No	Good	Concrete	No	None
171.2	Yes	No	Good	Concrete	No	None
At EATON ROAD		2 Ramps				
168.2	Yes	No	Good	Concrete	No	None
168.3	Yes	No	Good	Concrete	No	None
At ELM STREET		2 Ramps				
175.1	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
175.4	Yes	No	Good	Concrete	No	None
At JOYCE ROAD		2 Ramps				
163.2	Yes	No	Good	Concrete	No	None
163.3	Yes	No	Good	Concrete	No	None
At LOWRY ROAD		2 Ramps				
177.1	Yes	No	Good	Concrete	No	None
177.2	Yes	No	Good	Concrete	Yes	Curbing
At SCHOOL ENTRANCE		1 Ramps				
162.4	Yes	No	Good	Concrete	No	None
At WATER STREET		1 Ramps				
115.1	Yes	No	Good	Concrete	Yes	Curbing
PROSPECT STREET		**6 Ramps**				
At CENTRAL STREET		2 Ramps				
306.5	Yes	No	Good	Concrete	No	None
306.6	Yes	No	Good	Concrete	No	None
At LILIAN ROAD		1 Ramps				
310.4	Yes	No	Good	Concrete	No	None
At WOODSIDE COTTAGE WAY		1 Ramps				
310.3	Yes	No	Good	Concrete	No	None
At WYNDSTONE WAY		2 Ramps				
311.3	Yes	No	Good	Concrete	No	None
311.4	Yes	No	Good	Concrete	No	None
RESERVOIR RIDGE		**2 Ramps**				
At TEMPLE STREET		2 Ramps				
370.1	No	No	Fair	Asphalt	No	None
370.2	No	No	Fair	Asphalt	No	None
RHUBENA STREET		**2 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At WAVERLEY STREET		2 Ramps				
537.1	Yes	No	Good	Concrete	No	None
537.2	Yes	No	Good	Concrete	No	None
RIVERPATH DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
201.1	Yes	No	Good	Concrete	No	None
201.2	Yes	No	Good	Concrete	No	None
RON'S WAY		**2 Ramps**				
At WATER STREET		2 Ramps				
108.1	Yes	No	Good	Concrete	No	None
108.2	Yes	No	Good	Concrete	No	None
ROSE KENNEDY LANE		**1 Ramps**				
At NORMANDY ROAD EXTENSION		1 Ramps				
516.2	Yes	No	Good	Concrete	No	None
ROYAL MEADOW LANE		**1 Ramps**				
At KINGS ROW LANE		1 Ramps				
27.1	No	No	Fair	Asphalt	No	None
SAGE LANE		**1 Ramps**				
At WINCH STREET		1 Ramps				
11.1	No	No	Fair	Asphalt	No	None
SALEM END ROAD		**4 Ramps**				
At MAYHEW STREET		2 Ramps				
374.1	No	No	Fair	Concrete	No	None
374.2	No	No	Fair	Concrete	No	None
At SALEM END LANE		2 Ramps				
368.1	No	No	Good	Concrete	No	None
368.2	No	No	Good	Concrete	No	None
SAUCIER STREET		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
533.1	Yes	No	Good	Concrete	No	None
533.2	Yes	Yes	Fair	Concrete	No	None
SAVOY ROAD		**2 Ramps**				
At MARY AGNES ROAD		2 Ramps				
160.1	No	No	Poor	Asphalt	Yes	Vegetation
160.2	No	No	Poor	Asphalt	Yes	Vegetation
SAXONY ROAD		**2 Ramps**				
At DANFORTH STREET		2 Ramps				
191.1	Yes	No	Good	Concrete	No	None
191.2	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
SCHOOL ENTRANCE		**4 Ramps**				
At BROOK STREET		2 Ramps				
86.1	No	No	Good	Concrete	Yes	Excessive Ldg Slope
86.2	No	No	Good	Concrete	No	None
At POTTER ROAD		2 Ramps				
162.1	Yes	No	Good	Concrete	No	None
162.2	Yes	No	Good	Concrete	No	None
SCHOOL STREET		**7 Ramps**				
At CONCORD STREET		2 Ramps				
221.3	Yes	Yes	Good	Concrete	No	None
221.4	Yes	No	Good	Concrete	No	None
At HAMILTON STREET		4 Ramps				
219.1	No	No	Fair	Concrete	No	None
219.2	No	No	Fair	Concrete	No	None
219.5	Yes	No	Fair	Concrete	No	None
219.6	Yes	No	Fair	Concrete	Yes	ng & Excessive Ldg S
At OLD CONNECTICUT PATH		1 Ramps				
204.1	No	No	Fair	Concrete	Yes	Curbing
SECOND STREET		**6 Ramps**				
At BEAVER STREET		4 Ramps				
503.1	Yes	No	Good	Concrete	No	None
503.2	Yes	No	Good	Concrete	No	None
503.4	Yes	No	Good	Concrete	No	None
503.5	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
514.1	Yes	No	Good	Concrete	No	None
514.2	Yes	No	Good	Concrete	No	None
SHEFFIELD ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
169.1	Yes	No	Good	Concrete	No	None
169.2	Yes	No	Good	Concrete	No	None
SLOANE DRIVE		**1 Ramps**				
At MARY AGNES ROAD		1 Ramps				
159.1	No	No	Fair	Asphalt	Yes	Vegetation
SPEEN STREET		**4 Ramps**				
At COCHITUATE ROAD		2 Ramps				
252.1	Yes	No	Good	Concrete	No	None
252.5	No	No	Poor	Concrete	No	None
At LEGGATT MCCALL CONNECTOR		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
248.1	Yes	No	Good	Concrete	No	None
248.2	Yes	No	Good	Concrete	No	None
SPRING LANE	**2 Ramps**					
At WATER STREET	2 Ramps					
114.1	Yes	No	Good	Concrete	No	None
114.2	Yes	No	Good	Concrete	No	None
STATE STREET	**2 Ramps**					
At HIGH STREET	2 Ramps					
377.1	Yes	No	Good	Concrete	No	None
377.2	Yes	Yes	Good	Concrete	No	None
SUDBURY LANDING	**2 Ramps**					
At DANFORTH STREET	2 Ramps					
183.1	Yes	No	Good	Concrete	No	None
183.2	Yes	No	Good	Concrete	No	None
SUMMER STREET	**2 Ramps**					
At CONCORD STREET	2 Ramps					
235.3	Yes	No	Good	Concrete	No	None
235.4	Yes	No	Good	Concrete	No	None
SUN VALLEY DRIVE	**1 Ramps**					
At PLEASANT STREET	1 Ramps					
331.1	No	No	Good	Asphalt	Yes	Hydrant
SWANSON ROAD	**2 Ramps**					
At WATER STREET	2 Ramps					
97.1	Yes	No	Good	Concrete	No	None
97.2	Yes	No	Good	Concrete	No	None
TEMI ROAD	**2 Ramps**					
At POTTER ROAD	2 Ramps					
173.1	Yes	No	Good	Concrete	No	None
173.2	Yes	Yes	Good	Concrete	No	None
TEMPLE STREET	**4 Ramps**					
At TEMPLE PLACE	2 Ramps					
339.1	No	No	Fair	Asphalt	No	None
339.6	No	No	Fair	Asphalt	No	None
At WOODLEIGH ROAD	2 Ramps					
339.2	No	No	Fair	Asphalt	No	None
339.5	No	No	Fair	Asphalt	No	None
THELMA ROAD	**2 Ramps**					
At CONCORD STREET	2 Ramps					
518.1	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
518.8	Yes	No	Good	Concrete	No	None
THIRD STREET		**4 Ramps**				
At BEAVER STREET		4 Ramps				
504.1	Yes	No	Good	Concrete	No	None
504.2	Yes	No	Good	Concrete	No	None
504.3	Yes	No	Good	Concrete	No	None
504.4	Yes	No	Good	Concrete	No	None
TREELAND DRIVE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
129.1	No	No	Fair	Asphalt	Yes	Vegetation
129.2	No	No	Fair	Asphalt	No	None
UPTON ROAD		**2 Ramps**				
At POTTER ROAD		2 Ramps				
176.1	Yes	No	Good	Concrete	No	None
176.2	Yes	Yes	Good	Concrete	No	None
VERNON STREET		**13 Ramps**				
At EDGELL ROAD		4 Ramps				
315.3	Yes	Yes	Good	Concrete	No	None
315.4	Yes	Yes	Good	Concrete	No	None
315.5	Yes	No	Good	Concrete	No	None
315.6	Yes	No	Good	Concrete	No	None
At GROVE STREET		2 Ramps				
324.1	Yes	No	Good	Concrete	No	None
324.2	Yes	No	Good	Concrete	No	None
At OAK STREET		2 Ramps				
319.3	Yes	No	Good	Concrete	No	None
319.4	Yes	No	Good	Concrete	No	None
At PLEASANT STREET		5 Ramps				
325.3	Yes	No	Good	Concrete	No	None
325.4	Yes	Yes	Good	Concrete	No	None
325.5	Yes	No	Good	Asphalt	No	None
325.6	No	No	Fair	Asphalt	No	None
325.7	No	No	Fair	Asphalt	No	None
WALKERS WAY		**2 Ramps**				
At LANEWOOD AVENUE		2 Ramps				
65.1	No	No	Fair	Asphalt	No	None
65.2	No	No	Fair	Asphalt	No	None
WARREN PLACE		**2 Ramps**				
At EDGELL ROAD		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
314.1	Yes	No	Good	Concrete	No	None
314.2	Yes	No	Good	Concrete	No	None
WATER STREET		**31 Ramps**				
At BROOK STREET		2 Ramps				
96.3	Yes	No	Good	Concrete	No	None
96.4	Yes	No	Good	Concrete	No	None
At CART PATH		2 Ramps				
100.1	No	No	Good	Asphalt	No	None
100.2	No	No	Good	Asphalt	No	None
At CENTRAL STREET		2 Ramps				
105.3	Yes	No	Good	Concrete	No	None
105.4	Yes	No	Good	Concrete	No	None
At EDGELL ROAD		1 Ramps				
121.4	Yes	No	Good	Concrete	Yes	Curbing
At JOYCE LUNDBERG DRIVE		2 Ramps				
110.3	Yes	No	Good	Concrete	No	None
110.4	Yes	No	Good	Concrete	No	None
At LARIVIERE ROAD		2 Ramps				
98.1	Yes	No	Good	Concrete	No	None
98.2	Yes	No	Good	Concrete	No	None
At LIBRARY ENTRANCE		2 Ramps				
119.1	Yes	No	Good	Concrete	No	None
119.4	Yes	No	Good	Concrete	No	None
At NICHOLAS ROAD		2 Ramps				
104.1	Yes	No	Good	Concrete	No	None
104.2	Yes	No	Good	Concrete	No	None
At PAMELA ROAD		2 Ramps				
111.1	Yes	Yes	Good	Concrete	No	None
111.2	Yes	No	Good	Concrete	No	None
At PARK AVENUE		4 Ramps				
102.1	Yes	No	Good	Concrete	No	None
102.2	Yes	No	Good	Concrete	Yes	Utility Access
103.1	Yes	No	Good	Concrete	No	None
103.2	Yes	No	Good	Concrete	No	None
At POTTER ROAD		2 Ramps				
115.3	Yes	No	Fair	Concrete	Yes	Excessive Ldg Slope
115.4	Yes	No	Good	Concrete	No	None
At SCHOOL ENTRANCE		6 Ramps				
120.1	Yes	Yes	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
120.2	Yes	Yes	Good	Concrete	No	None
120.3	Yes	No	Good	Concrete	No	None
120.4	Yes	Yes	Good	Concrete	No	None
120.5	Yes	No	Good	Concrete	No	None
120.6	Yes	Yes	Good	Concrete	No	None
At SWANSON ROAD		2 Ramps				
97.3	Yes	No	Good	Concrete	No	None
97.4	Yes	No	Good	Concrete	No	None
WAVENEY ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
55.1	Yes	No	Good	Concrete	No	None
55.2	Yes	No	Good	Concrete	No	None
WAVERLEY STREET		**35 Ramps**				
At BEAVER STREET		2 Ramps				
498.2	Yes	Yes	Good	Concrete	No	None
498.5	Yes	No	Good	Concrete	No	None
At BISHOP STREET		2 Ramps				
498.1	Yes	No	Fair	Concrete	No	None
498.6	Yes	No	Good	Concrete	No	None
At CASEY COURT		2 Ramps				
530.1	No	No	Good	Concrete	No	None
530.2	No	No	Good	Concrete	No	None
At CEDAR STREET		2 Ramps				
529.1	Yes	No	Good	Concrete	No	None
529.2	Yes	No	Good	Concrete	No	None
At COOLIDGE STREET		2 Ramps				
511.1	Yes	No	Good	Concrete	No	None
511.2	Yes	No	Good	Concrete	No	None
At FOUNTAIN STREET		2 Ramps				
532.4	Yes	No	Good	Concrete	No	None
532.7	Yes	No	Good	Concrete	No	None
At LIBERTY STREET		2 Ramps				
550.1	No	No	Good	Concrete	No	None
550.2	No	No	Good	Concrete	No	None
At MELLEN STREET		2 Ramps				
532.3	Yes	No	Good	Concrete	No	None
532.8	Yes	No	Good	Concrete	No	None
At PARKING LOT		2 Ramps				
539.3	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
539.4	Yes	No	Good	Concrete	No	None
At PERSHING AVENUE		2 Ramps				
549.3	Yes	No	Good	Concrete	No	None
549.4	Yes	No	Good	Concrete	Yes	Curbing
At SECOND STREET		2 Ramps				
514.3	Yes	No	Good	Concrete	No	None
514.4	Yes	No	Good	Concrete	No	None
At TARALLI TERRACE		2 Ramps				
512.1	Yes	No	Good	Concrete	No	None
512.2	Yes	No	Good	Concrete	No	None
At WAVERLY COURT		3 Ramps				
531.1	Yes	No	Good	Concrete	No	None
531.2	Yes	No	Good	Concrete	No	None
531.3	Yes	No	Good	Concrete	No	None
At WILLIS STREET		2 Ramps				
513.1	Yes	No	Good	Concrete	No	None
513.2	Yes	No	Good	Concrete	No	None
At WINTER STREET		2 Ramps				
546.1	Yes	No	Good	Concrete	No	None
546.2	Yes	No	Good	Concrete	No	None
At WINTHROP STREET		4 Ramps				
536.11	Yes	No	Good	Concrete	No	None
536.12	Yes	No	Good	Concrete	No	None
536.7	Yes	No	Good	Concrete	No	None
536.8	Yes	No	Good	Concrete	No	None
WESLEY ROAD		**2 Ramps**				
At BROOK STREET		2 Ramps				
85.1	No	No	Fair	Concrete	No	None
85.2	No	No	Fair	Concrete	No	None
WEST STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
334.1	Yes	No	Good	Concrete	No	None
334.2	Yes	No	Fair	Concrete	No	None
WHITING ROAD		**2 Ramps**				
At EDGELL ROAD		2 Ramps				
124.1	Yes	No	Good	Concrete	No	None
124.2	Yes	No	Good	Concrete	Yes	Curbing
WHITTIER STREET		**6 Ramps**				
At COCHITUATE ROAD		2 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
242.4	No	No	Good	Concrete	No	None
242.5	No	No	Fair	Concrete	Yes	Excessive Ldg Slope
At NEWBURY STREET		4 Ramps				
241.1	Yes	No	Good	Concrete	No	None
241.2	Yes	No	Good	Concrete	No	None
241.3	Yes	No	Good	Concrete	Yes	Utillity Pole
241.4	Yes	No	Good	Concrete	No	None
WILDE AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
538.1	Yes	No	Good	Concrete	No	None
538.2	Yes	No	Good	Concrete	No	None
WILSON AVENUE		**2 Ramps**				
At WAVERLEY STREET		2 Ramps				
548.1	Yes	No	Good	Concrete	No	None
548.2	Yes	No	Good	Concrete	No	None
WINTER STREET		**7 Ramps**				
At MAPLE STREET		1 Ramps				
386.1	No	No	Poor	Asphalt	No	None
At MAYHEW STREET EXTENSION		2 Ramps				
378.1	No	No	Poor	Asphalt	No	None
378.2	No	No	Poor	Asphalt	No	None
At SALEM END ROAD		3 Ramps				
373.1	No	No	Poor	Concrete	No	None
373.2	No	No	Fair	Concrete	No	None
373.3	No	No	Fair	Asphalt	No	None
At WORCESTER ROAD		1 Ramps				
379.2	Yes	No	Good	Concrete	No	None
WINTHROP STREET		**11 Ramps**				
At BETHANY ROAD		1 Ramps				
553.3	Yes	No	Good	Concrete	No	None
At BRIDGES STREET EXTENSION		2 Ramps				
555.3	Yes	No	Fair	Concrete	No	None
555.4	Yes	No	Good	Concrete	No	None
At CONANT ROAD		2 Ramps				
536.3	Yes	No	Good	Concrete	No	None
536.4	Yes	No	Fair	Concrete	Yes	Major Curbing
At COVE AVENUE		2 Ramps				
556.3	Yes	No	Good	Concrete	No	None
556.4	Yes	No	Good	Concrete	No	None

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At DOW STREET		1 Ramps				
558.4	Yes	No	Good	Concrete	No	None
At MELLEN STREET		1 Ramps				
558.3	Yes	No	Good	Concrete	No	None
At WAVERLEY STREET		2 Ramps				
536.5	Yes	Yes	Good	Concrete	No	None
536.6	Yes	No	Good	Concrete	No	None
WINTHROP TERRACE		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
557.1	Yes	No	Good	Concrete	No	None
557.2	Yes	No	Good	Concrete	No	None
WOODLEIGH ROAD		**6 Ramps**				
At OLD WOOD ROAD		2 Ramps				
342.1	No	No	Poor	Asphalt	Yes	Vegetation
342.2	No	No	Fair	Asphalt	No	None
At PRIMO DRIVE		2 Ramps				
344.1	No	No	Fair	Asphalt	No	None
344.2	No	No	Fair	Asphalt	No	None
At TEMPLE STREET		2 Ramps				
339.3	No	No	Fair	Asphalt	No	None
339.4	No	No	Fair	Asphalt	No	None
WOODMERE ROAD		**2 Ramps**				
At PLEASANT STREET		2 Ramps				
37.1	Yes	No	Good	Concrete	No	None
37.2	Yes	No	Good	Concrete	No	None
WOODSIDE COTTAGE WAY		**2 Ramps**				
At PROSPECT STREET		2 Ramps				
310.1	Yes	No	Good	Concrete	No	None
310.2	Yes	No	Good	Concrete	Yes	Excessive Ldg Slope
WYNDSTONE WAY		**2 Ramps**				
At PROSPECT STREET		2 Ramps				
311.1	Yes	No	Good	Concrete	No	None
311.2	Yes	No	Good	Concrete	No	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Total: 50

Ramp Locations With Obstructions

		Obstruction	Obstruction Type	Material
A STREET	**2 Ramps Total**			
At CONCORD STREET	2 Ramps			
222.4		Yes	Utillity Pole	Concrete
222.5		Yes	Gate	Concrete
ANDERSON ROAD	**1 Ramps Total**			
At BROOK STREET	1 Ramps			
90.1		Yes	Man Hole	Asphalt
BACON ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
118.1		Yes	xcessive Ldg Slop	Concrete
BEAVER STREET	**1 Ramps Total**			
At PARKING LOT	1 Ramps			
578.2		Yes	Curbing	Concrete
BELKNAP ROAD	**1 Ramps Total**			
At FLANAGAN DRIVE	1 Ramps			
30.1		Yes	Curbing	Concrete
BROOK STREET	**1 Ramps Total**			
At MEREDITH CIRCLE	1 Ramps			
88.1		Yes	Vegetation	Concrete
CLIFFORD STREET	**1 Ramps Total**			
At BRIDGES STREET EXTENSION	1 Ramps			
563.2		Yes	Vegetation	Concrete
COBURN STREET	**1 Ramps Total**			
At SAUCIER STREET	1 Ramps			
565.2		Yes	Sign	Concrete
COCHITUATE ROAD	**1 Ramps Total**			
At WHITTIER STREET	1 Ramps			
242.1		Yes	xcessive Ldg Slop	Concrete
CONCORD STREET	**3 Ramps Total**			
At A STREET	2 Ramps			
222.3		Yes	Curbing	Concrete
222.6		Yes	Utility Access	Concrete
At HARTFORD STREET	1 Ramps			
520.6		Yes	xcessive Ldg Slop	Concrete
EDGELL ROAD	**2 Ramps Total**			
At EDMANDS ROAD	1 Ramps			
121.1		Yes	xcessive Ldg Slop	Concrete
At WHITING ROAD	1 Ramps			

		Obstruction	Obstruction Type	Material
124.3		Yes	Curbing	Concrete
GIBSON DRIVE	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
128.1		Yes	Vegetation	Asphalt
GREGORY ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
116.1		Yes	xcessive Ldg Slop	Concrete
HAMILTON STREET	**1 Ramps Total**			
At JACKSON PLACE	1 Ramps			
220.1		Yes	Curbing	Concrete
HEMENWAY ROAD	**1 Ramps Total**			
At WATER STREET	1 Ramps			
117.2		Yes	xcessive Ldg Slop	Concrete
IRVING STREET	**1 Ramps Total**			
At LORING DRIVE	1 Ramps			
487.2		Yes	Curbing	Concrete
MELLEN STREET	**1 Ramps Total**			
At WINTHROP STREET	1 Ramps			
558.1		Yes	Curbing	Concrete
MURPHY CIRCLE	**2 Ramps Total**			
At COLONIAL DRIVE	2 Ramps			
152.1		Yes	sive Slope & Ldg S	Concrete
152.2		Yes	sive Slope & Ldg S	Concrete
NEWBURY STREET	**1 Ramps Total**			
At WHITTIER STREET	1 Ramps			
241.5		Yes	Utillity Pole	Concrete
NORMANDY ROAD EXTENSION	**1 Ramps Total**			
At JOHN J BRADY DRIVE	1 Ramps			
574.2		Yes	Utillity Pole	Concrete
OLD WOOD ROAD	**2 Ramps Total**			
At OLD WORCESTER ROAD	2 Ramps			
343.1		Yes	Curbing	Concrete
343.2		Yes	Curbing	Concrete
OLD WORCESTER ROAD	**2 Ramps Total**			
At OLD WOOD ROAD	2 Ramps			
343.3		Yes	Curbing	Concrete
343.4		Yes	Curbing	Concrete
POTTER ROAD	**3 Ramps Total**			
At ELM STREET	1 Ramps			
175.1		Yes	xcessive Ldg Slop	Concrete
At LOWRY ROAD	1 Ramps			
177.2		Yes	Curbing	Concrete

		Obstruction	Obstruction Type	Material
At WATER STREET	1 Ramps			
115.1		Yes	Curbing	Concrete
SAVOY ROAD	**2 Ramps Total**			
At MARY AGNES ROAD	2 Ramps			
160.1		Yes	Vegetation	Asphalt
160.2		Yes	Vegetation	Asphalt
SCHOOL ENTRANCE	**1 Ramps Total**			
At BROOK STREET	1 Ramps			
86.1		Yes	xcessive Ldg Slop	Concrete
SCHOOL STREET	**2 Ramps Total**			
At HAMILTON STREET	1 Ramps			
219.6		Yes	g & Excessive Ldg	Concrete
At OLD CONNECTICUT PATH	1 Ramps			
204.1		Yes	Curbing	Concrete
SLOANE DRIVE	**1 Ramps Total**			
At MARY AGNES ROAD	1 Ramps			
159.1		Yes	Vegetation	Asphalt
SUN VALLEY DRIVE	**1 Ramps Total**			
At PLEASANT STREET	1 Ramps			
331.1		Yes	Hydrant	Asphalt
TREELAND DRIVE	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
129.1		Yes	Vegetation	Asphalt
WATER STREET	**3 Ramps Total**			
At EDGELL ROAD	1 Ramps			
121.4		Yes	Curbing	Concrete
At PARK AVENUE	1 Ramps			
102.2		Yes	Utility Access	Concrete
At POTTER ROAD	1 Ramps			
115.3		Yes	xcessive Ldg Slop	Concrete
WAVERLEY STREET	**1 Ramps Total**			
At PERSHING AVENUE	1 Ramps			
549.4		Yes	Curbing	Concrete
WHITING ROAD	**1 Ramps Total**			
At EDGELL ROAD	1 Ramps			
124.2		Yes	Curbing	Concrete
WHITTIER STREET	**2 Ramps Total**			
At COCHITUATE ROAD	1 Ramps			
242.5		Yes	xcessive Ldg Slop	Concrete
At NEWBURY STREET	1 Ramps			
241.3		Yes	Utillity Pole	Concrete
WINTHROP STREET	**1 Ramps Total**			

		Obstruction	Obstruction Type	Material
At CONANT ROAD	1 Ramps			
536.4		Yes	Major Curbing	Concrete
WOODLEIGH ROAD	**1 Ramps Total**			
At OLD WOOD ROAD	1 Ramps			
342.1		Yes	Vegetation	Asphalt
WOODSIDE COTTAGE WAY	**1 Ramps Total**			
At PROSPECT STREET	1 Ramps			
310.2		Yes	xcessive Ldg Slop	Concrete

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Ramp ID:	222.4
Street:	**A STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	222.5
Street:	**A STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Gate
Condition:	Good



Ramp ID:	90.1
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Man Hole
Condition:	Fair



Ramp ID:	90.2
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	90.3
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	90.4
Street:	**ANDERSON ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	126.1
Street:	**APPLE D'OR ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	126.2
Street:	**APPLE D'OR ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	316.1
Street:	**AUBURN STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.2
Street:	**AUBURN STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	118.1
Street:	**BACON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	118.2
Street:	**BACON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	131.1
Street:	**BALDWIN AVENUE**
Intersecting Street:	APPLE D'OR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	260.1
Street:	**BEACON STREET**
Intersecting Street:	HASTINGS STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	260.2
Street:	**BEACON STREET**
Intersecting Street:	HASTINGS STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	265.1
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	265.2
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	275.1
Street:	**BEACON STREET**
Intersecting Street:	CAVANAUGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	275.2
Street:	**BEACON STREET**
Intersecting Street:	CAVANAUGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	277.1
Street:	**BEACON STREET**
Intersecting Street:	MAGNOLIA STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	277.2
Street:	**BEACON STREET**
Intersecting Street:	MAGNOLIA STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	279.1
Street:	**BEACON STREET**
Intersecting Street:	LOHNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	279.2
Street:	**BEACON STREET**
Intersecting Street:	LOHNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	295.1
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	295.2
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.4
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.5
Street:	**BEACON STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	297.1
Street:	**BEACON STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	297.2
Street:	**BEACON STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.3
Street:	**BEAVER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.4
Street:	**BEAVER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	499.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	499.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	500.1
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	500.2
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	501.1
Street:	**BEAVER STREET**
Intersecting Street:	MARIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	501.2
Street:	**BEAVER STREET**
Intersecting Street:	MARIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.1
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.2
Street:	**BEAVER STREET**
Intersecting Street:	BEAVER PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	502.3
Street:	**BEAVER STREET**
Intersecting Street:	FIRST STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	502.4
Street:	**BEAVER STREET**
Intersecting Street:	FIRST STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.3
Street:	**BEAVER STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	577.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	577.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	578.1
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	578.2
Street:	**BEAVER STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	22.3
Street:	**BELKNAP ROAD**
Intersecting Street:	CLEARVIEW DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.4
Street:	**BELKNAP ROAD**
Intersecting Street:	CLEARVIEW DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	23.1
Street:	**BELKNAP ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	23.2
Street:	**BELKNAP ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	30.1
Street:	**BELKNAP ROAD**
Intersecting Street:	FLANAGAN DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	30.2
Street:	**BELKNAP ROAD**
Intersecting Street:	FLANAGAN DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	535.1
Street:	**BETHANY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	535.2
Street:	**BETHANY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.1
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.2
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	322.1
Street:	**BEULAH STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	322.2
Street:	**BEULAH STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.2
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.3
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	200.1
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	200.2
Street:	**BIRCH ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	499.4
Street:	**BLANDIN AVENUE**
Intersecting Street:	BEAVER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	171.3
Street:	**BRADFORD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	171.4
Street:	**BRADFORD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	534.1
Street:	**BRIDGES STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	534.2
Street:	**BRIDGES STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.3
Street:	**BRIDGES STREET**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.4
Street:	**BRIDGES STREET**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	570.2
Street:	**BRIDGES STREET**
Intersecting Street:	NAPLES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.1
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	564.2
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	COBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.3
Street:	**BRIGATI TERRACE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.4
Street:	**BRIGATI TERRACE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	84.1
Street:	**BROOK STREET**
Intersecting Street:	WILD OAK RISE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	84.2
Street:	**BROOK STREET**
Intersecting Street:	WILD OAK RISE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	86.3
Street:	**BROOK STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	86.4
Street:	**BROOK STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	87.1
Street:	**BROOK STREET**
Intersecting Street:	WARD FARM CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	87.2
Street:	**BROOK STREET**
Intersecting Street:	WARD FARM CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	87.3
Street:	**BROOK STREET**
Intersecting Street:	PERRY H. HENDERSON DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	87.4
Street:	**BROOK STREET**
Intersecting Street:	PERRY H. HENDERSON DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	88.1
Street:	**BROOK STREET**
Intersecting Street:	MEREDITH CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	88.2
Street:	**BROOK STREET**
Intersecting Street:	MEREDITH CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	88.3
Street:	**BROOK STREET**
Intersecting Street:	LEIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	88.4
Street:	**BROOK STREET**
Intersecting Street:	LEIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.1
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.2
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	89.3
Street:	**BROOK STREET**
Intersecting Street:	FROST STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	94.1
Street:	**BROOK STREET**
Intersecting Street:	BROOKBURY CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.2
Street:	**BROOK STREET**
Intersecting Street:	BROOKBURY CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.3
Street:	**BROOK STREET**
Intersecting Street:	SALVI DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	94.4
Street:	**BROOK STREET**
Intersecting Street:	SALVI DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.1
Street:	**BROOK STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.2
Street:	**BROOK STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	95.1
Street:	**BROOKFIELD AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	95.2
Street:	**BROOKFIELD AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.1
Street:	**BROWNLEA ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.2
Street:	**BROWNLEA ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	243.1
Street:	**BURR STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	243.2
Street:	**BURR STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	244.1
Street:	**BURR STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	244.2
Street:	**BURR STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	235.1
Street:	**CAMPELLO ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	235.2
Street:	**CAMPELLO ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	560.1
Street:	**CEDAR STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	560.2
Street:	**CEDAR STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	561.1
Street:	**CEDAR STREET**
Intersecting Street:	CYPRESS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	561.2
Street:	**CEDAR STREET**
Intersecting Street:	CYPRESS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.1
Street:	**CENTRAL STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.2
Street:	**CENTRAL STREET**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	303.1
Street:	**CENTRAL STREET**
Intersecting Street:	INDIAN HEAD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	303.2
Street:	**CENTRAL STREET**
Intersecting Street:	INDIAN HEAD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.3
Street:	**CENTRAL STREET**
Intersecting Street:	MICHAUD DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.4
Street:	**CENTRAL STREET**
Intersecting Street:	MICHAUD DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.1
Street:	**CHERRY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	239.2
Street:	**CHERRY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.1
Street:	**CLEARVIEW DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	22.2
Street:	**CLEARVIEW DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	562.1
Street:	**CLIFFORD STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	562.2
Street:	**CLIFFORD STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	563.1
Street:	**CLIFFORD STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	563.2
Street:	**CLIFFORD STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Good



Ramp ID:	554.1
Street:	**COBURN STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	554.2
Street:	**COBURN STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	565.1
Street:	**COBURN STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	565.2
Street:	**COBURN STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Sign
Condition:	Good



Ramp ID:	566.1
Street:	**COBURN STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	566.2
Street:	**COBURN STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.1
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	242.2
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.6
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.7
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	BEACON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	295.6
Street:	**COCHITUATE ROAD**
Intersecting Street:	BEACON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	536.1
Street:	**CONANT ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.2
Street:	**CONANT ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.1
Street:	**CONCORD STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.2
Street:	**CONCORD STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.1
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.2
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.3
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	222.6
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



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Ramp ID:	222.7
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	222.8
Street:	**CONCORD STREET**
Intersecting Street:	A STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.10
Street:	**CONCORD STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.3
Street:	**CONCORD STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	236.1
Street:	**CONCORD STREET**
Intersecting Street:	DONLON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	236.2
Street:	**CONCORD STREET**
Intersecting Street:	DONLON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	237.1
Street:	**CONCORD STREET**
Intersecting Street:	FEMIA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	237.2
Street:	**CONCORD STREET**
Intersecting Street:	FEMIA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	238.1
Street:	**CONCORD STREET**
Intersecting Street:	GIBBS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	238.2
Street:	**CONCORD STREET**
Intersecting Street:	GIBBS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.3
Street:	**CONCORD STREET**
Intersecting Street:	CHERRY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	239.4
Street:	**CONCORD STREET**
Intersecting Street:	CHERRY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	518.2
Street:	**CONCORD STREET**
Intersecting Street:	THELMA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.3
Street:	**CONCORD STREET**
Intersecting Street:	NORMANDY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.6
Street:	**CONCORD STREET**
Intersecting Street:	NORMANDY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.7
Street:	**CONCORD STREET**
Intersecting Street:	THELMA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.1
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.2
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.5
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	520.6
Street:	**CONCORD STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	101.1
Street:	**COSTA CIRCLE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	101.2
Street:	**COSTA CIRCLE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.3
Street:	**COTTAGE STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.4
Street:	**COTTAGE STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.1
Street:	**COVE AVENUE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.2
Street:	**COVE AVENUE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	559.1
Street:	**CYPRESS STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	559.2
Street:	**CYPRESS STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	181.1
Street:	**DANFORTH STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	181.2
Street:	**DANFORTH STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	182.1
Street:	**DANFORTH STREET**
Intersecting Street:	KING STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.2
Street:	**DANFORTH STREET**
Intersecting Street:	KING STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.3
Street:	**DANFORTH STREET**
Intersecting Street:	DANFORTH COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	182.4
Street:	**DANFORTH STREET**
Intersecting Street:	DANFORTH COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	184.1
Street:	**DANFORTH STREET**
Intersecting Street:	STEARNS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	184.2
Street:	**DANFORTH STREET**
Intersecting Street:	STEARNS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.1
Street:	**DANFORTH STREET**
Intersecting Street:	COTTAGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	185.2
Street:	**DANFORTH STREET**
Intersecting Street:	COTTAGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	186.1
Street:	**DANFORTH STREET**
Intersecting Street:	MEADOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	186.2
Street:	**DANFORTH STREET**
Intersecting Street:	MEADOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.1
Street:	**DANFORTH STREET**
Intersecting Street:	DERBY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.2
Street:	**DANFORTH STREET**
Intersecting Street:	FENWOOD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	188.3
Street:	**DANFORTH STREET**
Intersecting Street:	HIALEAH LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	189.1
Street:	**DANFORTH STREET**
Intersecting Street:	COLBY AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	189.2
Street:	**DANFORTH STREET**
Intersecting Street:	COLBY AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	190.1
Street:	**DANFORTH STREET**
Intersecting Street:	SAXONY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	190.2
Street:	**DANFORTH STREET**
Intersecting Street:	SAXONY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.5
Street:	**DANFORTH STREET**
Intersecting Street:	BRIGATI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	191.6
Street:	**DANFORTH STREET**
Intersecting Street:	BRIGATI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	192.1
Street:	**DANFORTH STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	192.2
Street:	**DANFORTH STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	543.1
Street:	**DAYTONA AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	543.2
Street:	**DAYTONA AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	125.1
Street:	**DONOVAN DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	125.2
Street:	**DONOVAN DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	109.1
Street:	**DOTTY ANN DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	109.2
Street:	**DOTTY ANN DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.5
Street:	**DOW STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.6
Street:	**DOW STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	167.1
Street:	**EATON ROAD**
Intersecting Street:	EATON PINES LANE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	168.1
Street:	**EATON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	121.1
Street:	**EDGELL ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	121.5
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.6
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	124.3
Street:	**EDGELL ROAD**
Intersecting Street:	WHITING ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	124.4
Street:	**EDGELL ROAD**
Intersecting Street:	WHITING ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.1
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.2
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	315.7
Street:	**EDGELL ROAD**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.3
Street:	**EDGELL ROAD**
Intersecting Street:	AUBURN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.4
Street:	**EDGELL ROAD**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	157.1
Street:	**EISENHOWER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	157.2
Street:	**EISENHOWER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	521.1
Street:	**ELIOT STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	521.2
Street:	**ELIOT STREET**
Intersecting Street:	HARTFORD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	333.1
Street:	**ELLIS STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	333.2
Street:	**ELLIS STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.3
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.5
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.6
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	174.1
Street:	**ELMFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	174.2
Street:	**ELMFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	233.1
Street:	**EMILY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	233.2
Street:	**EMILY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	92.1
Street:	**FAIRBROOK ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	92.2
Street:	**FAIRBROOK ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	99.1
Street:	**FAIRFIELD ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	99.2
Street:	**FAIRFIELD ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	547.1
Street:	**FAY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	547.2
Street:	**FAY ROAD**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	551.1
Street:	**FAY ROAD**
Intersecting Street:	OLD CENTRAL TURNPIKE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	551.2
Street:	**FAY ROAD**
Intersecting Street:	OLD CENTRAL TURNPIKE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	79.1
Street:	**FENWICK STREET**
Intersecting Street:	WICKFORD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.1
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.2
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.3
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	83.4
Street:	**FENWICK STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	187.3
Street:	**FENWOOD STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	187.4
Street:	**FENWOOD STREET**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.1
Street:	**FLAGG DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.2
Street:	**FLAGG DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.5
Street:	**FOUNTAIN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.6
Street:	**FOUNTAIN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.1
Street:	**FRANKLIN STREET**
Intersecting Street:	MAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.2
Street:	**FRANKLIN STREET**
Intersecting Street:	MAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	407.1
Street:	**FRANKLIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	407.2
Street:	**FRANKLIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	7.1
Street:	**GARVEY ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	9.1
Street:	**GARVEY ROAD**
Intersecting Street:	EDMANDS ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	128.1
Street:	**GIBSON DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	128.2
Street:	**GIBSON DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	312.1
Street:	**GIL LEONARD LANE**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	560.3
Street:	**GILBERT STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	560.4
Street:	**GILBERT STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	353.1
Street:	**GOODNOW LANE**
Intersecting Street:	GATES STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	475.1
Street:	**GRANT STREET**
Intersecting Street:	JOHN J. GALLAGHER DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	475.2
Street:	**GRANT STREET**
Intersecting Street:	JOHN J. GALLAGHER DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	240.1
Street:	**GREENLEAF CIRCLE**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	240.2
Street:	**GREENLEAF CIRCLE**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	116.1
Street:	**GREGORY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	116.2
Street:	**GREGORY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	165.1
Street:	**HADLEY ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	165.2
Street:	**HADLEY ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	219.3
Street:	**HAMILTON STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.4
Street:	**HAMILTON STREET**
Intersecting Street:	SCHOOL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	220.1
Street:	**HAMILTON STREET**
Intersecting Street:	JACKSON PLACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	220.2
Street:	**HAMILTON STREET**
Intersecting Street:	JACKSON PLACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	231.3
Street:	**HARDY STREET**
Intersecting Street:	DEBRA LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	234.1
Street:	**HARDY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	234.2
Street:	**HARDY STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.3
Street:	**HARTFORD STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	520.4
Street:	**HARTFORD STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	522.1
Street:	**HARTFORD STREET**
Intersecting Street:	DYER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	522.2
Street:	**HARTFORD STREET**
Intersecting Street:	DYER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	523.1
Street:	**HARTFORD STREET**
Intersecting Street:	HOWE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	523.2
Street:	**HARTFORD STREET**
Intersecting Street:	HOWE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	524.1
Street:	**HARTFORD STREET**
Intersecting Street:	HARRISON STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	524.2
Street:	**HARTFORD STREET**
Intersecting Street:	HARRISON STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	525.1
Street:	**HARTFORD STREET**
Intersecting Street:	C STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	525.2
Street:	**HARTFORD STREET**
Intersecting Street:	C STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.1
Street:	**HARTFORD STREET**
Intersecting Street:	BELVIDERE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.2
Street:	**HARTFORD STREET**
Intersecting Street:	BELVIDERE ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	526.3
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.1
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	527.2
Street:	**HARTFORD STREET**
Intersecting Street:	GRANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.3
Street:	**HARTFORD STREET**
Intersecting Street:	LOKER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	527.4
Street:	**HARTFORD STREET**
Intersecting Street:	LOKER STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	528.1
Street:	**HARTFORD STREET**
Intersecting Street:	UNDERWOOD STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	117.1
Street:	**HEMENWAY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	117.2
Street:	**HEMENWAY ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	188.1
Street:	**HIALEAH LANE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	188.2
Street:	**HIALEAH LANE**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	567.1
Street:	**HILTON STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	567.2
Street:	**HILTON STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	569.1
Street:	**HILTON STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	569.2
Street:	**HILTON STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	298.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	SUMMER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	298.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	SUMMER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	299.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	DONNA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	299.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	DONNA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	300.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	LOCKLAND AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	300.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	LOCKLAND AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	301.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	INDIAN HEAD HEIGHTS
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	301.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	INDIAN HEAD HEIGHTS
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	302.1
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	CRESTWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	302.2
Street:	**INDIAN HEAD ROAD**
Intersecting Street:	CRESTWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	487.1
Street:	**IRVING STREET**
Intersecting Street:	HERBERT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	487.2
Street:	**IRVING STREET**
Intersecting Street:	LORING DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



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Ramp ID:	574.3
Street:	**JOHN J BRADY DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.4
Street:	**JOHN J BRADY DRIVE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	476.1
Street:	**JOHN J. GALLAGHER DRIVE**
Intersecting Street:	EVERIT AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	476.2
Street:	**JOHN J. GALLAGHER DRIVE**
Intersecting Street:	EVERIT AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	57.1
Street:	**JOHN MCQUINN CIRCLE**
Intersecting Street:	WAVENEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	107.1
Street:	**JOSEPH ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	107.2
Street:	**JOSEPH ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	110.1
Street:	**JOYCE LUNDBERG DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	110.2
Street:	**JOYCE LUNDBERG DRIVE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	163.1
Street:	**JOYCE ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	309.2
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	309.3
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	505.3
Street:	**KENDALL AVENUE**
Intersecting Street:	LELAND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	505.4
Street:	**KENDALL AVENUE**
Intersecting Street:	LELAND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	506.1
Street:	**KENDALL AVENUE**
Intersecting Street:	GLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	506.2
Street:	**KENDALL AVENUE**
Intersecting Street:	GLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	507.1
Street:	**KENDALL AVENUE**
Intersecting Street:	CURTIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	507.2
Street:	**KENDALL AVENUE**
Intersecting Street:	CURTIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	508.1
Street:	**KENDALL AVENUE**
Intersecting Street:	AMERICA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	508.2
Street:	**KENDALL AVENUE**
Intersecting Street:	AMERICA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	509.1
Street:	**KENDALL AVENUE**
Intersecting Street:	STILLMAN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	509.2
Street:	**KENDALL AVENUE**
Intersecting Street:	STILLMAN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.1
Street:	**KENDALL AVENUE**
Intersecting Street:	ALLA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.2
Street:	**KENDALL AVENUE**
Intersecting Street:	ALLA STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.3
Street:	**KENDALL AVENUE**
Intersecting Street:	KENDALL LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	510.4
Street:	**KENDALL AVENUE**
Intersecting Street:	KENDALL LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	46.1
Street:	**KNIGHT ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	46.2
Street:	**KNIGHT ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	545.1
Street:	**KNOX AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



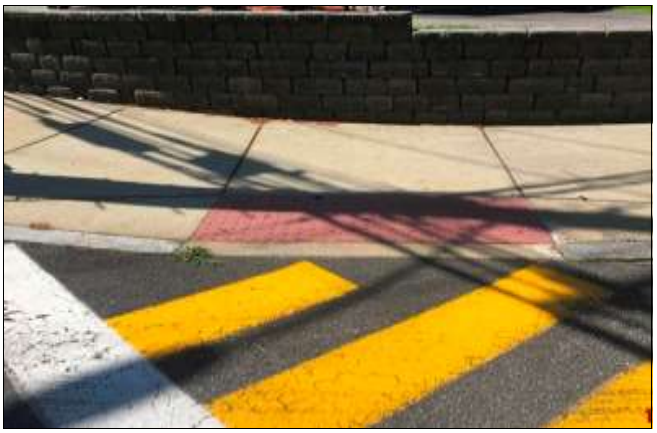
Ramp ID:	545.2
Street:	**KNOX AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	164.1
Street:	**LANCASTER DRIVE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	164.2
Street:	**LANCASTER DRIVE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	56.1
Street:	**LANEWOOD AVENUE**
Intersecting Street:	WAVENEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	66.1
Street:	**LANEWOOD AVENUE**
Intersecting Street:	CURRIER DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	539.1
Street:	**LARRABEE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.2
Street:	**LARRABEE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	246.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	246.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	247.3
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	247.4
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	573.1
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	573.2
Street:	LEGGATT MCCALL CONNECTOR ROAD
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	573.3
Street:	**LEGGATT MCCALL CONNECTOR ROAD**
Intersecting Street:	PARKING LOT
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	505.1
Street:	**LELAND STREET**
Intersecting Street:	KENDALL AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	505.2
Street:	**LELAND STREET**
Intersecting Street:	KENDALL AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	8.1
Street:	**LEO CHASSE WAY**
Intersecting Street:	GARVEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	8.2
Street:	**LEO CHASSE WAY**
Intersecting Street:	GARVEY ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	318.1
Street:	**LIBERTY STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	318.2
Street:	**LIBERTY STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	93.1
Street:	**LINDA AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	93.2
Street:	**LINDA AVENUE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	48.1
Street:	**LITTLE TREE LANE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	48.2
Street:	**LITTLE TREE LANE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	289.1
Street:	**LOCKLAND AVENUE**
Intersecting Street:	DONNA ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	399.1
Street:	**MAIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	399.2
Street:	**MAIN STREET**
Intersecting Street:	MOULTON PARK ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	400.3
Street:	**MAIN STREET**
Intersecting Street:	FRANKLIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	400.4
Street:	**MAIN STREET**
Intersecting Street:	FRANKLIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	31.1
Street:	**MAJOR HALE DRIVE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	161.1
Street:	**MARY AGNES ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	161.2
Street:	**MARY AGNES ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.1
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.2
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	375.3
Street:	**MAYNARD ROAD**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	380.1
Street:	**MAYNARD ROAD**
Intersecting Street:	CHURCH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	380.2
Street:	**MAYNARD ROAD**
Intersecting Street:	CHURCH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	532.1
Street:	**MELLEN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.2
Street:	**MELLEN STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.1
Street:	**MELLEN STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	558.2
Street:	**MELLEN STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	47.1
Street:	**MERRIAM ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	47.2
Street:	**MERRIAM ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	306.1
Street:	**MICHAUD DRIVE**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.2
Street:	**MICHAUD DRIVE**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	51.1
Street:	**MILL STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	51.2
Street:	**MILL STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	31.2
Street:	**MONTEREY LANE**
Intersecting Street:	BELKNAP ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	152.1
Street:	**MURPHY CIRCLE**
Intersecting Street:	COLONIAL DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Slope & Ldg Slope
Condition:	Good



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Ramp ID:	152.2
Street:	**MURPHY CIRCLE**
Intersecting Street:	COLONIAL DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Slope & Ldg Slope
Condition:	Good



Ramp ID:	568.1
Street:	**NAPLES STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	568.2
Street:	**NAPLES STREET**
Intersecting Street:	SAUCIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	570.1
Street:	**NAPLES STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	570.3
Street:	**NAPLES STREET**
Intersecting Street:	BRIDGES STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	228.1
Street:	**NEWBURY STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	228.2
Street:	**NEWBURY STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	241.5
Street:	**NEWBURY STREET**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



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Ramp ID:	241.6
Street:	**NEWBURY STREET**
Intersecting Street:	WHITTIER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	251.2
Street:	**NEWBURY STREET**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.3
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.4
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	104.5
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.6
Street:	**NICHOLAS ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.4
Street:	**NORMANDY ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.5
Street:	**NORMANDY ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.3
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	FLAGG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	515.4
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	FLAGG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.3
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ROSE KENNEDY LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.4
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ROSE KENNEDY LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	517.2
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	ARSENAL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.1
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	JOHN J BRADY DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	574.2
Street:	**NORMANDY ROAD EXTENSION**
Intersecting Street:	JOHN J BRADY DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	350.1
Street:	**OAK CREST DRIVE**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	350.2
Street:	**OAK CREST DRIVE**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	317.1
Street:	**OAK STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	317.2
Street:	**OAK STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.1
Street:	**OAK STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.2
Street:	**OAK STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	170.1
Street:	**OAKWOOD COURT**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	170.2
Street:	**OAKWOOD COURT**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	198.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROSSI CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	199.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BIRCH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	199.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BIRCH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	202.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LAKE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	210.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROWNLEA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	211.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	211.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	211.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	211.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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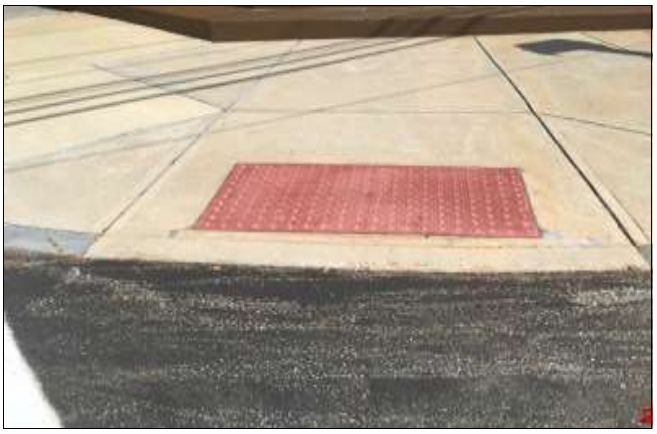
Ramp ID:	223.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	227.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	ARLENE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	227.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	ARLENE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	229.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	229.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	230.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	230.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.6
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.7
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	230.8
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	230.9
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	253.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	253.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	343.1
Street:	**OLD WOOD ROAD**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



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Ramp ID:	343.2
Street:	**OLD WOOD ROAD**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	341.2
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	343.3
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	343.4
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



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Ramp ID:	544.1
Street:	**PALMETTO AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	544.2
Street:	**PALMETTO AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.3
Street:	**PAMELA ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.4
Street:	**PAMELA ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	223.6
Street:	**PARKING LOT**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.5
Street:	**PARKING LOT**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	316.6
Street:	**PARKING LOT**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.10
Street:	**PARKING LOT**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	536.9
Street:	**PARKING LOT**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.1
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.2
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	576.1
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	576.2
Street:	**PERSHING AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.1
Street:	**PLEASANT STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.2
Street:	**PLEASANT STREET**
Intersecting Street:	VERNON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	327.1
Street:	**PLEASANT STREET**
Intersecting Street:	MAYNARD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	327.2
Street:	**PLEASANT STREET**
Intersecting Street:	MAYNARD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	329.2
Street:	**PLEASANT STREET**
Intersecting Street:	ARNOLD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	115.1
Street:	**POTTER ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	162.4
Street:	**POTTER ROAD**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	163.2
Street:	**POTTER ROAD**
Intersecting Street:	JOYCE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	163.3
Street:	**POTTER ROAD**
Intersecting Street:	JOYCE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	168.2
Street:	**POTTER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	168.3
Street:	**POTTER ROAD**
Intersecting Street:	EATON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	171.1
Street:	**POTTER ROAD**
Intersecting Street:	BRADFORD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	171.2
Street:	**POTTER ROAD**
Intersecting Street:	BRADFORD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	175.1
Street:	**POTTER ROAD**
Intersecting Street:	ELM STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	175.4
Street:	**POTTER ROAD**
Intersecting Street:	ELM STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	177.1
Street:	**POTTER ROAD**
Intersecting Street:	LOWRY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	177.2
Street:	**POTTER ROAD**
Intersecting Street:	LOWRY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	306.5
Street:	**PROSPECT STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	306.6
Street:	**PROSPECT STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	310.3
Street:	**PROSPECT STREET**
Intersecting Street:	WOODSIDE COTTAGE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.4
Street:	**PROSPECT STREET**
Intersecting Street:	LILIAN ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	311.3
Street:	**PROSPECT STREET**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	311.4
Street:	**PROSPECT STREET**
Intersecting Street:	WYNDSTONE WAY
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	370.1
Street:	**RESERVOIR RIDGE**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	370.2
Street:	**RESERVOIR RIDGE**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	537.1
Street:	**RHUBENA STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	537.2
Street:	**RHUBENA STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	201.1
Street:	**RIVERPATH DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	201.2
Street:	**RIVERPATH DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	108.1
Street:	**RON'S WAY**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	108.2
Street:	**RON'S WAY**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	516.2
Street:	**ROSE KENNEDY LANE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	27.1
Street:	**ROYAL MEADOW LANE**
Intersecting Street:	KINGS ROW LANE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	11.1
Street:	**SAGE LANE**
Intersecting Street:	WINCH STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	368.1
Street:	**SALEM END ROAD**
Intersecting Street:	SALEM END LANE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	368.2
Street:	**SALEM END ROAD**
Intersecting Street:	SALEM END LANE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	374.1
Street:	**SALEM END ROAD**
Intersecting Street:	MAYHEW STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	374.2
Street:	**SALEM END ROAD**
Intersecting Street:	MAYHEW STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	533.1
Street:	**SAUCIER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	533.2
Street:	**SAUCIER STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	160.1
Street:	**SAVOY ROAD**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	160.2
Street:	**SAVOY ROAD**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



Ramp ID:	191.1
Street:	**SAXONY ROAD**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	191.2
Street:	**SAXONY ROAD**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.1
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.2
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	86.1
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



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Ramp ID:	86.2
Street:	**SCHOOL ENTRANCE**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	204.1
Street:	**SCHOOL STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	219.1
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.2
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	219.5
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	219.6
Street:	**SCHOOL STREET**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing & Excessive Ldg Slope
Condition:	Fair



Ramp ID:	221.3
Street:	**SCHOOL STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	221.4
Street:	**SCHOOL STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	503.1
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.2
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.4
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	503.5
Street:	**SECOND STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	514.1
Street:	**SECOND STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	514.2
Street:	**SECOND STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	169.1
Street:	**SHEFFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	169.2
Street:	**SHEFFIELD ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	159.1
Street:	**SLOANE DRIVE**
Intersecting Street:	MARY AGNES ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	248.1
Street:	**SPEEN STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	248.2
Street:	**SPEEN STREET**
Intersecting Street:	LEGGATT MCCALL CONNECTOR ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	252.1
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	252.5
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	114.1
Street:	**SPRING LANE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	114.2
Street:	**SPRING LANE**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	377.1
Street:	**STATE STREET**
Intersecting Street:	HIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	377.2
Street:	**STATE STREET**
Intersecting Street:	HIGH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	183.1
Street:	**SUDBURY LANDING**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	183.2
Street:	**SUDBURY LANDING**
Intersecting Street:	DANFORTH STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	235.3
Street:	**SUMMER STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	235.4
Street:	**SUMMER STREET**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	331.1
Street:	**SUN VALLEY DRIVE**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Hydrant
Condition:	Good



Ramp ID:	97.1
Street:	**SWANSON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	97.2
Street:	**SWANSON ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	173.1
Street:	**TEMI ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	173.2
Street:	**TEMI ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	339.1
Street:	**TEMPLE STREET**
Intersecting Street:	TEMPLE PLACE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.2
Street:	**TEMPLE STREET**
Intersecting Street:	WOODLEIGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	339.5
Street:	**TEMPLE STREET**
Intersecting Street:	WOODLEIGH ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.6
Street:	**TEMPLE STREET**
Intersecting Street:	TEMPLE PLACE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	518.1
Street:	**THELMA ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	518.8
Street:	**THELMA ROAD**
Intersecting Street:	CONCORD STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	504.1
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.2
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.3
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	504.4
Street:	**THIRD STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	129.1
Street:	**TREELAND DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Fair



Ramp ID:	129.2
Street:	**TREELAND DRIVE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	176.1
Street:	**UPTON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	176.2
Street:	**UPTON ROAD**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	315.3
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.4
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.5
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	315.6
Street:	**VERNON STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	319.3
Street:	**VERNON STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	319.4
Street:	**VERNON STREET**
Intersecting Street:	OAK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	324.1
Street:	**VERNON STREET**
Intersecting Street:	GROVE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	324.2
Street:	**VERNON STREET**
Intersecting Street:	GROVE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	325.3
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.4
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.5
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	325.6
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	325.7
Street:	**VERNON STREET**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	65.1
Street:	**WALKERS WAY**
Intersecting Street:	LANEWOOD AVENUE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	65.2
Street:	**WALKERS WAY**
Intersecting Street:	LANEWOOD AVENUE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	314.1
Street:	**WARREN PLACE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	314.2
Street:	**WARREN PLACE**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	100.1
Street:	**WATER STREET**
Intersecting Street:	CART PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	100.2
Street:	**WATER STREET**
Intersecting Street:	CART PATH
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	102.1
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	102.2
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	103.1
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	103.2
Street:	**WATER STREET**
Intersecting Street:	PARK AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	104.1
Street:	**WATER STREET**
Intersecting Street:	NICHOLAS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	104.2
Street:	**WATER STREET**
Intersecting Street:	NICHOLAS ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.3
Street:	**WATER STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	105.4
Street:	**WATER STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	110.3
Street:	**WATER STREET**
Intersecting Street:	JOYCE LUNDBERG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	110.4
Street:	**WATER STREET**
Intersecting Street:	JOYCE LUNDBERG DRIVE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.1
Street:	**WATER STREET**
Intersecting Street:	PAMELA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	111.2
Street:	**WATER STREET**
Intersecting Street:	PAMELA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	115.3
Street:	**WATER STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Fair



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Ramp ID:	115.4
Street:	**WATER STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.1
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.4
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.1
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	120.2
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.3
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.4
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	120.5
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	120.6
Street:	**WATER STREET**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.4
Street:	**WATER STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	96.3
Street:	**WATER STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	96.4
Street:	**WATER STREET**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	97.3
Street:	**WATER STREET**
Intersecting Street:	SWANSON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	97.4
Street:	**WATER STREET**
Intersecting Street:	SWANSON ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	98.1
Street:	**WATER STREET**
Intersecting Street:	LARIVIERE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	98.2
Street:	**WATER STREET**
Intersecting Street:	LARIVIERE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	55.1
Street:	**WAVENEY ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	55.2
Street:	**WAVENEY ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.1
Street:	**WAVERLEY STREET**
Intersecting Street:	BISHOP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	498.2
Street:	**WAVERLEY STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	498.5
Street:	**WAVERLEY STREET**
Intersecting Street:	BEAVER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	498.6
Street:	**WAVERLEY STREET**
Intersecting Street:	BISHOP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	511.1
Street:	**WAVERLEY STREET**
Intersecting Street:	COOLIDGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	511.2
Street:	**WAVERLEY STREET**
Intersecting Street:	COOLIDGE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	512.1
Street:	**WAVERLEY STREET**
Intersecting Street:	TARALLI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	512.2
Street:	**WAVERLEY STREET**
Intersecting Street:	TARALLI TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	513.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WILLIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	513.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WILLIS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	514.3
Street:	**WAVERLEY STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	514.4
Street:	**WAVERLEY STREET**
Intersecting Street:	SECOND STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	529.1
Street:	**WAVERLEY STREET**
Intersecting Street:	CEDAR STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	529.2
Street:	**WAVERLEY STREET**
Intersecting Street:	CEDAR STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	530.1
Street:	**WAVERLEY STREET**
Intersecting Street:	CASEY COURT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	530.2
Street:	**WAVERLEY STREET**
Intersecting Street:	CASEY COURT
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	531.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	531.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	531.3
Street:	**WAVERLEY STREET**
Intersecting Street:	WAVERLY COURT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.3
Street:	**WAVERLEY STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.4
Street:	**WAVERLEY STREET**
Intersecting Street:	FOUNTAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	532.7
Street:	**WAVERLEY STREET**
Intersecting Street:	FOUNTAIN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	532.8
Street:	**WAVERLEY STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.11
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.12
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.7
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
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Ramp ID:	536.8
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.3
Street:	**WAVERLEY STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	539.4
Street:	**WAVERLEY STREET**
Intersecting Street:	PARKING LOT
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	546.1
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	546.2
Street:	**WAVERLEY STREET**
Intersecting Street:	WINTER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.3
Street:	**WAVERLEY STREET**
Intersecting Street:	PERSHING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	549.4
Street:	**WAVERLEY STREET**
Intersecting Street:	PERSHING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	550.1
Street:	**WAVERLEY STREET**
Intersecting Street:	LIBERTY STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Curb Ramp Inventory & Assessment
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Ramp ID:	550.2
Street:	**WAVERLEY STREET**
Intersecting Street:	LIBERTY STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	85.1
Street:	**WESLEY ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	85.2
Street:	**WESLEY ROAD**
Intersecting Street:	BROOK STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	334.1
Street:	**WEST STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	334.2
Street:	**WEST STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	124.1
Street:	**WHITING ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	124.2
Street:	**WHITING ROAD**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	241.1
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	241.2
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	241.3
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	241.4
Street:	**WHITTIER STREET**
Intersecting Street:	NEWBURY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	242.4
Street:	**WHITTIER STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	242.5
Street:	**WHITTIER STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Fair



Ramp ID:	538.1
Street:	**WILDE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	538.2
Street:	**WILDE AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	548.1
Street:	**WILSON AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	548.2
Street:	**WILSON AVENUE**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	373.1
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	373.2
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	373.3
Street:	**WINTER STREET**
Intersecting Street:	SALEM END ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



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Ramp ID:	378.1
Street:	**WINTER STREET**
Intersecting Street:	MAYHEW STREET EXTENSION
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	378.2
Street:	**WINTER STREET**
Intersecting Street:	MAYHEW STREET EXTENSION
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



Ramp ID:	379.2
Street:	**WINTER STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	386.1
Street:	**WINTER STREET**
Intersecting Street:	MAPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



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Ramp ID:	536.3
Street:	**WINTHROP STREET**
Intersecting Street:	CONANT ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.4
Street:	**WINTHROP STREET**
Intersecting Street:	CONANT ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Major Curbing
Condition:	Fair



Ramp ID:	536.5
Street:	**WINTHROP STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	536.6
Street:	**WINTHROP STREET**
Intersecting Street:	WAVERLEY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	553.3
Street:	**WINTHROP STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.3
Street:	**WINTHROP STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	555.4
Street:	**WINTHROP STREET**
Intersecting Street:	BRIDGES STREET EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	556.3
Street:	**WINTHROP STREET**
Intersecting Street:	COVE AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	556.4
Street:	**WINTHROP STREET**
Intersecting Street:	COVE AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.3
Street:	**WINTHROP STREET**
Intersecting Street:	MELLEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	558.4
Street:	**WINTHROP STREET**
Intersecting Street:	DOW STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	557.1
Street:	**WINTHROP TERRACE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	557.2
Street:	**WINTHROP TERRACE**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	339.3
Street:	**WOODLEIGH ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	339.4
Street:	**WOODLEIGH ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	342.1
Street:	**WOODLEIGH ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Vegetation
Condition:	Poor



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Ramp ID:	342.2
Street:	**WOODLEIGH ROAD**
Intersecting Street:	OLD WOOD ROAD
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	344.1
Street:	**WOODLEIGH ROAD**
Intersecting Street:	PRIMO DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	344.2
Street:	**WOODLEIGH ROAD**
Intersecting Street:	PRIMO DRIVE
Ramp Material:	Asphalt
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	37.1
Street:	**WOODMERE ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	37.2
Street:	**WOODMERE ROAD**
Intersecting Street:	PLEASANT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.1
Street:	**WOODSIDE COTTAGE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	310.2
Street:	**WOODSIDE COTTAGE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Excessive Ldg Slope
Condition:	Good



Ramp ID:	311.1
Street:	**WYNDSTONE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Ramp ID:	311.2
Street:	**WYNDSTONE WAY**
Intersecting Street:	PROSPECT STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



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Curb Ramp Inventory & Assessment

Ramp Compliance - By Street With Inspection Data Total: 316

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
AUBURN STREET			***1 Ramps***							
At EDGELL ROAD			1 Ramps							
316.2	Concrete	Good	Yes	No	60	6.4	60	60	None	Yes
BEACON STREET			***3 Ramps***							
At COCHITUATE ROAD			2 Ramps							
295.1	Concrete	Good	Yes	No	60	7.2	60	36	None	Yes
295.4	Concrete	Good	Yes	No	60	7.2	60	44	None	Yes
At WORCESTER ROAD			1 Ramps							
297.1	Concrete	Good	Yes	No	60	8.2	60	66	None	Yes
BEAVER STREET			***12 Ramps***							
At BEAVER COURT			2 Ramps							
500.1	Concrete	Good	Yes	No	62	6.1	65	60	None	Yes
500.2	Concrete	Fair	Yes	No	38	4.8	60	60	None	Yes
At BEAVER PARK ROAD			1 Ramps							
502.2	Concrete	Good	Yes	No	42	6.6	60	60	None	Yes
At FIRST STREET			1 Ramps							
502.3	Concrete	Good	Yes	No	48	2.3	60	60	None	Yes
At MARIAN ROAD			1 Ramps							
501.1	Concrete	Good	Yes	No	48	7.6	60	60	None	Yes
At PARKING LOT			4 Ramps							
499.2	Concrete	Good	Yes	No	170	0.5	170	42	None	Yes
577.1	Concrete	Good	Yes	No	60	1.6	60	36	None	Yes
577.2	Concrete	Good	Yes	No	60	1.3	60	38	None	Yes
578.1	Concrete	Good	Yes	No	60	2.2	60	36	None	Yes
At SECOND STREET			1 Ramps							
503.3	Concrete	Good	Yes	No	60	0.1	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WAVERLEY STREET		2 Ramps								
498.3	Concrete	Good	Yes	No	60	2.8	60	67	None	Yes
498.4	Concrete	Good	Yes	No	48	4.4	55	43	None	Yes
BELKNAP ROAD		***4 Ramps***								
At CLEARVIEW DRIVE		1 Ramps								
22.3	Concrete	Good	Yes	No	60	2.1	60	41	None	Yes
At FLANAGAN DRIVE		1 Ramps								
30.2	Concrete	Fair	Yes	No	82	1.1	82	60	None	Yes
At PLEASANT STREET		2 Ramps								
23.1	Concrete	Good	Yes	No	62	2.6	62	45	None	Yes
23.2	Concrete	Good	Yes	No	72	3.6	80	60	None	Yes
BETHANY ROAD		***3 Ramps***								
At WAVERLEY STREET		1 Ramps								
535.2	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
At WINTHROP STREET		2 Ramps								
553.1	Concrete	Good	Yes	No	60	2.7	60	60	None	Yes
553.2	Concrete	Good	Yes	No	58	5.1	58	48	None	Yes
BEULAH STREET		***2 Ramps***								
At WORCESTER ROAD		2 Ramps								
322.1	Concrete	Fair	Yes	No	48	4.7	96	60	None	Yes
322.2	Concrete	Fair	Yes	No	55	3.5	62	60	None	Yes
BRIDGES STREET		***3 Ramps***								
At COBURN STREET		2 Ramps								
564.3	Concrete	Good	Yes	No	60	3.1	60	50	None	Yes
564.4	Concrete	Fair	Yes	No	60	7.5	60	48	None	Yes
At WAVERLEY STREET		1 Ramps								
534.1	Concrete	Good	Yes	No	60	6.4	60	54	None	Yes
BRIDGES STREET EXTENSION		***2 Ramps***								
At COBURN STREET		2 Ramps								
564.1	Concrete	Good	Yes	No	60	5.5	60	52	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
564.2	Concrete	Good	Yes	No	60	0.8	60	46	None	Yes
BRIGATI TERRACE			***2 Ramps***							
At DANFORTH STREET			2 Ramps							
191.3	Concrete	Good	Yes	No	60	5.3	60	55	None	Yes
191.4	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
CAMPELLO ROAD			***2 Ramps***							
At CONCORD STREET			2 Ramps							
235.1	Concrete	Good	Yes	No	64	6.1	64	50	None	Yes
235.2	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
CEDAR STREET			***3 Ramps***							
At CYPRESS STREET			2 Ramps							
561.1	Concrete	Good	Yes	No	60	1.9	60	50	None	Yes
561.2	Concrete	Good	Yes	No	60	0.5	60	40	None	Yes
At WINTHROP STREET			1 Ramps							
560.2	Concrete	Fair	Yes	No	60	0.8	60	48	None	Yes
CENTRAL STREET			***6 Ramps***							
At INDIAN HEAD ROAD			2 Ramps							
303.1	Concrete	Good	Yes	No	60	6.4	60	42	None	Yes
303.2	Concrete	Good	Yes	No	60	5.4	60	57	None	Yes
At MICHAUD DRIVE			2 Ramps							
306.3	Concrete	Good	Yes	No	60	1.3	60	42	None	Yes
306.4	Concrete	Good	Yes	No	60	2.1	60	40	None	Yes
At WATER STREET			2 Ramps							
105.1	Concrete	Good	Yes	No	60	5.8	60	48	None	Yes
105.2	Concrete	Good	Yes	No	60	3.4	60	46	None	Yes
CHERRY STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
239.2	Concrete	Good	Yes	No	60	5.8	60	48	None	Yes
CLEARVIEW DRIVE			***2 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BELKNAP ROAD			2 Ramps							
22.1	Concrete	Good	Yes	No	60	7.1	60	51	None	Yes
22.2	Concrete	Good	Yes	No	60	4.8	60	48	None	Yes
CLIFFORD STREET			***3 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.1	Concrete	Good	Yes	No	60	7.5	60	55	None	Yes
At MELLEN STREET			2 Ramps							
562.1	Concrete	Fair	Yes	No	60	2	60	39	None	Yes
562.2	Concrete	Good	Yes	No	58	1.9	58	40	None	Yes
COBURN STREET			***5 Ramps***							
At BETHANY ROAD			2 Ramps							
554.1	Concrete	Good	Yes	No	60	6.3	60	45	None	Yes
554.2	Concrete	Good	Yes	No	60	0.4	60	46	None	Yes
At MELLEN STREET			2 Ramps							
566.1	Concrete	Good	Yes	No	58	6.1	58	60	None	Yes
566.2	Concrete	Good	Yes	No	54	3.1	60	43	None	Yes
At SAUCIER STREET			1 Ramps							
565.1	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
COCHITUATE ROAD			***2 Ramps***							
At BEACON STREET			2 Ramps							
295.3	Concrete	Good	Yes	No	60	7.5	60	42	None	Yes
295.6	Concrete	Good	Yes	No	60	6.4	60	40	None	Yes
CONCORD STREET			***17 Ramps***							
At A STREET			4 Ramps							
222.1	Concrete	Good	Yes	No	60	4.1	60	52	None	Yes
222.2	Concrete	Good	Yes	No	60	4.1	60	54	None	Yes
222.7	Concrete	Good	Yes	No	60	7.4	60	60	None	Yes
222.8	Concrete	Good	Yes	No	60	5.1	60	60	None	Yes
At CHERRY STREET			2 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
239.3	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
239.4	Concrete	Good	Yes	No	60	6.8	60	48	None	Yes
At DONLON STREET		2 Ramps								
236.1	Concrete	Good	Yes	No	50	6.9	98	60	None	Yes
236.2	Concrete	Good	Yes	No	48	6.2	78	60	None	Yes
At GIBBS STREET		1 Ramps								
238.2	Concrete	Good	Yes	No	50	1.2	70	60	None	Yes
At HARTFORD STREET		1 Ramps								
520.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At NORMANDY ROAD		2 Ramps								
518.3	Concrete	Good	Yes	No	60	5.1	60	42	None	Yes
518.6	Concrete	Good	Yes	No	60	4.3	60	48	None	Yes
At OLD CONNECTICUT PATH		1 Ramps								
230.10	Concrete	Good	Yes	No	60	3.6	60	48	None	Yes
At SCHOOL STREET		2 Ramps								
221.1	Concrete	Good	Yes	No	60	5.3	60	55	None	Yes
221.2	Concrete	Good	Yes	No	60	6.5	60	60	None	Yes
At THELMA ROAD		2 Ramps								
518.2	Concrete	Good	Yes	No	60	4.8	60	58	None	Yes
518.7	Concrete	Good	Yes	No	60	6.1	60	60	None	Yes
COSTA CIRCLE		***1 Ramps***								
At WATER STREET		1 Ramps								
101.2	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
COTTAGE STREET		***1 Ramps***								
At DANFORTH STREET		1 Ramps								
185.4	Concrete	Good	Yes	No	60	4.9	60	44	None	Yes
COVE AVENUE		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
556.1	Concrete	Good	Yes	No	60	0.9	60	40	None	Yes
556.2	Concrete	Good	Yes	No	60	0.8	60	38	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
CYPRESS STREET		***1 Ramps***								
At MELLEN STREET		1 Ramps								
559.2	Concrete	Good	Yes	No	60	2.6	60	40	None	Yes
DANFORTH STREET		***14 Ramps***								
At BRIGATI TERRACE		2 Ramps								
191.5	Concrete	Good	Yes	No	60	6.5	60	46	None	Yes
191.6	Concrete	Good	Yes	No	60	1.3	60	40	None	Yes
At COLBY AVENUE		2 Ramps								
189.1	Concrete	Good	Yes	No	62	6.4	66	60	None	Yes
189.2	Concrete	Good	Yes	No	64	3.1	64	60	None	Yes
At COTTAGE STREET		2 Ramps								
185.1	Concrete	Good	Yes	No	60	6.1	60	49	None	Yes
185.2	Concrete	Good	Yes	No	60	5.6	60	82	None	Yes
At DANFORTH COURT		1 Ramps								
182.3	Concrete	Good	Yes	No	36	7.6	62	60	None	Yes
At DERBY STREET		1 Ramps								
187.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At FENWOOD STREET		1 Ramps								
187.2	Concrete	Good	Yes	No	60	0.9	60	48	None	Yes
At HIALEAH LANE		1 Ramps								
188.3	Concrete	Good	Yes	No	60	1.1	60	36	None	Yes
At KING STREET		1 Ramps								
182.2	Concrete	Good	Yes	No	48	5.1	48	60	None	Yes
At OLD CONNECTICUT PATH		2 Ramps								
192.1	Concrete	Good	Yes	No	60	5.4	60	48	None	Yes
192.2	Concrete	Good	Yes	No	60	5.6	60	51	None	Yes
At SAXONY ROAD		1 Ramps								
190.1	Concrete	Good	Yes	No	60	5.7	60	42	None	Yes
DAYTONA AVENUE		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
543.1	Concrete	Good	Yes	No	60	5.5	60	64	None	Yes
DOTTY ANN DRIVE		***2 Ramps***								
At WATER STREET		2 Ramps								
109.1	Concrete	Good	Yes	No	60	1.6	60	40	None	Yes
109.2	Concrete	Good	Yes	No	60	0.2	60	36	None	Yes
DOW STREET		***1 Ramps***								
At WINTHROP STREET		1 Ramps								
558.6	Concrete	Good	Yes	No	60	6.3	60	43	None	Yes
EDGELL ROAD		***7 Ramps***								
At AUBURN STREET		1 Ramps								
316.3	Concrete	Good	Yes	No	58	2.4	60	60	None	Yes
At VERNON STREET		3 Ramps								
315.1	Concrete	Good	Yes	No	60	7.6	60	60	None	Yes
315.2	Concrete	Good	Yes	No	60	5.5	60	72	None	Yes
315.7	Concrete	Good	Yes	No	60	1.3	60	60	None	Yes
At WATER STREET		2 Ramps								
121.5	Concrete	Good	Yes	No	60	2.3	60	40	None	Yes
121.6	Concrete	Good	Yes	No	60	7.6	60	48	None	Yes
At WHITING ROAD		1 Ramps								
124.4	Concrete	Good	Yes	No	60	4.1	60	46	None	Yes
ELLIS STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
333.2	Concrete	Good	Yes	No	48	7.1	65	60	None	Yes
ELM STREET		***1 Ramps***								
At POTTER ROAD		1 Ramps								
175.3	Concrete	Good	Yes	No	60	4.2	60	46	None	Yes
ELMFIELD ROAD		***2 Ramps***								
At POTTER ROAD		2 Ramps								
174.1	Concrete	Good	Yes	No	59	6.1	59	42	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
174.2	Concrete	Good	Yes	No	59	5.3	59	42	None	Yes
EMILY ROAD			***2 Ramps***							
At HARDY STREET			2 Ramps							
233.1	Concrete	Good	Yes	No	50	6.7	50	48	None	Yes
233.2	Concrete	Good	Yes	No	48	5.7	48	50	None	Yes
FAIRFIELD ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
99.1	Concrete	Good	Yes	No	60	4.8	60	58	None	Yes
99.2	Concrete	Good	Yes	No	60	4.1	60	40	None	Yes
FAY ROAD			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
547.1	Concrete	Good	Yes	No	60	4.2	60	64	None	Yes
547.2	Concrete	Good	Yes	No	60	6.3	60	50	None	Yes
FENWOOD STREET			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
187.3	Concrete	Good	Yes	No	60	2.3	60	38	None	Yes
FLAGG DRIVE			***2 Ramps***							
At NORMANDY ROAD EXTENSION			2 Ramps							
515.1	Concrete	Good	Yes	No	60	5.4	60	50	None	Yes
515.2	Concrete	Good	Yes	No	60	6.6	60	48	None	Yes
FOUNTAIN STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.6	Concrete	Good	Yes	No	58	1.1	58	38	None	Yes
FRANKLIN STREET			***1 Ramps***							
At MAIN STREET			1 Ramps							
400.1	Concrete	Good	Yes	No	58	6.6	60	36	None	Yes
GILBERT STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.3	Concrete	Good	Yes	No	60	7.4	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
GRANT STREET			***1 Ramps***							
At JOHN J. GALLAGHER DRIVE			1 Ramps							
475.1	Concrete	Good	Yes	No	65	0.2	65	36	None	Yes
GREENLEAF CIRCLE			***2 Ramps***							
At NEWBURY STREET			2 Ramps							
240.1	Concrete	Good	Yes	No	60	6.3	60	63	None	Yes
240.2	Concrete	Good	Yes	No	60	6.2	60	50	None	Yes
HADLEY ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
165.1	Concrete	Good	Yes	No	60	0.1	60	48	None	Yes
165.2	Concrete	Good	Yes	No	59	0.4	59	48	None	Yes
HARDY STREET			***2 Ramps***							
At CONCORD STREET			1 Ramps							
234.2	Concrete	Good	Yes	No	72	0.5	72	60	None	Yes
At DEBRA LANE			1 Ramps							
231.3	Concrete	Good	Yes	No	48	1.1	48	48	None	Yes
HARTFORD STREET			***3 Ramps***							
At CONCORD STREET			2 Ramps							
520.3	Concrete	Good	Yes	No	48	5.3	48	58	None	Yes
520.4	Concrete	Fair	Yes	No	48	7.1	48	48	None	Yes
At DYER STREET			1 Ramps							
522.2	Concrete	Good	Yes	No	64	3.1	64	40	None	Yes
HEMENWAY ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
117.1	Concrete	Good	Yes	No	60	2.2	60	36	None	Yes
HIALEAH LANE			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
188.1	Concrete	Good	Yes	No	60	3.7	60	48	None	Yes
HILTON STREET			***4 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BRIDGES STREET		2 Ramps								
569.1	Concrete	Good	Yes	No	60	1.2	60	36	None	Yes
569.2	Concrete	Good	Yes	No	58	6.3	60	52	None	Yes
At SAUCIER STREET		2 Ramps								
567.1	Concrete	Good	Yes	No	60	2.3	60	42	None	Yes
567.2	Concrete	Good	Yes	No	40	5.4	64	60	None	Yes
INDIAN HEAD ROAD		***4 Ramps***								
At CRESTWOOD ROAD		1 Ramps								
302.1	Concrete	Good	Yes	No	60	1.8	60	39	None	Yes
At DONNA ROAD		1 Ramps								
299.2	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
At INDIAN HEAD HEIGHTS		1 Ramps								
301.1	Concrete	Good	Yes	No	48	1.5	65	60	None	Yes
At SUMMER STREET		1 Ramps								
298.2	Concrete	Good	Yes	No	58	4.1	58	42	None	Yes
IRVING STREET		***1 Ramps***								
At HERBERT STREET		1 Ramps								
487.1	Concrete	Good	Yes	No	65	2.4	65	57	None	Yes
JOHN J BRADY DRIVE		***1 Ramps***								
At NORMANDY ROAD EXTENSION		1 Ramps								
574.4	Concrete	Good	Yes	No	59	3.9	80	60	None	Yes
JOHN J. GALLAGHER DRIVE		***1 Ramps***								
At EVERIT AVENUE		1 Ramps								
476.1	Concrete	Good	Yes	No	60	6.8	60	48	None	Yes
JOSEPH ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
107.1	Concrete	Good	Yes	No	59	2.2	59	36	None	Yes
JOYCE LUNDBERG DRIVE		***1 Ramps***								
At WATER STREET		1 Ramps								
110.1	Concrete	Good	Yes	No	60	2.1	60	36	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
KENDALL AVENUE		***10 Ramps***								
At ALLA STREET		1 Ramps								
510.1	Concrete	Good	Yes	No	50	6.1	60	60	None	Yes
At AMERICA STREET		2 Ramps								
508.1	Concrete	Good	Yes	No	58	2.4	72	60	None	Yes
508.2	Concrete	Good	Yes	No	56	5.9	60	60	None	Yes
At CURTIS STREET		1 Ramps								
507.1	Concrete	Good	Yes	No	48	4.2	60	60	None	Yes
At GLEN STREET		2 Ramps								
506.1	Concrete	Good	Yes	No	40	7.6	70	60	None	Yes
506.2	Concrete	Good	Yes	No	64	5.8	64	40	None	Yes
At LELAND STREET		2 Ramps								
505.3	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
505.4	Concrete	Good	Yes	No	48	0.9	48	48	None	Yes
At STILLMAN STREET		2 Ramps								
509.1	Concrete	Good	Yes	No	48	3.8	64	60	None	Yes
509.2	Concrete	Good	Yes	No	42	6.6	70	60	None	Yes
KNIGHT ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
46.1	Concrete	Good	Yes	No	60	5.3	60	48	None	Yes
KNOX AVENUE		***2 Ramps***								
At WAVERLEY STREET		2 Ramps								
545.1	Concrete	Good	Yes	No	60	7.5	60	78	None	Yes
545.2	Concrete	Good	Yes	No	60	2.8	60	67	None	Yes
LANCASTER DRIVE		***2 Ramps***								
At POTTER ROAD		2 Ramps								
164.1	Concrete	Good	Yes	No	59	0.6	59	48	None	Yes
164.2	Concrete	Good	Yes	No	58	0.2	59	66	None	Yes
LARRABEE AVENUE		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
539.1	Concrete	Good	Yes	No	58	5.5	58	48	None	Yes
LELAND STREET			***2 Ramps***							
At KENDALL AVENUE			2 Ramps							
505.1	Concrete	Good	Yes	No	60	2.6	60	48	None	Yes
505.2	Concrete	Good	Yes	No	60	5.7	60	48	None	Yes
MAIN STREET			***2 Ramps***							
At FRANKLIN STREET			2 Ramps							
400.3	Concrete	Good	Yes	No	60	5.2	60	42	None	Yes
400.4	Concrete	Good	Yes	No	60	4.1	60	50	None	Yes
MARY AGNES ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
161.1	Concrete	Good	Yes	No	60	2.2	60	48	None	Yes
161.2	Concrete	Good	Yes	No	59	1.6	59	48	None	Yes
MAYNARD ROAD			***3 Ramps***							
At SALEM END ROAD			3 Ramps							
375.1	Concrete	Good	Yes	No	58	7.1	60	53	None	Yes
375.2	Concrete	Good	Yes	No	60	7.3	60	54	None	Yes
375.3	Concrete	Good	Yes	No	48	4.6	48	48	None	Yes
MELLEN STREET			***2 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.1	Concrete	Good	Yes	No	60	3.3	60	50	None	Yes
At WINTHROP STREET			1 Ramps							
558.2	Concrete	Good	Yes	No	60	3.5	60	48	None	Yes
MICHAUD DRIVE			***2 Ramps***							
At CENTRAL STREET			2 Ramps							
306.1	Concrete	Good	Yes	No	60	1.1	60	40	None	Yes
306.2	Concrete	Good	Yes	No	60	1.1	60	40	None	Yes
NAPLES STREET			***3 Ramps***							
At BRIDGES STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
570.1	Concrete	Good	Yes	No	50	7.9	65	60	None	Yes
At SAUCIER STREET		2 Ramps								
568.1	Concrete	Good	Yes	No	60	7.1	60	48	None	Yes
568.2	Concrete	Good	Yes	No	36	8.1	50	60	None	Yes
NEWBURY STREET		***3 Ramps***								
At OLD CONNECTICUT PATH		2 Ramps								
228.1	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
228.2	Concrete	Good	Yes	No	60	4.2	60	48	None	Yes
At WHITTIER STREET		1 Ramps								
241.6	Concrete	Good	Yes	No	60	5.5	60	60	None	Yes
NICHOLAS ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
104.5	Concrete	Good	Yes	No	120	2.1	120	100	None	Yes
104.6	Concrete	Good	Yes	No	120	3.2	120	91	None	Yes
NORMANDY ROAD		***1 Ramps***								
At CONCORD STREET		1 Ramps								
518.5	Concrete	Good	Yes	No	60	6.9	60	48	None	Yes
NORMANDY ROAD		***5 Ramps***								
At ARSENAL ROAD		1 Ramps								
517.2	Concrete	Good	Yes	No	60	6.3	60	45	None	Yes
At FLAGG DRIVE		1 Ramps								
515.3	Concrete	Good	Yes	No	58	5.6	58	50	None	Yes
At JOHN J BRADY DRIVE		1 Ramps								
574.1	Concrete	Good	Yes	No	60	6.8	60	55	None	Yes
At ROSE KENNEDY LANE		2 Ramps								
516.3	Concrete	Good	Yes	No	60	7.4	60	46	None	Yes
516.4	Concrete	Good	Yes	No	60	8.1	60	45	None	Yes
OAK CREST DRIVE		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
350.1	Concrete	Good	Yes	No	68	4.4	68	60	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
OAK STREET			***1 Ramps***							
At VERNON STREET			1 Ramps							
319.2	Concrete	Good	Yes	No	60	0.7	60	60	None	Yes
OAKWOOD COURT			***1 Ramps***							
At POTTER ROAD			1 Ramps							
170.1	Concrete	Good	Yes	No	59	4.7	59	46	None	Yes
OLD CONNECTICUT PATH			***13 Ramps***							
At CONCORD STREET			10 Ramps							
230.1	Concrete	Good	Yes	No	58	1.7	58	42	None	Yes
230.2	Concrete	Good	Yes	No	58	3.9	58	60	None	Yes
230.4	Concrete	Good	Yes	No	60	7.8	60	50	None	Yes
230.5	Concrete	Good	Yes	No	60	6.5	60	60	None	Yes
230.6	Concrete	Good	Yes	No	60	3.1	60	60	None	Yes
230.7	Concrete	Good	Yes	No	60	3.1	60	60	None	Yes
230.8	Concrete	Good	Yes	No	60	5.9	60	60	None	Yes
230.9	Concrete	Good	Yes	No	60	4.3	60	48	None	Yes
253.1	Concrete	Good	Yes	No	48	1.2	90	60	None	Yes
253.2	Concrete	Good	Yes	No	55	4.2	90	60	None	Yes
At PARKING LOT			3 Ramps							
211.2	Concrete	Good	Yes	No	60	0.4	60	60	None	Yes
211.3	Concrete	Good	Yes	No	120	1.1	120	40	None	Yes
211.4	Concrete	Good	Yes	No	120	2.5	120	40	None	Yes
PALMETTO AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
544.1	Concrete	Good	Yes	No	60	4.9	60	60	None	Yes
544.2	Concrete	Good	Yes	No	60	4.5	60	51	None	Yes
PAMELA ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
111.4	Concrete	Good	Yes	No	38	8.3	62	60	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
PARKING LOT			***3 Ramps***							
At OLD CONNECTICUT PATH			1 Ramps							
223.6	Concrete	Good	Yes	No	62	5.2	65	60	None	Yes
At WAVERLEY STREET			2 Ramps							
536.10	Concrete	Good	Yes	No	60	4.7	60	48	None	Yes
536.9	Concrete	Good	Yes	No	60	5.3	60	58	None	Yes
PERSHING AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
549.1	Concrete	Good	Yes	No	60	5.3	60	50	None	Yes
576.2	Concrete	Good	Yes	No	60	0.3	60	39	None	Yes
PLEASANT STREET			***5 Ramps***							
At ARNOLD ROAD			1 Ramps							
329.2	Concrete	Good	Yes	No	50	6.6	60	60	None	Yes
At MAYNARD ROAD			2 Ramps							
327.1	Concrete	Good	Yes	No	48	0.2	60	60	None	Yes
327.2	Concrete	Good	Yes	No	48	7.1	58	60	None	Yes
At VERNON STREET			2 Ramps							
325.1	Concrete	Good	Yes	No	52	2.5	54	60	None	Yes
325.2	Concrete	Good	Yes	No	50	7.2	50	55	None	Yes
POTTER ROAD			***8 Ramps***							
At BRADFORD ROAD			2 Ramps							
171.1	Concrete	Good	Yes	No	60	7.7	60	43	None	Yes
171.2	Concrete	Good	Yes	No	60	3.9	60	45	None	Yes
At EATON ROAD			2 Ramps							
168.2	Concrete	Good	Yes	No	60	4.5	60	40	None	Yes
168.3	Concrete	Good	Yes	No	60	5.2	60	46	None	Yes
At ELM STREET			1 Ramps							
175.4	Concrete	Good	Yes	No	60	1.2	63	45	None	Yes
At JOYCE ROAD			1 Ramps							
163.3	Concrete	Good	Yes	No	59	0.2	59	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At LOWRY ROAD			1 Ramps							
177.1	Concrete	Good	Yes	No	59	7.3	60	38	None	Yes
At SCHOOL ENTRANCE			1 Ramps							
162.4	Concrete	Good	Yes	No	59	5.8	59	45	None	Yes
PROSPECT STREET			***2 Ramps***							
At CENTRAL STREET			1 Ramps							
306.6	Concrete	Good	Yes	No	46	3.2	84	60	None	Yes
At LILIAN ROAD			1 Ramps							
310.4	Concrete	Good	Yes	No	60	0.4	60	36	None	Yes
RHUBENA STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
537.1	Concrete	Good	Yes	No	60	2.6	60	45	None	Yes
RIVERPATH DRIVE			***2 Ramps***							
At OLD CONNECTICUT PATH			2 Ramps							
201.1	Concrete	Good	Yes	No	60	7.2	60	57	None	Yes
201.2	Concrete	Good	Yes	No	60	6.3	60	58	None	Yes
SAUCIER STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
533.1	Concrete	Good	Yes	No	60	7.4	60	63	None	Yes
SAXONY ROAD			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
191.1	Concrete	Good	Yes	No	60	4.1	60	48	None	Yes
SCHOOL ENTRANCE			***2 Ramps***							
At POTTER ROAD			2 Ramps							
162.1	Concrete	Good	Yes	No	60	7.6	60	38	None	Yes
162.2	Concrete	Good	Yes	No	59	5.1	59	41	None	Yes
SCHOOL STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
221.4	Concrete	Good	Yes	No	60	7.5	60	86	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
SECOND STREET			***5 Ramps***							
At BEAVER STREET			3 Ramps							
503.2	Concrete	Good	Yes	No	62	3.1	62	48	None	Yes
503.4	Concrete	Good	Yes	No	60	0.2	60	48	None	Yes
503.5	Concrete	Good	Yes	No	48	4.8	60	60	None	Yes
At WAVERLEY STREET			2 Ramps							
514.1	Concrete	Good	Yes	No	60	1.2	60	50	None	Yes
514.2	Concrete	Good	Yes	No	60	1.2	60	43	None	Yes
SHEFFIELD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
169.2	Concrete	Good	Yes	No	59	0.7	59	36	None	Yes
SPEEN STREET			***3 Ramps***							
At COCHITUATE ROAD			1 Ramps							
252.1	Concrete	Good	Yes	No	60	3.8	60	52	None	Yes
At LEGGATT MCCALL CONNECTOR			2 Ramps							
248.1	Concrete	Good	Yes	No	60	1.2	60	36	None	Yes
248.2	Concrete	Good	Yes	No	60	2.3	60	44	None	Yes
SPRING LANE			***1 Ramps***							
At WATER STREET			1 Ramps							
114.1	Concrete	Good	Yes	No	60	1.6	60	55	None	Yes
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.1	Concrete	Good	Yes	No	60	2.6	60	45	None	Yes
SUDBURY LANDING			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
183.1	Concrete	Good	Yes	No	60	6.6	60	44	None	Yes
SUMMER STREET			***2 Ramps***							
At CONCORD STREET			2 Ramps							
235.3	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
235.4	Concrete	Good	Yes	No	56	1.4	56	48	None	Yes
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.1	Concrete	Good	Yes	No	60	5.6	60	43	None	Yes
THELMA ROAD			***2 Ramps***							
At CONCORD STREET			2 Ramps							
518.1	Concrete	Good	Yes	No	60	4.6	60	48	None	Yes
518.8	Concrete	Good	Yes	No	60	6.3	60	50	None	Yes
THIRD STREET			***1 Ramps***							
At BEAVER STREET			1 Ramps							
504.3	Concrete	Good	Yes	No	48	5.3	54	60	None	Yes
VERNON STREET			***7 Ramps***							
At EDGELL ROAD			2 Ramps							
315.5	Concrete	Good	Yes	No	60	8.3	60	60	None	Yes
315.6	Concrete	Good	Yes	No	60	7.3	60	60	None	Yes
At GROVE STREET			2 Ramps							
324.1	Concrete	Good	Yes	No	60	1.3	60	60	None	Yes
324.2	Concrete	Good	Yes	No	60	5.4	60	36	None	Yes
At OAK STREET			2 Ramps							
319.3	Concrete	Good	Yes	No	60	2.3	60	60	None	Yes
319.4	Concrete	Good	Yes	No	60	1.9	60	36	None	Yes
At PLEASANT STREET			1 Ramps							
325.3	Concrete	Good	Yes	No	60	7.7	60	60	None	Yes
WARREN PLACE			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
314.1	Concrete	Good	Yes	No	60	5.5	60	60	None	Yes
314.2	Concrete	Good	Yes	No	60	1.2	60	60	None	Yes
WATER STREET			***8 Ramps***							
At JOYCE LUNDBERG DRIVE			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
110.4	Concrete	Good	Yes	No	60	1.9	60	36	None	Yes
At LARIVIERE ROAD		1 Ramps								
98.1	Concrete	Good	Yes	No	60	6.1	90	60	None	Yes
At PARK AVENUE		2 Ramps								
102.1	Concrete	Good	Yes	No	70	4.5	78	60	None	Yes
103.1	Concrete	Good	Yes	No	39	2.1	58	60	None	Yes
At SCHOOL ENTRANCE		2 Ramps								
120.3	Concrete	Good	Yes	No	45	1.2	45	50	None	Yes
120.5	Concrete	Good	Yes	No	60	8.1	60	60	None	Yes
At SWANSON ROAD		2 Ramps								
97.3	Concrete	Good	Yes	No	60	1.1	60	36	None	Yes
97.4	Concrete	Good	Yes	No	60	3.1	60	36	None	Yes
WAVENEY ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
55.1	Concrete	Good	Yes	No	66	1.5	66	49	None	Yes
WAVERLEY STREET		***25 Ramps***								
At BEAVER STREET		1 Ramps								
498.5	Concrete	Good	Yes	No	48	4.8	54	52	None	Yes
At BISHOP STREET		2 Ramps								
498.1	Concrete	Fair	Yes	No	58	3.3	58	48	None	Yes
498.6	Concrete	Good	Yes	No	60	7.7	60	68	None	Yes
At CEDAR STREET		1 Ramps								
529.2	Concrete	Good	Yes	No	60	1.3	60	42	None	Yes
At COOLIDGE STREET		2 Ramps								
511.1	Concrete	Good	Yes	No	60	3.7	60	50	None	Yes
511.2	Concrete	Good	Yes	No	60	4.3	60	50	None	Yes
At FOUNTAIN STREET		1 Ramps								
532.7	Concrete	Good	Yes	No	60	1.3	60	44	None	Yes
At MELLEN STREET		1 Ramps								
532.8	Concrete	Good	Yes	No	60	4.8	60	55	None	Yes

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At PARKING LOT		2 Ramps								
539.3	Concrete	Good	Yes	No	60	1.4	60	45	None	Yes
539.4	Concrete	Good	Yes	No	60	3.3	60	45	None	Yes
At PERSHING AVENUE		1 Ramps								
549.3	Concrete	Good	Yes	No	60	6.4	60	48	None	Yes
At SECOND STREET		1 Ramps								
514.3	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
At TARALLI TERRACE		2 Ramps								
512.1	Concrete	Good	Yes	No	48	2.6	55	43	None	Yes
512.2	Concrete	Good	Yes	No	48	2.9	58	48	None	Yes
At WAVERLY COURT		3 Ramps								
531.1	Concrete	Good	Yes	No	60	5.3	60	48	None	Yes
531.2	Concrete	Good	Yes	No	60	0.2	60	48	None	Yes
531.3	Concrete	Good	Yes	No	60	4.9	60	50	None	Yes
At WILLIS STREET		2 Ramps								
513.1	Concrete	Good	Yes	No	48	1.7	57	63	None	Yes
513.2	Concrete	Good	Yes	No	48	1.7	48	54	None	Yes
At WINTER STREET		2 Ramps								
546.1	Concrete	Good	Yes	No	60	6.5	60	50	None	Yes
546.2	Concrete	Good	Yes	No	60	0.9	60	50	None	Yes
At WINTHROP STREET		4 Ramps								
536.11	Concrete	Good	Yes	No	60	2.9	60	48	None	Yes
536.12	Concrete	Good	Yes	No	60	7.2	60	48	None	Yes
536.7	Concrete	Good	Yes	No	60	2.5	60	48	None	Yes
536.8	Concrete	Good	Yes	No	60	6.1	60	76	None	Yes
WEST STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
334.2	Concrete	Fair	Yes	No	50	7.2	72	60	None	Yes
WHITING ROAD		***1 Ramps***								
At EDGELL ROAD		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
124.1	Concrete	Good	Yes	No	60	5.9	60	40	None	Yes
WHITTIER STREET			***3 Ramps***							
At NEWBURY STREET			3 Ramps							
241.1	Concrete	Good	Yes	No	60	5.1	60	48	None	Yes
241.2	Concrete	Good	Yes	No	60	5.1	60	48	None	Yes
241.4	Concrete	Good	Yes	No	60	6.1	60	54	None	Yes
WILDE AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
538.1	Concrete	Good	Yes	No	60	5.1	60	80	None	Yes
538.2	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
WILSON AVENUE			***2 Ramps***							
At WAVERLEY STREET			2 Ramps							
548.1	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
548.2	Concrete	Good	Yes	No	60	4.6	60	48	None	Yes
WINTER STREET			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
379.2	Concrete	Good	Yes	No	60	5.5	96	60	None	Yes
WINTHROP STREET			***9 Ramps***							
At BETHANY ROAD			1 Ramps							
553.3	Concrete	Good	Yes	No	60	7.3	60	46	None	Yes
At BRIDGES STREET EXTENSION			2 Ramps							
555.3	Concrete	Fair	Yes	No	48	6.4	48	55	None	Yes
555.4	Concrete	Good	Yes	No	48	1.8	48	53	None	Yes
At CONANT ROAD			1 Ramps							
536.3	Concrete	Good	Yes	No	60	5.5	60	48	None	Yes
At COVE AVENUE			2 Ramps							
556.3	Concrete	Good	Yes	No	60	2.4	60	42	None	Yes
556.4	Concrete	Good	Yes	No	55	3.1	55	40	None	Yes
At DOW STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
558.4	Concrete	Good	Yes	No	60	6.5	60	53	None	Yes
At MELLEN STREET		1 Ramps								
558.3	Concrete	Good	Yes	No	60	6.2	60	48	None	Yes
At WAVERLEY STREET		1 Ramps								
536.6	Concrete	Good	Yes	No	64	5.5	64	48	None	Yes
WINTHROP TERRACE		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
557.1	Concrete	Good	Yes	No	60	3.3	60	36	None	Yes
557.2	Concrete	Good	Yes	No	38	5.3	68	60	None	Yes

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Non-Compliance - By Street With Inspection Data Total: 377

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
A STREET		***2 Ramps***								
At CONCORD STREET		2 Ramps								
222.4	Concrete	Good	Yes	Yes	60	8.2	60	75	Utillity Pole	No
222.5	Concrete	Good	Yes	No	52	7.9	60	48	Gate	No
ANDERSON ROAD		***4 Ramps***								
At BROOK STREET		4 Ramps								
90.1	Asphalt	Fair	No	No	0	0	0	0	Man Hole	No
90.2	Concrete	Fair	No	No	60	4.8	0	0	None	No
90.3	Concrete	Fair	No	No	60	2.9	0	0	None	No
90.4	Asphalt	Poor	No	No	0	0	0	0	None	No
APPLE D'OR ROAD		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
126.1	Asphalt	Fair	No	No	0	0	0	0	None	No
126.2	Asphalt	Fair	No	No	0	0	0	0	None	No
AUBURN STREET		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
316.1	Concrete	Good	Yes	No	60	0.1	56	60	None	No
BACON ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
118.1	Concrete	Good	Yes	No	60	2.3	60	36	cessive Ldg Slop	No
118.2	Concrete	Good	Yes	No	60	1.6	60	32	None	No
BALDWIN AVENUE		***1 Ramps***								
At APPLE D'OR ROAD		1 Ramps								
131.1	Asphalt	Fair	No	No	0	0	0	0	None	No
BEACON STREET		***13 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CAVANAUGH ROAD		2 Ramps								
275.1	Asphalt	Fair	No	No	0	0	0	0	None	No
275.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At COCHITUATE ROAD		2 Ramps								
295.2	Concrete	Good	Yes	No	56	6.6	54	51	None	No
295.5	Concrete	Good	Yes	No	60	9.5	60	48	None	No
At FAIRBANKS WAY		2 Ramps								
265.1	Asphalt	Fair	No	No	0	0	0	0	None	No
265.2	Asphalt	Poor	No	No	0	0	0	0	None	No
At HASTINGS STREET		2 Ramps								
260.1	Asphalt	Fair	No	No	0	0	0	0	None	No
260.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At LOHNES ROAD		2 Ramps								
279.1	Asphalt	Fair	No	No	0	0	0	0	None	No
279.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At MAGNOLIA STREET		2 Ramps								
277.1	Asphalt	Fair	No	No	0	0	0	0	None	No
277.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At WORCESTER ROAD		1 Ramps								
297.2	Concrete	Good	Yes	No	60	4.9	0	0	None	No
BEAVER STREET		***5 Ramps***								
At BEAVER PARK ROAD		1 Ramps								
502.1	Concrete	Good	Yes	Yes	60	0.6	60	32	None	No
At FIRST STREET		1 Ramps								
502.4	Concrete	Good	Yes	No	60	3.8	0	0	None	No
At MARIAN ROAD		1 Ramps								
501.2	Concrete	Good	Yes	No	60	0.9	60	26	None	No
At PARKING LOT		2 Ramps								
499.1	Concrete	Good	Yes	No	60	3.6	0	0	None	No
578.2	Concrete	Good	Yes	No	60	1.4	60	40	Curbing	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
BELKNAP ROAD			***2 Ramps***							
At CLEARVIEW DRIVE			1 Ramps							
22.4	Concrete	Good	Yes	No	60	0.1	60	30	None	No
At FLANAGAN DRIVE			1 Ramps							
30.1	Concrete	Good	Yes	No	62	5.8	55	58	Curbing	No
BETHANY ROAD			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
535.1	Concrete	Good	Yes	No	62	3.3	57	55	None	No
BIRCH ROAD			***4 Ramps***							
At OLD CONNECTICUT PATH			4 Ramps							
199.2	Asphalt	Fair	No	No	0	0	0	0	None	No
199.3	Asphalt	Fair	No	No	0	0	0	0	None	No
200.1	Asphalt	Fair	No	No	0	0	0	0	None	No
200.2	Asphalt	Fair	No	No	0	0	0	0	None	No
BLANDIN AVENUE			***1 Ramps***							
At BEAVER STREET			1 Ramps							
499.4	Asphalt	Fair	Yes	No	0	0	0	0	None	No
BRADFORD ROAD			***2 Ramps***							
At POTTER ROAD			2 Ramps							
171.3	Concrete	Good	Yes	Yes	60	6.1	60	48	None	No
171.4	Concrete	Good	Yes	No	59	5.2	58	40	None	No
BRIDGES STREET			***2 Ramps***							
At NAPLES STREET			1 Ramps							
570.2	Concrete	Good	Yes	No	60	6.4	58	60	None	No
At WAVERLEY STREET			1 Ramps							
534.2	Concrete	Good	Yes	No	58	4.4	56	48	None	No
BROOK STREET			***21 Ramps***							
At BROOKBURY CIRCLE			2 Ramps							
94.1	Concrete	Good	No	No	48	9.1	48	58	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
94.2	Concrete	Good	Yes	No	50	0.8	48	38	None	No
At FROST STREET		3 Ramps								
89.1	Concrete	Fair	No	No	54	6.2	0	0	None	No
89.2	Concrete	Fair	No	No	54	3.7	0	0	None	No
89.3	Concrete	Fair	No	No	54	8.4	0	0	None	No
At LEIGH STREET		2 Ramps								
88.3	Concrete	Fair	No	No	54	3.8	0	0	None	No
88.4	Concrete	Fair	No	No	60	2.7	0	0	None	No
At MEREDITH CIRCLE		2 Ramps								
88.1	Concrete	Fair	No	No	48	2.1	0	0	Vegetation	No
88.2	Concrete	Fair	No	No	48	6.3	0	0	None	No
At PERRY H. HENDERSON DRIVE		2 Ramps								
87.3	Concrete	Fair	No	No	46	5.1	0	0	None	No
87.4	Concrete	Fair	No	No	56	2.7	56	34	None	No
At SALVI DRIVE		2 Ramps								
94.3	Concrete	Good	No	No	60	4.3	0	0	None	No
94.4	Concrete	Good	No	No	62	5.4	0	0	None	No
At SCHOOL ENTRANCE		2 Ramps								
86.3	Concrete	Good	No	No	52	10.1	52	60	None	No
86.4	Concrete	Good	No	No	60	13.1	60	48	None	No
At WARD FARM CIRCLE		2 Ramps								
87.1	Concrete	Fair	No	No	48	7.9	0	0	None	No
87.2	Concrete	Fair	No	No	46	6.1	0	0	None	No
At WATER STREET		2 Ramps								
96.1	Concrete	Good	No	No	65	2.8	0	0	None	No
96.2	Concrete	Good	Yes	No	60	0.6	60	34	None	No
At WILD OAK RISE		2 Ramps								
84.1	Concrete	Fair	No	No	62	3.3	0	0	None	No
84.2	Asphalt	Fair	No	No	0	0	0	0	None	No

BROOKFIELD AVENUE ***2 Ramps***

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BROOK STREET			2 Ramps							
95.1	Concrete	Fair	No	No	55	3.7	0	0	None	No
95.2	Concrete	Fair	No	No	60	3.2	0	0	None	No
BROWNLEA ROAD			***2 Ramps***							
At OLD CONNECTICUT PATH			2 Ramps							
210.1	Concrete	Fair	No	No	60	3.8	0	0	None	No
210.2	Concrete	Fair	No	No	70	3.4	0	0	None	No
BURR STREET			***4 Ramps***							
At COCHITUATE ROAD			2 Ramps							
243.1	Asphalt	Fair	No	No	0	0	0	0	None	No
243.2	Concrete	Good	No	No	54	16.1	0	0	None	No
At LEGGATT MCCALL CONNECTOR			2 Ramps							
244.1	Asphalt	Fair	No	No	0	0	0	0	None	No
244.2	Asphalt	Fair	No	No	0	0	0	0	None	No
CEDAR STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.1	Concrete	Fair	Yes	Yes	60	2.2	60	45	None	No
CHERRY STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
239.1	Asphalt	Fair	Yes	No	0	0	0	0	None	No
CLIFFORD STREET			***1 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.2	Concrete	Good	Yes	No	60	1.5	60	39	Vegetation	No
COBURN STREET			***1 Ramps***							
At SAUCIER STREET			1 Ramps							
565.2	Concrete	Good	Yes	No	60	1.6	60	38	Sign	No
COCHITUATE ROAD			***5 Ramps***							
At SPEEN STREET			2 Ramps							
252.6	Concrete	Fair	No	No	58	2.5	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
252.7	Concrete	Good	Yes	No	57	2.6	56	36	None	No
At WHITTIER STREET		3 Ramps								
242.1	Concrete	Good	No	No	60	3.3	58	48	cessive Ldg Slop	No
242.2	Concrete	Good	No	No	46	1.9	46	59	None	No
242.3	Concrete	Fair	No	No	60	0.4	60	40	None	No
CONANT ROAD		***2 Ramps***								
At WINTHROP STREET		2 Ramps								
536.1	Concrete	Good	Yes	No	58	1.9	56	38	None	No
536.2	Concrete	Good	Yes	No	58	3.7	56	48	None	No
CONCORD STREET		***9 Ramps***								
At A STREET		2 Ramps								
222.3	Concrete	Good	Yes	No	60	0.3	58	54	Curbing	No
222.6	Concrete	Good	Yes	No	60	7.3	60	61	Utility Access	No
At FEMIA ROAD		2 Ramps								
237.1	Concrete	Good	Yes	No	52	7.2	0	0	None	No
237.2	Concrete	Good	Yes	No	72	0.3	65	43	None	No
At GIBBS STREET		1 Ramps								
238.1	Concrete	Good	Yes	No	50	9.9	0	0	None	No
At HARTFORD STREET		3 Ramps								
520.2	Concrete	Good	Yes	No	63	5.5	60	73	None	No
520.5	Concrete	Fair	Yes	No	55	5.4	52	56	None	No
520.6	Concrete	Good	Yes	No	62	6.8	62	42	cessive Ldg Slop	No
At OLD CONNECTICUT PATH		1 Ramps								
230.3	Concrete	Good	Yes	No	52	4.5	50	60	None	No
COSTA CIRCLE		***1 Ramps***								
At WATER STREET		1 Ramps								
101.1	Concrete	Good	Yes	No	60	1.8	60	34	None	No
COTTAGE STREET		***1 Ramps***								
At DANFORTH STREET		1 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
185.3	Concrete	Good	Yes	No	60	0.5	60	29	None	No
CYPRESS STREET			***1 Ramps***							
At MELLEN STREET			1 Ramps							
559.1	Concrete	Good	Yes	No	58	2.3	57	39	None	No
DANFORTH STREET			***9 Ramps***							
At CONCORD STREET			2 Ramps							
181.1	Concrete	Poor	No	No	56	1.4	0	0	None	No
181.2	Concrete	Fair	No	No	65	2.5	0	0	None	No
At DANFORTH COURT			1 Ramps							
182.4	Concrete	Good	Yes	No	43	8.6	0	0	None	No
At KING STREET			1 Ramps							
182.1	Concrete	Good	Yes	No	46	4.3	0	0	None	No
At MEADOW STREET			2 Ramps							
186.1	Concrete	Good	Yes	No	81	4.3	70	53	None	No
186.2	Concrete	Good	Yes	No	77	0.1	72	28	None	No
At SAXONY ROAD			1 Ramps							
190.2	Concrete	Good	Yes	No	80	4.4	75	44	None	No
At STEARNS STREET			2 Ramps							
184.1	Concrete	Good	Yes	No	84	0.4	70	48	None	No
184.2	Concrete	Good	Yes	No	94	5.5	81	48	None	No
DAYTONA AVENUE			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
543.2	Concrete	Good	Yes	No	60	6.9	56	55	None	No
DONOVAN DRIVE			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
125.1	Asphalt	Fair	No	No	0	0	0	0	None	No
125.2	Asphalt	Fair	No	No	0	0	0	0	None	No
DOW STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
558.5	Concrete	Good	Yes	No	60	1.2	60	30	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
EATON ROAD		***2 Ramps***								
At EATON PINES LANE		1 Ramps								
167.1	Asphalt	Good	No	No	0	0	0	0	None	No
At POTTER ROAD		1 Ramps								
168.1	Asphalt	Fair	No	No	0	0	0	0	None	No
EDGELL ROAD		***3 Ramps***								
At EDMANDS ROAD		1 Ramps								
121.1	Concrete	Good	Yes	No	60	4.7	82	100	cessive Ldg Slop	No
At PARKING LOT		1 Ramps								
316.4	Concrete	Good	Yes	Yes	48	7.4	70	60	None	No
At WHITING ROAD		1 Ramps								
124.3	Concrete	Good	Yes	No	60	6.7	60	42	Curbing	No
EISENHOWER ROAD		***2 Ramps***								
At EATON ROAD		2 Ramps								
157.1	Concrete	Good	Yes	No	60	6.6	58	48	None	No
157.2	Concrete	Good	Yes	No	60	6.6	58	48	None	No
ELIOT STREET		***2 Ramps***								
At HARTFORD STREET		2 Ramps								
521.1	Asphalt	Fair	No	No	0	0	0	0	None	No
521.2	Asphalt	Fair	No	No	0	0	0	0	None	No
ELLIS STREET		***1 Ramps***								
At WORCESTER ROAD		1 Ramps								
333.1	Concrete	Good	Yes	No	52	7.4	48	60	None	No
ELM STREET		***2 Ramps***								
At POTTER ROAD		2 Ramps								
175.5	Concrete	Good	Yes	Yes	60	7.7	60	49	None	No
175.6	Concrete	Good	Yes	Yes	60	1.3	60	38	None	No
FAIRBROOK ROAD		***2 Ramps***								
At BROOK STREET		2 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
92.1	Concrete	Fair	No	No	54	5.3	0	0	None	No
92.2	Concrete	Fair	No	No	68	2.1	0	0	None	No
FAY ROAD			***2 Ramps***							
At OLD CENTRAL TURNPIKE			2 Ramps							
551.1	Asphalt	Fair	No	No	0	0	0	0	None	No
551.2	Asphalt	Fair	No	No	0	0	0	0	None	No
FENWICK STREET			***5 Ramps***							
At BROOK STREET			4 Ramps							
83.1	Asphalt	Fair	No	No	0	0	0	0	None	No
83.2	Concrete	Fair	No	No	58	2.3	0	0	None	No
83.3	Concrete	Fair	No	No	56	2.1	0	0	None	No
83.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At WICKFORD ROAD			1 Ramps							
79.1	Asphalt	Fair	No	No	0	0	0	0	None	No
FENWOOD STREET			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
187.4	Concrete	Good	Yes	No	90	2.4	84	45	None	No
FOUNTAIN STREET			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.5	Concrete	Good	Yes	No	62	0.7	56	60	None	No
FRANKLIN STREET			***3 Ramps***							
At MAIN STREET			1 Ramps							
400.2	Concrete	Good	Yes	Yes	60	4.1	60	40	None	No
At MOULTON PARK ROAD			2 Ramps							
407.1	Concrete	Good	Yes	No	38	7.2	64	60	None	No
407.2	Concrete	Good	Yes	Yes	38	2.2	64	60	None	No
GARVEY ROAD			***2 Ramps***							
At EDMANDS ROAD			2 Ramps							
7.1	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
9.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GIBSON DRIVE		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
128.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
128.2	Asphalt	Fair	No	No	0	0	0	0	None	No
GIL LEONARD LANE		***1 Ramps***								
At WYNDSTONE WAY		1 Ramps								
312.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GILBERT STREET		***1 Ramps***								
At WINTHROP STREET		1 Ramps								
560.4	Concrete	Good	Yes	No	60	0.7	60	35	None	No
GOODNOW LANE		***1 Ramps***								
At GATES STREET		1 Ramps								
353.1	Asphalt	Fair	No	No	0	0	0	0	None	No
GRANT STREET		***1 Ramps***								
At JOHN J. GALLAGHER DRIVE		1 Ramps								
475.2	Concrete	Good	Yes	No	67	1.3	67	34	None	No
GREGORY ROAD		***2 Ramps***								
At WATER STREET		2 Ramps								
116.1	Concrete	Good	Yes	No	60	2.3	60	34	cessive Ldg Slop	No
116.2	Concrete	Good	Yes	No	60	0.8	60	34	None	No
HAMILTON STREET		***4 Ramps***								
At JACKSON PLACE		2 Ramps								
220.1	Concrete	Fair	No	No	57	1.4	0	0	Curbing	No
220.2	Concrete	Fair	No	No	64	5.2	0	0	None	No
At SCHOOL STREET		2 Ramps								
219.3	Concrete	Fair	No	No	58	7.9	0	0	None	No
219.4	Concrete	Fair	No	No	60	14.4	0	0	None	No
HARDY STREET		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CONCORD STREET		1 Ramps								
234.1	Concrete	Good	Yes	No	70	4.6	0	0	None	No
HARTFORD STREET		***15 Ramps***								
At BELVIDERE ROAD		2 Ramps								
526.1	Asphalt	Fair	No	No	0	0	0	0	None	No
526.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At C STREET		2 Ramps								
525.1	Asphalt	Fair	No	No	0	0	0	0	None	No
525.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At DYER STREET		1 Ramps								
522.1	Concrete	Good	Yes	No	62	3.1	66	34	None	No
At GRANT STREET		3 Ramps								
526.3	Asphalt	Fair	No	No	0	0	0	0	None	No
527.1	Asphalt	Fair	No	No	0	0	0	0	None	No
527.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At HARRISON STREET		2 Ramps								
524.1	Asphalt	Fair	No	No	0	0	0	0	None	No
524.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At HOWE STREET		2 Ramps								
523.1	Asphalt	Fair	No	No	0	0	0	0	None	No
523.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At LOKER STREET		2 Ramps								
527.3	Asphalt	Fair	No	No	0	0	0	0	None	No
527.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At UNDERWOOD STREET		1 Ramps								
528.1	Asphalt	Fair	No	No	0	0	0	0	None	No
HEMENWAY ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
117.2	Concrete	Good	Yes	Yes	60	2.5	60	33	cessive Ldg Slop	No
HIALEAH LANE		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At DANFORTH STREET			1 Ramps							
188.2	Concrete	Good	Yes	Yes	60	3.1	60	48	None	No
INDIAN HEAD ROAD			***6 Ramps***							
At CRESTWOOD ROAD			1 Ramps							
302.2	Concrete	Good	Yes	No	60	0.6	60	32	None	No
At DONNA ROAD			1 Ramps							
299.1	Concrete	Good	Yes	No	60	1.3	60	26	None	No
At INDIAN HEAD HEIGHTS			1 Ramps							
301.2	Concrete	Good	Yes	No	65	2.6	0	0	None	No
At LOCKLAND AVENUE			2 Ramps							
300.1	Concrete	Good	Yes	No	48	13.9	0	0	None	No
300.2	Concrete	Good	Yes	Yes	60	1.9	60	48	None	No
At SUMMER STREET			1 Ramps							
298.1	Concrete	Good	Yes	Yes	60	6.3	60	48	None	No
IRVING STREET			***1 Ramps***							
At LORING DRIVE			1 Ramps							
487.2	Concrete	Fair	No	No	60	2.2	0	0	Curbing	No
JOHN J BRADY DRIVE			***1 Ramps***							
At NORMANDY ROAD EXTENSION			1 Ramps							
574.3	Concrete	Good	Yes	No	65	0.1	59	60	None	No
JOHN J. GALLAGHER DRIVE			***1 Ramps***							
At EVERIT AVENUE			1 Ramps							
476.2	Concrete	Good	Yes	No	60	3.2	60	34	None	No
JOHN MCQUINN CIRCLE			***1 Ramps***							
At WAVENEY ROAD			1 Ramps							
57.1	Asphalt	Fair	No	No	0	0	0	0	None	No
JOSEPH ROAD			***1 Ramps***							
At WATER STREET			1 Ramps							
107.2	Concrete	Good	Yes	No	60	0.5	60	32	None	No
JOYCE LUNDBERG DRIVE			***1 Ramps***							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WATER STREET			1 Ramps							
110.2	Concrete	Good	Yes	Yes	60	2.4	60	34	None	No
JOYCE ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
163.1	Asphalt	Good	No	No	0	0	0	0	None	No
KELLOGG STREET			***2 Ramps***							
At CENTRAL STREET			2 Ramps							
309.2	Concrete	Poor	No	No	60	1.7	60	60	None	No
309.3	Concrete	Poor	No	No	75	5.5	70	60	None	No
KENDALL AVENUE			***4 Ramps***							
At ALLA STREET			1 Ramps							
510.2	Concrete	Good	Yes	No	60	1.1	60	32	None	No
At CURTIS STREET			1 Ramps							
507.2	Concrete	Good	Yes	No	55	6.1	0	0	None	No
At KENDALL LANE			2 Ramps							
510.3	Concrete	Good	Yes	No	60	0.8	60	32	None	No
510.4	Concrete	Good	Yes	No	58	2.6	58	27	None	No
KNIGHT ROAD			***1 Ramps***							
At PLEASANT STREET			1 Ramps							
46.2	Concrete	Good	Yes	No	70	0.3	66	48	None	No
LANEWOOD AVENUE			***2 Ramps***							
At CURRIER DRIVE			1 Ramps							
66.1	Asphalt	Fair	No	No	0	0	0	0	None	No
At WAVENEY ROAD			1 Ramps							
56.1	Asphalt	Poor	No	No	0	0	0	0	None	No
LARRABEE AVENUE			***1 Ramps***							
At WAVERLEY STREET			1 Ramps							
539.2	Concrete	Good	Yes	No	64	5.8	54	48	None	No
LEGGATT MCCALL			***9 Ramps***							
At PARKING LOT			9 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
246.1	Asphalt	Fair	No	No	0	0	0	0	None	No
246.2	Asphalt	Fair	No	No	0	0	0	0	None	No
247.1	Asphalt	Fair	No	No	0	0	0	0	None	No
247.2	Asphalt	Fair	No	No	0	0	0	0	None	No
247.3	Asphalt	Fair	No	No	0	0	0	0	None	No
247.4	Asphalt	Fair	No	No	0	0	0	0	None	No
573.1	Concrete	Fair	No	No	60	10.1	60	48	None	No
573.2	Asphalt	Fair	No	No	0	0	0	0	None	No
573.3	Asphalt	Fair	No	No	0	0	0	0	None	No
LEO CHASSE WAY		***2 Ramps***								
At GARVEY ROAD		2 Ramps								
8.1	Asphalt	Fair	No	No	0	0	0	0	None	No
8.2	Asphalt	Poor	No	No	0	0	0	0	None	No
LIBERTY STREET		***2 Ramps***								
At OAK STREET		2 Ramps								
318.1	Concrete	Good	Yes	No	60	0.8	60	35	None	No
318.2	Concrete	Good	Yes	No	58	3.9	48	44	None	No
LINDA AVENUE		***2 Ramps***								
At BROOK STREET		2 Ramps								
93.1	Concrete	Fair	No	No	58	4.7	0	0	None	No
93.2	Concrete	Fair	No	No	64	5.3	0	0	None	No
LITTLE TREE LANE		***2 Ramps***								
At PLEASANT STREET		2 Ramps								
48.1	Asphalt	Fair	No	No	0	0	0	0	None	No
48.2	Asphalt	Fair	No	No	0	0	0	0	None	No
LOCKLAND AVENUE		***1 Ramps***								
At DONNA ROAD		1 Ramps								
289.1	Asphalt	Fair	No	No	0	0	0	0	None	No
MAIN STREET		***2 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At MOULTON PARK ROAD			2 Ramps							
399.1	Concrete	Fair	No	No	44	3.4	54	60	None	No
399.2	Concrete	Fair	No	No	36	1.1	40	60	None	No
MAJOR HALE DRIVE			***1 Ramps***							
At BELKNAP ROAD			1 Ramps							
31.1	Asphalt	Fair	No	No	0	0	0	0	None	No
MAYNARD ROAD			***2 Ramps***							
At CHURCH STREET			2 Ramps							
380.1	Concrete	Good	Yes	Yes	60	1.7	60	48	None	No
380.2	Concrete	Good	Yes	No	44	17.3	0	0	None	No
MELLEN STREET			***2 Ramps***							
At WAVERLEY STREET			1 Ramps							
532.2	Concrete	Good	Yes	No	55	7.1	54	48	None	No
At WINTHROP STREET			1 Ramps							
558.1	Concrete	Good	Yes	No	60	4.1	60	48	Curbing	No
MERRIAM ROAD			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
47.1	Asphalt	Fair	No	No	0	0	0	0	None	No
47.2	Asphalt	Fair	No	No	0	0	0	0	None	No
MILL STREET			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
51.1	Concrete	Good	Yes	No	72	4.2	65	50	None	No
51.2	Concrete	Good	Yes	No	69	4.7	65	54	None	No
MONTEREY LANE			***1 Ramps***							
At BELKNAP ROAD			1 Ramps							
31.2	Asphalt	Fair	No	No	0	0	0	0	None	No
MURPHY CIRCLE			***2 Ramps***							
At COLONIAL DRIVE			2 Ramps							
152.1	Concrete	Good	Yes	No	61	10.2	60	45	sive Slope & Ldg	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
152.2	Concrete	Good	Yes	No	61	10.4	60	46	sive Slope & Ldg	No
NAPLES STREET			***1 Ramps***							
At BRIDGES STREET			1 Ramps							
570.3	Concrete	Good	No	No	60	1.4	60	60	None	No
NEWBURY STREET			***2 Ramps***							
At SPEEN STREET			1 Ramps							
251.2	Concrete	Good	Yes	No	59	1.9	59	34	None	No
At WHITTIER STREET			1 Ramps							
241.5	Concrete	Good	Yes	No	60	1.1	60	26	Utillity Pole	No
NICHOLAS ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
104.3	Concrete	Good	Yes	No	60	2.1	60	35	None	No
104.4	Concrete	Good	Yes	Yes	60	6.2	56	46	None	No
NORMANDY ROAD			***1 Ramps***							
At CONCORD STREET			1 Ramps							
518.4	Concrete	Good	Yes	No	60	2	60	34	None	No
NORMANDY ROAD			***2 Ramps***							
At FLAGG DRIVE			1 Ramps							
515.4	Concrete	Good	Yes	No	54	4.7	52	48	None	No
At JOHN J BRADY DRIVE			1 Ramps							
574.2	Concrete	Good	Yes	No	60	4.2	60	45	Utillity Pole	No
OAK CREST DRIVE			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
350.2	Concrete	Good	Yes	Yes	60	8.3	70	60	None	No
OAK STREET			***3 Ramps***							
At EDGELL ROAD			2 Ramps							
317.1	Concrete	Good	Yes	Yes	72	0.4	72	60	None	No
317.2	Concrete	Good	Yes	No	60	2.6	60	33	None	No
At VERNON STREET			1 Ramps							

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
319.1	Concrete	Good	Yes	Yes	60	6.2	60	44	None	No
OAKWOOD COURT		***1 Ramps***								
At POTTER ROAD		1 Ramps								
170.2	Concrete	Good	Yes	No	58	1.1	60	32	None	No
OLD CONNECTICUT PATH		***11 Ramps***								
At ARLENE ROAD		2 Ramps								
227.1	Concrete	Fair	No	No	65	0.5	64	60	None	No
227.2	Concrete	Fair	No	No	66	0.5	65	50	None	No
At BIRCH ROAD		2 Ramps								
199.1	Asphalt	Fair	No	No	0	0	0	0	None	No
199.4	Asphalt	Fair	No	No	0	0	0	0	None	No
At BROSSI CIRCLE		1 Ramps								
198.1	Concrete	Good	Yes	No	64	5.1	62	48	None	No
At BROWNLEA ROAD		1 Ramps								
210.3	Concrete	Fair	No	No	54	3.6	0	0	None	No
At HARDY STREET		2 Ramps								
229.1	Concrete	Good	Yes	No	50	6.2	48	65	None	No
229.3	Asphalt	Fair	No	No	0	0	0	0	None	No
At LAKE ROAD		1 Ramps								
202.2	Concrete	Good	No	No	52	4.2	94	60	None	No
At PARKING LOT		2 Ramps								
211.1	Concrete	Poor	No	No	50	13.9	0	0	None	No
223.5	Concrete	Good	Yes	No	72	4.3	62	74	None	No
OLD WOOD ROAD		***2 Ramps***								
At OLD WORCESTER ROAD		2 Ramps								
343.1	Concrete	Good	Yes	No	58	3.3	58	43	Curbing	No
343.2	Concrete	Good	Yes	No	60	3.2	60	48	Curbing	No
OLD WORCESTER ROAD		***3 Ramps***								
At OLD WOOD ROAD		2 Ramps								
343.3	Concrete	Good	Yes	No	59	5.5	59	46	Curbing	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
343.4	Concrete	Good	Yes	No	60	2.7	60	44	Curbing	No
At TEMPLE STREET		1 Ramps								
341.2	Concrete	Good	Yes	No	57	5.8	55	60	None	No
PAMELA ROAD		***1 Ramps***								
At WATER STREET		1 Ramps								
111.3	Concrete	Good	Yes	No	60	1.9	59	33	None	No
PARKING LOT		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
316.5	Concrete	Good	Yes	Yes	64	1.6	64	48	None	No
316.6	Concrete	Good	Yes	No	60	2.4	0	0	None	No
PERSHING AVENUE		***2 Ramps***								
At WAVERLEY STREET		2 Ramps								
549.2	Concrete	Good	Yes	No	65	6.1	60	45	None	No
576.1	Concrete	Good	Yes	No	52	8.1	50	54	None	No
POTTER ROAD		***4 Ramps***								
At ELM STREET		1 Ramps								
175.1	Concrete	Good	Yes	No	60	6.1	60	45	cessive Ldg Slop	No
At JOYCE ROAD		1 Ramps								
163.2	Concrete	Good	Yes	No	59	1.2	57	35	None	No
At LOWRY ROAD		1 Ramps								
177.2	Concrete	Good	Yes	No	59	5.5	59	48	Curbing	No
At WATER STREET		1 Ramps								
115.1	Concrete	Good	Yes	No	58	5.2	70	60	Curbing	No
PROSPECT STREET		***4 Ramps***								
At CENTRAL STREET		1 Ramps								
306.5	Concrete	Good	Yes	No	60	0.4	60	34	None	No
At WOODSIDE COTTAGE WAY		1 Ramps								
310.3	Concrete	Good	Yes	No	60	2.2	60	35	None	No
At WYNDSTONE WAY		2 Ramps								
311.3	Concrete	Good	Yes	No	60	2.6	60	35	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
311.4	Concrete	Good	Yes	No	60	1.4	60	33	None	No
RESERVOIR RIDGE		***2 Ramps***								
At TEMPLE STREET		2 Ramps								
370.1	Asphalt	Fair	No	No	0	0	0	0	None	No
370.2	Asphalt	Fair	No	No	0	0	0	0	None	No
RHUBENA STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
537.2	Concrete	Good	Yes	No	64	4.1	58	48	None	No
RON'S WAY		***2 Ramps***								
At WATER STREET		2 Ramps								
108.1	Concrete	Good	Yes	No	60	0.7	60	35	None	No
108.2	Concrete	Good	Yes	No	60	1.1	60	32	None	No
ROSE KENNEDY LANE		***1 Ramps***								
At NORMANDY ROAD EXTENSION		1 Ramps								
516.2	Concrete	Good	Yes	No	58	4.6	52	42	None	No
ROYAL MEADOW LANE		***1 Ramps***								
At KINGS ROW LANE		1 Ramps								
27.1	Asphalt	Fair	No	No	0	0	0	0	None	No
SAGE LANE		***1 Ramps***								
At WINCH STREET		1 Ramps								
11.1	Asphalt	Fair	No	No	0	0	0	0	None	No
SALEM END ROAD		***4 Ramps***								
At MAYHEW STREET		2 Ramps								
374.1	Concrete	Fair	No	No	65	7.7	0	0	None	No
374.2	Concrete	Fair	No	No	65	3.2	54	60	None	No
At SALEM END LANE		2 Ramps								
368.1	Concrete	Good	No	No	64	5.4	0	0	None	No
368.2	Concrete	Good	No	No	64	0.5	64	60	None	No
SAUCIER STREET		***1 Ramps***								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WAVERLEY STREET			1 Ramps							
533.2	Concrete	Fair	Yes	Yes	60	5.3	60	48	None	No
SAVOY ROAD			***2 Ramps***							
At MARY AGNES ROAD			2 Ramps							
160.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
160.2	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
SAXONY ROAD			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
191.2	Concrete	Good	Yes	Yes	84	5	80	50	None	No
SCHOOL ENTRANCE			***2 Ramps***							
At BROOK STREET			2 Ramps							
86.1	Concrete	Good	No	No	57	7.4	57	48	cessive Ldg Slop	No
86.2	Concrete	Good	No	No	56	8.1	56	48	None	No
SCHOOL STREET			***6 Ramps***							
At CONCORD STREET			1 Ramps							
221.3	Concrete	Good	Yes	Yes	60	6.1	60	60	None	No
At HAMILTON STREET			4 Ramps							
219.1	Concrete	Fair	No	No	52	15.7	0	0	None	No
219.2	Concrete	Fair	No	No	55	5.4	0	0	None	No
219.5	Concrete	Fair	Yes	No	58	4.2	0	0	None	No
219.6	Concrete	Fair	Yes	No	48	4.1	48	38	g & Excessive Ld	No
At OLD CONNECTICUT PATH			1 Ramps							
204.1	Concrete	Fair	No	No	105	3.8	0	0	Curbing	No
SECOND STREET			***1 Ramps***							
At BEAVER STREET			1 Ramps							
503.1	Concrete	Good	Yes	No	60	0.7	60	34	None	No
SHEFFIELD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
169.1	Concrete	Good	Yes	No	59	1.2	59	29	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
SLOANE DRIVE			***1 Ramps***							
At MARY AGNES ROAD			1 Ramps							
159.1	Asphalt	Fair	No	No	0	0	0	0	Vegetation	No
SPEEN STREET			***1 Ramps***							
At COCHITUATE ROAD			1 Ramps							
252.5	Concrete	Poor	No	No	62	3.3	0	0	None	No
SPRING LANE			***1 Ramps***							
At WATER STREET			1 Ramps							
114.2	Concrete	Good	Yes	No	60	2.7	60	34	None	No
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.2	Concrete	Good	Yes	Yes	58	2.2	58	48	None	No
SUDBURY LANDING			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
183.2	Concrete	Good	Yes	No	64	3.5	64	32	None	No
SUN VALLEY DRIVE			***1 Ramps***							
At PLEASANT STREET			1 Ramps							
331.1	Asphalt	Good	No	No	0	0	0	0	Hydrant	No
SWANSON ROAD			***2 Ramps***							
At WATER STREET			2 Ramps							
97.1	Concrete	Good	Yes	No	60	2.3	60	35	None	No
97.2	Concrete	Good	Yes	No	60	1.5	60	35	None	No
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.2	Concrete	Good	Yes	Yes	60	5.3	60	40	None	No
TEMPLE STREET			***4 Ramps***							
At TEMPLE PLACE			2 Ramps							
339.1	Asphalt	Fair	No	No	0	0	0	0	None	No
339.6	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At WOODLEIGH ROAD		2 Ramps								
339.2	Asphalt	Fair	No	No	0	0	0	0	None	No
339.5	Asphalt	Fair	No	No	0	0	0	0	None	No
THIRD STREET		***3 Ramps***								
At BEAVER STREET		3 Ramps								
504.1	Concrete	Good	Yes	No	58	9.6	0	0	None	No
504.2	Concrete	Good	Yes	No	60	2.8	60	28	None	No
504.4	Concrete	Good	Yes	No	45	5.5	0	0	None	No
TREELAND DRIVE		***2 Ramps***								
At EDGELL ROAD		2 Ramps								
129.1	Asphalt	Fair	No	No	0	0	0	0	Vegetation	No
129.2	Asphalt	Fair	No	No	0	0	0	0	None	No
UPTON ROAD		***2 Ramps***								
At POTTER ROAD		2 Ramps								
176.1	Concrete	Good	Yes	No	60	4.7	58	48	None	No
176.2	Concrete	Good	Yes	Yes	60	6.5	60	40	None	No
VERNON STREET		***6 Ramps***								
At EDGELL ROAD		2 Ramps								
315.3	Concrete	Good	Yes	Yes	60	6.9	60	48	None	No
315.4	Concrete	Good	Yes	Yes	60	7.9	60	60	None	No
At PLEASANT STREET		4 Ramps								
325.4	Concrete	Good	Yes	Yes	60	6.1	0	0	None	No
325.5	Asphalt	Good	Yes	No	0	0	0	0	None	No
325.6	Asphalt	Fair	No	No	0	0	0	0	None	No
325.7	Asphalt	Fair	No	No	0	0	0	0	None	No
WALKERS WAY		***2 Ramps***								
At LANEWOOD AVENUE		2 Ramps								
65.1	Asphalt	Fair	No	No	0	0	0	0	None	No
65.2	Asphalt	Fair	No	No	0	0	0	0	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
WATER STREET		***23 Ramps***								
At BROOK STREET		2 Ramps								
96.3	Concrete	Good	Yes	No	60	0.7	60	32	None	No
96.4	Concrete	Good	Yes	No	60	0.9	60	35	None	No
At CART PATH		2 Ramps								
100.1	Asphalt	Good	No	No	0	0	0	0	None	No
100.2	Asphalt	Good	No	No	0	0	0	0	None	No
At CENTRAL STREET		2 Ramps								
105.3	Concrete	Good	Yes	No	58	1.1	57	48	None	No
105.4	Concrete	Good	Yes	No	60	6.4	57	59	None	No
At EDGELL ROAD		1 Ramps								
121.4	Concrete	Good	Yes	No	60	6.4	60	48	Curbing	No
At JOYCE LUNDBERG DRIVE		1 Ramps								
110.3	Concrete	Good	Yes	No	60	2.2	60	34	None	No
At LARIVIERE ROAD		1 Ramps								
98.2	Concrete	Good	Yes	No	48	5.6	0	0	None	No
At LIBRARY ENTRANCE		2 Ramps								
119.1	Concrete	Good	Yes	No	41	2.3	38	60	None	No
119.4	Concrete	Good	Yes	No	48	5.9	40	60	None	No
At NICHOLAS ROAD		2 Ramps								
104.1	Concrete	Good	Yes	No	60	2.4	60	32	None	No
104.2	Concrete	Good	Yes	No	60	1.7	60	34	None	No
At PAMELA ROAD		2 Ramps								
111.1	Concrete	Good	Yes	Yes	60	1.9	60	36	None	No
111.2	Concrete	Good	Yes	No	60	1.8	60	35	None	No
At PARK AVENUE		2 Ramps								
102.2	Concrete	Good	Yes	No	55	1.3	68	60	Utility Access	No
103.2	Concrete	Good	Yes	No	40	6.5	0	0	None	No
At POTTER ROAD		2 Ramps								
115.3	Concrete	Fair	Yes	No	60	3.1	60	60	cessive Ldg Slop	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
115.4	Concrete	Good	Yes	No	60	2.3	60	35	None	No
At SCHOOL ENTRANCE		4 Ramps								
120.1	Concrete	Good	Yes	Yes	60	2.8	60	36	None	No
120.2	Concrete	Good	Yes	Yes	70	2.4	70	28	None	No
120.4	Concrete	Good	Yes	Yes	60	6.2	0	0	None	No
120.6	Concrete	Good	Yes	Yes	60	8.3	60	60	None	No
WAVENEY ROAD		***1 Ramps***								
At PLEASANT STREET		1 Ramps								
55.2	Concrete	Good	Yes	No	72	0.4	68	50	None	No
WAVERLEY STREET		***10 Ramps***								
At BEAVER STREET		1 Ramps								
498.2	Concrete	Good	Yes	Yes	60	1.4	60	50	None	No
At CASEY COURT		2 Ramps								
530.1	Concrete	Good	No	No	64	5.8	82	60	None	No
530.2	Concrete	Good	No	No	64	5.4	78	60	None	No
At CEDAR STREET		1 Ramps								
529.1	Concrete	Good	Yes	No	68	2.5	64	32	None	No
At FOUNTAIN STREET		1 Ramps								
532.4	Concrete	Good	Yes	No	64	4.3	56	58	None	No
At LIBERTY STREET		2 Ramps								
550.1	Concrete	Good	No	No	48	7.4	0	0	None	No
550.2	Concrete	Good	No	No	70	1.6	54	60	None	No
At MELLEN STREET		1 Ramps								
532.3	Concrete	Good	Yes	No	58	1.8	58	35	None	No
At PERSHING AVENUE		1 Ramps								
549.4	Concrete	Good	Yes	No	55	0.3	59	43	Curbing	No
At SECOND STREET		1 Ramps								
514.4	Concrete	Good	Yes	No	60	2.2	60	32	None	No
WESLEY ROAD		***2 Ramps***								
At BROOK STREET		2 Ramps								

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
85.1	Concrete	Fair	No	No	60	2.3	0	0	None	No
85.2	Concrete	Fair	No	No	55	3.3	0	0	None	No
WEST STREET			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
334.1	Concrete	Good	Yes	No	50	5.1	48	60	None	No
WHITING ROAD			***1 Ramps***							
At EDGELL ROAD			1 Ramps							
124.2	Concrete	Good	Yes	No	60	6.1	60	42	Curbing	No
WHITTIER STREET			***3 Ramps***							
At COCHITUATE ROAD			2 Ramps							
242.4	Concrete	Good	No	No	55	2.5	51	50	None	No
242.5	Concrete	Fair	No	No	64	0.2	62	54	ccessive Ldg Slo	No
At NEWBURY STREET			1 Ramps							
241.3	Concrete	Good	Yes	No	60	1.6	60	32	Utillity Pole	No
WINTER STREET			***6 Ramps***							
At MAPLE STREET			1 Ramps							
386.1	Asphalt	Poor	No	No	0	0	0	0	None	No
At MAYHEW STREET EXTENSION			2 Ramps							
378.1	Asphalt	Poor	No	No	0	0	0	0	None	No
378.2	Asphalt	Poor	No	No	0	0	0	0	None	No
At SALEM END ROAD			3 Ramps							
373.1	Concrete	Poor	No	No	52	6.4	0	0	None	No
373.2	Concrete	Fair	No	No	60	1.1	0	0	None	No
373.3	Asphalt	Fair	No	No	0	0	0	0	None	No
WINTHROP STREET			***2 Ramps***							
At CONANT ROAD			1 Ramps							
536.4	Concrete	Fair	Yes	No	60	5.6	60	48	Major Curbing	No
At WAVERLEY STREET			1 Ramps							
536.5	Concrete	Good	Yes	Yes	60	6.2	60	42	None	No

	Ramp Material	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
WOODLEIGH ROAD			***6 Ramps***							
At OLD WOOD ROAD			2 Ramps							
342.1	Asphalt	Poor	No	No	0	0	0	0	Vegetation	No
342.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At PRIMO DRIVE			2 Ramps							
344.1	Asphalt	Fair	No	No	0	0	0	0	None	No
344.2	Asphalt	Fair	No	No	0	0	0	0	None	No
At TEMPLE STREET			2 Ramps							
339.3	Asphalt	Fair	No	No	0	0	0	0	None	No
339.4	Asphalt	Fair	No	No	0	0	0	0	None	No
WOODMERE ROAD			***2 Ramps***							
At PLEASANT STREET			2 Ramps							
37.1	Concrete	Good	Yes	No	60	5.1	50	43	None	No
37.2	Concrete	Good	Yes	No	62	3.1	60	48	None	No
WOODSIDE COTTAGE WAY			***2 Ramps***							
At PROSPECT STREET			2 Ramps							
310.1	Concrete	Good	Yes	No	60	2.1	60	35	None	No
310.2	Concrete	Good	Yes	No	62	2.5	0	0	ccessive Ldg Slop	No
WYNDSTONE WAY			***2 Ramps***							
At PROSPECT STREET			2 Ramps							
311.1	Concrete	Good	Yes	No	60	1.8	60	34	None	No
311.2	Concrete	Good	Yes	No	60	1.8	60	35	None	No

City of Framingham, Massachusetts

Concrete Ramps with no warning panel and/or repairable obstruction

Curb Ramp Inventory & Assessment

Ramp Retrofit - By Street With Inspection Data

Total: 49

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
BEAVER STREET			***1 Ramps***							
At PARKING LOT			1 Ramps							
578.2	Curbing	Good	Yes	No	60	1.4	60	40	Curbing	No
BRADFORD ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
171.3	None	Good	Yes	Yes	60	6.1	60	48	None	No
CEDAR STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
560.1	None	Fair	Yes	Yes	60	2.2	60	45	None	No
CLIFFORD STREET			***1 Ramps***							
At BRIDGES STREET EXTENSION			1 Ramps							
563.2	Vegetation	Good	Yes	No	60	1.5	60	39	Vegetation	No
COCHITUATE ROAD			***2 Ramps***							
At WHITTIER STREET			2 Ramps							
242.2	None	Good	No	No	46	1.9	46	59	None	No
242.3	None	Fair	No	No	60	0.4	60	40	None	No
EDGELL ROAD			***2 Ramps***							
At PARKING LOT			1 Ramps							
316.4	None	Good	Yes	Yes	48	7.4	70	60	None	No
At WHITING ROAD			1 Ramps							
124.3	Curbing	Good	Yes	No	60	6.7	60	42	Curbing	No
ELM STREET			***2 Ramps***							
At POTTER ROAD			2 Ramps							
175.5	None	Good	Yes	Yes	60	7.7	60	49	None	No
175.6	None	Good	Yes	Yes	60	1.3	60	38	None	No

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
FRANKLIN STREET			***1 Ramps***							
At MAIN STREET			1 Ramps							
400.2	None	Good	Yes	Yes	60	4.1	60	40	None	No
HIALEAH LANE			***1 Ramps***							
At DANFORTH STREET			1 Ramps							
188.2	None	Good	Yes	Yes	60	3.1	60	48	None	No
INDIAN HEAD ROAD			***2 Ramps***							
At LOCKLAND AVENUE			1 Ramps							
300.2	None	Good	Yes	Yes	60	1.9	60	48	None	No
At SUMMER STREET			1 Ramps							
298.1	None	Good	Yes	Yes	60	6.3	60	48	None	No
MAIN STREET			***2 Ramps***							
At MOULTON PARK ROAD			2 Ramps							
399.1	None	Fair	No	No	44	3.4	54	60	None	No
399.2	None	Fair	No	No	36	1.1	40	60	None	No
MAYNARD ROAD			***1 Ramps***							
At CHURCH STREET			1 Ramps							
380.1	None	Good	Yes	Yes	60	1.7	60	48	None	No
MELLEN STREET			***1 Ramps***							
At WINTHROP STREET			1 Ramps							
558.1	Curbing	Good	Yes	No	60	4.1	60	48	Curbing	No
NAPLES STREET			***1 Ramps***							
At BRIDGES STREET			1 Ramps							
570.3	None	Good	No	No	60	1.4	60	60	None	No
OAK CREST DRIVE			***1 Ramps***							
At WORCESTER ROAD			1 Ramps							
350.2	None	Good	Yes	Yes	60	8.3	70	60	None	No
OAK STREET			***2 Ramps***							
At EDGELL ROAD			1 Ramps							

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
317.1	None	Good	Yes	Yes	72	0.4	72	60	None	No
At VERNON STREET		1 Ramps								
319.1	None	Good	Yes	Yes	60	6.2	60	44	None	No
OLD CONNECTICUT PATH		***1 Ramps***								
At LAKE ROAD		1 Ramps								
202.2	None	Good	No	No	52	4.2	94	60	None	No
OLD WOOD ROAD		***2 Ramps***								
At OLD WORCESTER ROAD		2 Ramps								
343.1	Curbing	Good	Yes	No	58	3.3	58	43	Curbing	No
343.2	Curbing	Good	Yes	No	60	3.2	60	48	Curbing	No
OLD WORCESTER ROAD		***2 Ramps***								
At OLD WOOD ROAD		2 Ramps								
343.3	Curbing	Good	Yes	No	59	5.5	59	46	Curbing	No
343.4	Curbing	Good	Yes	No	60	2.7	60	44	Curbing	No
PARKING LOT		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
316.5	None	Good	Yes	Yes	64	1.6	64	48	None	No
POTTER ROAD		***2 Ramps***								
At LOWRY ROAD		1 Ramps								
177.2	Curbing	Good	Yes	No	59	5.5	59	48	Curbing	No
At WATER STREET		1 Ramps								
115.1	Curbing	Good	Yes	No	58	5.2	70	60	Curbing	No
SALEM END ROAD		***1 Ramps***								
At SALEM END LANE		1 Ramps								
368.2	None	Good	No	No	64	0.5	64	60	None	No
SAUCIER STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
533.2	None	Fair	Yes	Yes	60	5.3	60	48	None	No
SCHOOL ENTRANCE		***1 Ramps***								

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At BROOK STREET			1 Ramps							
86.2	None	Good	No	No	56	8.1	56	48	None	No
SCHOOL STREET			***1 Ramps***							
At CONCORD STREET			1 Ramps							
221.3	None	Good	Yes	Yes	60	6.1	60	60	None	No
STATE STREET			***1 Ramps***							
At HIGH STREET			1 Ramps							
377.2	None	Good	Yes	Yes	58	2.2	58	48	None	No
TEMI ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
173.2	None	Good	Yes	Yes	60	5.3	60	40	None	No
UPTON ROAD			***1 Ramps***							
At POTTER ROAD			1 Ramps							
176.2	None	Good	Yes	Yes	60	6.5	60	40	None	No
VERNON STREET			***2 Ramps***							
At EDGELL ROAD			2 Ramps							
315.3	None	Good	Yes	Yes	60	6.9	60	48	None	No
315.4	None	Good	Yes	Yes	60	7.9	60	60	None	No
WATER STREET			***4 Ramps***							
At EDGELL ROAD			1 Ramps							
121.4	Curbing	Good	Yes	No	60	6.4	60	48	Curbing	No
At PAMELA ROAD			1 Ramps							
111.1	None	Good	Yes	Yes	60	1.9	60	36	None	No
At SCHOOL ENTRANCE			2 Ramps							
120.1	None	Good	Yes	Yes	60	2.8	60	36	None	No
120.6	None	Good	Yes	Yes	60	8.3	60	60	None	No
WAVERLEY STREET			***4 Ramps***							
At BEAVER STREET			1 Ramps							
498.2	None	Good	Yes	Yes	60	1.4	60	50	None	No

	Obstruction	Condition	Warning Panel	Panel Damage	Opening Width	Ramp Slope	Landing Width	Landing Depth	Obstruction	Overall Pass
At CASEY COURT		2 Ramps								
530.1	None	Good	No	No	64	5.8	82	60	None	No
530.2	None	Good	No	No	64	5.4	78	60	None	No
At PERSHING AVENUE		1 Ramps								
549.4	Curbing	Good	Yes	No	55	0.3	59	43	Curbing	No
WHITING ROAD		***1 Ramps***								
At EDGELL ROAD		1 Ramps								
124.2	Curbing	Good	Yes	No	60	6.1	60	42	Curbing	No
WINTHROP STREET		***1 Ramps***								
At WAVERLEY STREET		1 Ramps								
536.5	None	Good	Yes	Yes	60	6.2	60	42	None	No

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals

Street	Number of Ramps
AUBURN STREET	2
BEACON STREET	2
BEAVER STREET	1
BETHANY ROAD	2
BRIDGES STREET EXTENSION	2
CAPRI DRIVE	2
COCHITUATE ROAD	2
DEBRA LANE	2
EDGELL ROAD	1
ELM STREET	1
FENTON STREET	2
HAMILTON STREET	2
HARDY STREET	1
KELLOGG STREET	2
NEWBURY STREET	1
NORMANDY ROAD	1
OAK CREST DRIVE	1
OLD CONNECTICUT PATH	14
OLD WORCESTER ROAD	1
PARKING LOT	1
PINECREST ROAD	2
PLEASANT STREET	1
POTTER ROAD	2
RANDY ROAD	2
ROSE KENNEDY LANE	1
SCHOOL STREET	1
SEALTEST DRIVE	2
SPEEN STREET	3
WATER STREET	3
WINTER STREET	1
WINTHROP STREET	1
Total:	**62**

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Totals - By Street With Inspection Data

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
AUBURN STREET		**2 Ramps**				
At WORCESTER ROAD		2 Ramps				
323.1	Yes	No	Good	Concrete	No	None
323.2	Yes	No	Good	Concrete	No	None
BEACON STREET		**2 Ramps**				
At FAIRBANKS STREET		2 Ramps				
296.1	Yes	No	Good	Concrete	No	None
296.2	Yes	Yes	Good	Concrete	No	None
BEAVER STREET		**1 Ramps**				
At BLANDIN AVENUE		1 Ramps				
499.3	Yes	Yes	Good	Concrete	No	None
BETHANY ROAD		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
553.5	Yes	No	Good	Concrete	No	None
553.6	Yes	No	Good	Concrete	No	None
BRIDGES STREET EXTENSION		**2 Ramps**				
At WINTHROP STREET		2 Ramps				
555.1	Yes	No	Good	Concrete	No	None
555.2	Yes	No	Good	Concrete	No	None
CAPRI DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
209.1	No	No	Fair	Concrete	No	None
209.2	No	No	Fair	Concrete	No	None
COCHITUATE ROAD		**2 Ramps**				
At SPEEN STREET		2 Ramps				
252.2	Yes	No	Good	Concrete	No	None
252.3	Yes	No	Good	Concrete	Yes	Curbing
DEBRA LANE		**2 Ramps**				
At HARDY STREET		2 Ramps				
231.1	Yes	No	Good	Concrete	No	None
231.2	Yes	No	Good	Concrete	No	None
EDGELL ROAD		**1 Ramps**				
At WATER STREET		1 Ramps				
121.2	Yes	No	Good	Concrete	No	None
ELM STREET		**1 Ramps**				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
At POTTER ROAD		1 Ramps				
175.2	Yes	No	Good	Concrete	No	None
FENTON STREET		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
206.1	No	No	Good	Concrete	No	None
206.2	No	No	Good	Concrete	No	None
HAMILTON STREET		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
208.3	No	No	Fair	Concrete	No	None
208.4	No	No	Fair	Concrete	Yes	Curbing
HARDY STREET		**1 Ramps**				
At DEBRA LANE		1 Ramps				
231.4	Yes	No	Good	Concrete	No	None
KELLOGG STREET		**2 Ramps**				
At CENTRAL STREET		2 Ramps				
309.1	No	No	Fair	Concrete	No	None
309.4	No	No	Poor	Concrete	No	None
NEWBURY STREET		**1 Ramps**				
At SPEEN STREET		1 Ramps				
251.1	Yes	No	Good	Concrete	No	None
NORMANDY ROAD		**1 Ramps**				
At ARSENAL ROAD		1 Ramps				
517.1	Yes	No	Good	Concrete	No	None
OAK CREST DRIVE		**1 Ramps**				
At OLD WORCESTER ROAD		1 Ramps				
346.1	Yes	No	Good	Concrete	Yes	Curbing
OLD CONNECTICUT PATH		**14 Ramps**				
At BROSSI CIRCLE		1 Ramps				
198.2	Yes	No	Good	Concrete	No	None
At BROWNLEA ROAD		1 Ramps				
210.4	No	No	Fair	Concrete	No	None
At CHAPPELLWOOD ROAD		1 Ramps				
205.1	No	No	Good	Concrete	No	None
At HAMILTON STREET		2 Ramps				
208.1	No	No	Fair	Concrete	Yes	Curbing
208.2	No	No	Fair	Concrete	No	None
At HARDY STREET		1 Ramps				
229.2	Yes	No	Good	Concrete	No	None
At LAKE ROAD		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
202.1	No	No	Good	Concrete	No	None
At LOVERING AVENUE		2 Ramps				
207.4	No	No	Fair	Concrete	No	None
207.5	No	No	Fair	Concrete	No	None
At PINECREST ROAD		1 Ramps				
207.3	No	No	Fair	Concrete	No	None
At SAXONY TERRACE		2 Ramps				
203.1	No	No	Good	Concrete	No	None
203.2	No	No	Good	Concrete	Yes	Curbing
At SPEEN STREET		2 Ramps				
223.1	Yes	No	Good	Concrete	No	None
223.2	Yes	No	Good	Concrete	Yes	Utility Access
OLD WORCESTER ROAD		**1 Ramps**				
At TEMPLE STREET		1 Ramps				
341.1	Yes	No	Good	Concrete	Yes	Utillity Pole
PARKING LOT		**1 Ramps**				
At OLD CONNECTICUT PATH		1 Ramps				
223.7	Yes	No	Good	Concrete	No	None
PINECREST ROAD		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
207.1	No	No	Fair	Concrete	No	None
207.2	No	No	Fair	Concrete	No	None
PLEASANT STREET		**1 Ramps**				
At ARNOLD ROAD		1 Ramps				
329.1	Yes	No	Good	Concrete	Yes	Utillity Pole
POTTER ROAD		**2 Ramps**				
At SCHOOL ENTRANCE		1 Ramps				
162.3	Yes	No	Fair	Concrete	No	None
At WATER STREET		1 Ramps				
115.2	Yes	No	Good	Concrete	No	None
RANDY ROAD		**2 Ramps**				
At HARDY STREET		2 Ramps				
232.1	Yes	No	Good	Concrete	No	None
232.2	Yes	No	Good	Concrete	No	None
ROSE KENNEDY LANE		**1 Ramps**				
At NORMANDY ROAD EXTENSION		1 Ramps				
516.1	Yes	No	Good	Concrete	No	None
SCHOOL STREET		**1 Ramps**				
At OLD CONNECTICUT PATH		1 Ramps				

	Det. Warning Panel	Det. Warning Panel Damage	Ramp Condition	Ramp Material	Obstruction	Obstruction Type
204.2	No	No	Good	Concrete	No	None
SEALTEST DRIVE		**2 Ramps**				
At OLD CONNECTICUT PATH		2 Ramps				
224.1	Yes	No	Good	Concrete	Yes	Utility Access
224.2	Yes	No	Good	Concrete	Yes	Utility Access
SPEEN STREET		**3 Ramps**				
At COCHITUATE ROAD		1 Ramps				
252.4	Yes	No	Good	Concrete	No	None
At OLD CONNECTICUT PATH		2 Ramps				
223.3	Yes	No	Good	Concrete	No	None
223.4	Yes	No	Good	Concrete	No	None
WATER STREET		**3 Ramps**				
At EDGELL ROAD		1 Ramps				
121.3	Yes	No	Good	Concrete	No	None
At LIBRARY ENTRANCE		2 Ramps				
119.2	Yes	No	Good	Concrete	No	None
119.3	Yes	Yes	Good	Concrete	No	None
WINTER STREET		**1 Ramps**				
At WORCESTER ROAD		1 Ramps				
379.1	Yes	No	Good	Concrete	No	None
WINTHROP STREET		**1 Ramps**				
At BETHANY ROAD		1 Ramps				
553.4	Yes	No	Good	Concrete	No	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Total: 10

Ramp Locations With Obstructions

		Obstruction	Obstruction Type	Material
COCHITUATE ROAD	**1 Ramps Total**			
At SPEEN STREET	1 Ramps			
252.3		Yes	Curbing	Concrete
HAMILTON STREET	**1 Ramps Total**			
At OLD CONNECTICUT PATH	1 Ramps			
208.4		Yes	Curbing	Concrete
OAK CREST DRIVE	**1 Ramps Total**			
At OLD WORCESTER ROAD	1 Ramps			
346.1		Yes	Curbing	Concrete
OLD CONNECTICUT PATH	**3 Ramps Total**			
At HAMILTON STREET	1 Ramps			
208.1		Yes	Curbing	Concrete
At SAXONY TERRACE	1 Ramps			
203.2		Yes	Curbing	Concrete
At SPEEN STREET	1 Ramps			
223.2		Yes	Utility Access	Concrete
OLD WORCESTER ROAD	**1 Ramps Total**			
At TEMPLE STREET	1 Ramps			
341.1		Yes	Utillity Pole	Concrete
PLEASANT STREET	**1 Ramps Total**			
At ARNOLD ROAD	1 Ramps			
329.1		Yes	Utillity Pole	Concrete
SEALTEST DRIVE	**2 Ramps Total**			
At OLD CONNECTICUT PATH	2 Ramps			
224.1		Yes	Utility Access	Concrete
224.2		Yes	Utility Access	Concrete

City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	323.1
Street:	**AUBURN STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	323.2
Street:	**AUBURN STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	296.1
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	296.2
Street:	**BEACON STREET**
Intersecting Street:	FAIRBANKS STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	499.3
Street:	**BEAVER STREET**
Intersecting Street:	BLANDIN AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.5
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.6
Street:	**BETHANY ROAD**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.1
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	555.2
Street:	**BRIDGES STREET EXTENSION**
Intersecting Street:	WINTHROP STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	209.1
Street:	**CAPRI DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	209.2
Street:	**CAPRI DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	252.2
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	252.3
Street:	**COCHITUATE ROAD**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	231.1
Street:	**DEBRA LANE**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	231.2
Street:	**DEBRA LANE**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.2
Street:	**EDGELL ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	175.2
Street:	**ELM STREET**
Intersecting Street:	POTTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	206.1
Street:	**FENTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	206.2
Street:	**FENTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	208.3
Street:	**HAMILTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	208.4
Street:	**HAMILTON STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	231.4
Street:	**HARDY STREET**
Intersecting Street:	DEBRA LANE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	309.1
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	309.4
Street:	**KELLOGG STREET**
Intersecting Street:	CENTRAL STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Poor



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	251.1
Street:	**NEWBURY STREET**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	517.1
Street:	**NORMANDY ROAD**
Intersecting Street:	ARSENAL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	346.1
Street:	**OAK CREST DRIVE**
Intersecting Street:	OLD WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	198.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROSSI CIRCLE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	202.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LAKE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	203.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SAXONY TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	203.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SAXONY TERRACE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Good



Ramp ID:	205.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	CHAPPELLWOOD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	207.3
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	PINECREST ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LOVERING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.5
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	LOVERING AVENUE
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



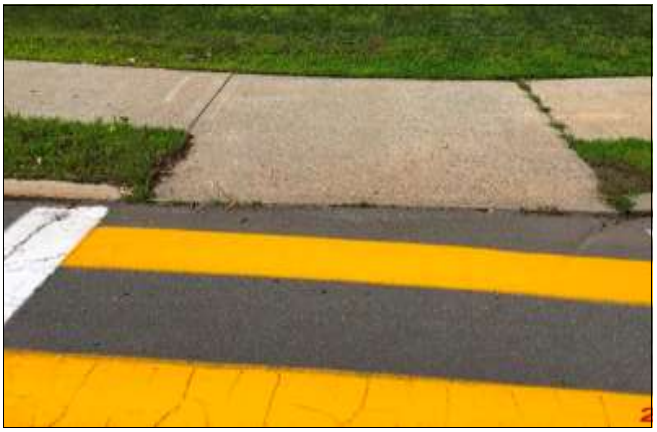
Ramp ID:	208.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Curbing
Condition:	Fair



Ramp ID:	208.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HAMILTON STREET
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	210.4
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	BROWNLEA ROAD
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	223.1
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	223.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	SPEEN STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	229.2
Street:	**OLD CONNECTICUT PATH**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	341.1
Street:	**OLD WORCESTER ROAD**
Intersecting Street:	TEMPLE STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	223.7
Street:	**PARKING LOT**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	207.1
Street:	**PINECREST ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	207.2
Street:	**PINECREST ROAD**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



Ramp ID:	329.1
Street:	**PLEASANT STREET**
Intersecting Street:	ARNOLD ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utillity Pole
Condition:	Good



Ramp ID:	115.2
Street:	**POTTER ROAD**
Intersecting Street:	WATER STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	162.3
Street:	**POTTER ROAD**
Intersecting Street:	SCHOOL ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Fair



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	232.1
Street:	**RANDY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	232.2
Street:	**RANDY ROAD**
Intersecting Street:	HARDY STREET
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	516.1
Street:	**ROSE KENNEDY LANE**
Intersecting Street:	NORMANDY ROAD EXTENSION
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	204.2
Street:	**SCHOOL STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	No
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	224.1
Street:	**SEALTEST DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	224.2
Street:	**SEALTEST DRIVE**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	Yes
Obstruction Type:	Utility Access
Condition:	Good



Ramp ID:	223.3
Street:	**SPEEN STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	223.4
Street:	**SPEEN STREET**
Intersecting Street:	OLD CONNECTICUT PATH
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	252.4
Street:	**SPEEN STREET**
Intersecting Street:	COCHITUATE ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.2
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	119.3
Street:	**WATER STREET**
Intersecting Street:	LIBRARY ENTRANCE
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	Yes
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	121.3
Street:	**WATER STREET**
Intersecting Street:	EDGELL ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts
Curb Ramp Inventory & Assessment
Ramp Inspection Data and Picture

Ramp ID:	379.1
Street:	**WINTER STREET**
Intersecting Street:	WORCESTER ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



Ramp ID:	553.4
Street:	**WINTHROP STREET**
Intersecting Street:	BETHANY ROAD
Ramp Material:	Concrete
Det. Warning Panel:	Yes
Panel Damage:	No
Obstructions:	No
Obstruction Type:	None
Condition:	Good



City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Compliance - By Street With Inspection Data **Total: 19**

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
AUBURN STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
323.2	Concrete	Good	Yes	No	60	1.7	65	60	5.1	0	0	60	4.1	0	0	None
BETHANY ROAD			***1 Ramps***													
At WINTHROP STREET			1 Ramps													
553.6	Concrete	Good	Yes	No	60	1.1	79	74	3.7	0	0	72	8.3	0	0	None
DEBRA LANE			***1 Ramps***													
At HARDY STREET			1 Ramps													
231.1	Concrete	Good	Yes	No	65	0.4	76	72	6.4	72	60	72	4.1	72	60	None
EDGELL ROAD			***1 Ramps***													
At WATER STREET			1 Ramps													
121.2	Concrete	Good	Yes	No	60	0.7	60	60	8.3	60	60	60	2.4	0	0	None
ELM STREET			***1 Ramps***													
At POTTER ROAD			1 Ramps													
175.2	Concrete	Good	Yes	No	61	1.9	62	0	0	0	0	65	4.3	77	60	None
NEWBURY STREET			***1 Ramps***													
At SPEEN STREET			1 Ramps													
251.1	Concrete	Good	Yes	No	60	1.9	65	0	0	0	0	60	6.5	60	60	None
NORMANDY ROAD			***1 Ramps***													
At ARSENAL ROAD			1 Ramps													
517.1	Concrete	Good	Yes	No	60	2	80	78	6.1	72	60	72	2.5	84	60	None
OLD WORCESTER ROAD			***1 Ramps***													
At TEMPLE STREET			1 Ramps													
341.1	Concrete	Good	Yes	No	75	1.2	68	76	6.1	0	0	80	2.5	0	0	Utillity Pole

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
PARKING LOT			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
223.7	Concrete	Good	Yes	No	60	0.5	60	55	2.8	0	0	0	0	0	0	None
PLEASANT STREET			***1 Ramps***													
At ARNOLD ROAD			1 Ramps													
329.1	Concrete	Good	Yes	No	83	1.1	61	56	2.6	56	60	58	8.3	60	60	Utillity Pole
POTTER ROAD			***2 Ramps***													
At SCHOOL ENTRANCE			1 Ramps													
162.3	Concrete	Fair	Yes	No	60	0.6	54	54	1.9	54	48	0	0	0	0	None
At WATER STREET			1 Ramps													
115.2	Concrete	Good	Yes	No	79	1.2	62	62	5.7	62	60	62	3.8	62	60	None
RANDY ROAD			***1 Ramps***													
At HARDY STREET			1 Ramps													
232.2	Concrete	Good	Yes	No	64	1.1	78	72	5.7	0	0	72	7.2	80	60	None
SPEEN STREET			***2 Ramps***													
At COCHITUATE ROAD			1 Ramps													
252.4	Concrete	Good	Yes	No	64	1.2	60	55	5.9	58	60	56	3.3	38	60	None
At OLD CONNECTICUT PATH			1 Ramps													
223.4	Concrete	Good	Yes	No	62	1.8	66	60	7.1	60	60	0	0	0	0	None
WATER STREET			***2 Ramps***													
At EDGELL ROAD			1 Ramps													
121.3	Concrete	Good	Yes	No	50	0.2	64	62	7.1	60	60	66	1.7	66	48	None
At LIBRARY ENTRANCE			1 Ramps													
119.2	Concrete	Good	Yes	No	312	1.8	60	60	4.7	60	60	70	4.9	72	60	None
WINTER STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
379.1	Concrete	Good	Yes	No	60	0.5	70	60	3.2	0	0	78	5.1	100	60	None
WINTHROP STREET			***1 Ramps***													

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
At BETHANY ROAD			1 Ramps													
553.4	Concrete	Good	Yes	No	60	1	77	70	7.1	70	60	70	3.8	70	60	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Ramp Non-Compliance - By Street With Inspection Data Total: 43

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
AUBURN STREET			***1 Ramps***													
At WORCESTER ROAD			1 Ramps													
323.1	Concrete	Good	Yes	No	60	2.5	65	60	3.6	60	60	60	3.7	60	60	None
BEACON STREET			***2 Ramps***													
At FAIRBANKS STREET			2 Ramps													
296.1	Concrete	Good	Yes	No	75	1.2	72	60	2.8	60	60	64	4.6	64	24	None
296.2	Concrete	Good	Yes	Yes	75	3.3	80	76	6.8	0	0	75	1.2	75	60	None
BEAVER STREET			***1 Ramps***													
At BLANDIN AVENUE			1 Ramps													
499.3	Concrete	Good	Yes	Yes	60	1.3	74	68	6.3	66	60	70	4.9	66	60	None
BETHANY ROAD			***1 Ramps***													
At WINTHROP STREET			1 Ramps													
553.5	Concrete	Good	Yes	No	60	2.2	77	72	4.8	72	60	70	2.3	70	60	None
BRIDGES STREET EXTENSION			***2 Ramps***													
At WINTHROP STREET			2 Ramps													
555.1	Concrete	Good	Yes	No	58	2.4	77	68	5.7	65	60	78	3.1	57	60	None
555.2	Concrete	Good	Yes	No	60	3.6	75	65	6.1	66	60	68	2.4	66	60	None
CAPRI DRIVE			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
209.1	Concrete	Fair	No	No	52	0.9	55	55	1.6	55	60	58	9.1	0	0	None
209.2	Concrete	Fair	No	No	57	1.6	54	54	1.8	64	60	39	7.8	55	60	None
COCHITUATE ROAD			***2 Ramps***													
At SPEEN STREET			2 Ramps													
252.2	Concrete	Good	Yes	No	60	3.1	67	70	1	70	60	57	7.7	62	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
252.3	Concrete	Good	Yes	No	64	1.9	55	50	4.3	55	60	50	1.1	50	60	Curbing
DEBRA LANE		***1 Ramps***														
At HARDY STREET		1 Ramps														
231.2	Concrete	Good	Yes	No	60	2.5	80	72	4.1	72	60	72	5.8	72	60	None
FENTON STREET		***2 Ramps***														
At OLD CONNECTICUT PATH		2 Ramps														
206.1	Concrete	Good	No	No	48	2.4	82	80	4.6	0	0	86	4.5	96	60	None
206.2	Concrete	Good	No	No	48	1.6	86	82	5.2	82	60	80	7.3	0	0	None
HAMILTON STREET		***2 Ramps***														
At OLD CONNECTICUT PATH		2 Ramps														
208.3	Concrete	Fair	No	No	75	3	69	64	1.7	64	60	57	5.2	80	48	None
208.4	Concrete	Fair	No	No	66	0.1	104	108	3.5	58	60	86	3.3	74	60	Curbing
HARDY STREET		***1 Ramps***														
At DEBRA LANE		1 Ramps														
231.4	Concrete	Good	Yes	No	66	3.5	82	75	3.5	75	60	75	5.2	0	0	None
KELLOGG STREET		***2 Ramps***														
At CENTRAL STREET		2 Ramps														
309.1	Concrete	Fair	No	No	64	3.9	65	64	0.1	64	60	64	6.4	64	60	None
309.4	Concrete	Poor	No	No	60	1.8	64	57	3.7	0	0	58	6.7	62	60	None
OAK CREST DRIVE		***1 Ramps***														
At OLD WORCESTER ROAD		1 Ramps														
346.1	Concrete	Good	Yes	No	60	2.4	64	60	7.8	0	0	0	0	0	0	Curbing
OLD CONNECTICUT PATH		***14 Ramps***														
At BROSSI CIRCLE		1 Ramps														
198.2	Concrete	Good	Yes	No	66	2.9	88	77	5.2	0	0	87	1.5	0	0	None
At BROWNLEA ROAD		1 Ramps														
210.4	Concrete	Fair	No	No	77	0.7	82	50	2.2	50	60	50	7.7	50	60	None
At CHAPPELLWOOD ROAD		1 Ramps														

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
205.1	Concrete	Good	No	No	48	3.1	96	100	7.6	55	60	100	3.9	58	60	None
At HAMILTON STREET			2 Ramps													
208.1	Concrete	Fair	No	No	85	2.3	84	79	8.7	58	60	48	1.7	48	60	Curbing
208.2	Concrete	Fair	No	No	49	2.7	126	117	0.7	117	60	59	2.7	59	60	None
At HARDY STREET			1 Ramps													
229.2	Concrete	Good	Yes	No	48	0.6	82	75	7.4	80	60	78	8.8	78	60	None
At LAKE ROAD			1 Ramps													
202.1	Concrete	Good	No	No	60	2.8	60	65	4.7	65	54	64	3.1	65	60	None
At LOVERING AVENUE			2 Ramps													
207.4	Concrete	Fair	No	No	53	3	80	72	5.8	65	62	76	1.9	76	57	None
207.5	Concrete	Fair	No	No	50	1.1	87	86	5.8	93	60	80	3.5	72	60	None
At PINECREST ROAD			1 Ramps													
207.3	Concrete	Fair	No	No	70	4.3	70	55	3	65	62	68	2.7	68	44	None
At SAXONY TERRACE			2 Ramps													
203.1	Concrete	Good	No	No	46	3.7	76	70	1.3	63	60	82	7.8	0	0	None
203.2	Concrete	Good	No	No	48	1.1	68	66	5.3	60	60	60	3.4	0	0	Curbing
At SPEEN STREET			2 Ramps													
223.1	Concrete	Good	Yes	No	60	2.4	64	48	4.5	60	60	60	7.1	0	0	None
223.2	Concrete	Good	Yes	No	60	1.9	67	60	9.2	0	0	0	0	0	0	Utility Access
PINECREST ROAD			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
207.1	Concrete	Fair	No	No	58	4.6	80	75	3.5	0	0	72	8.7	0	0	None
207.2	Concrete	Fair	No	No	58	3.4	75	67	8.5	0	0	0	0	0	0	None
RANDY ROAD			***1 Ramps***													
At HARDY STREET			1 Ramps													
232.1	Concrete	Good	Yes	No	48	3.9	72	70	5.8	78	60	72	9.5	68	60	None
ROSE KENNEDY LANE			***1 Ramps***													
At NORMANDY ROAD EXTENSION			1 Ramps													
516.1	Concrete	Good	Yes	No	68	4.2	80	70	5.2	0	0	75	3.8	75	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
SCHOOL STREET			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
204.2	Concrete	Good	No	No	48	0.7	70	65	2.2	70	60	62	8.5	0	0	None
SEALTEST DRIVE			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
224.1	Concrete	Good	Yes	No	59	0.3	64	0	0	0	0	60	9.2	60	60	Utility Access
224.2	Concrete	Good	Yes	No	58	2.3	72	66	9.9	66	60	66	6.6	66	60	Utility Access
SPEEN STREET			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
223.3	Concrete	Good	Yes	No	60	2.1	66	60	8.3	0	0	60	4.3	0	0	None
WATER STREET			***1 Ramps***													
At LIBRARY ENTRANCE			1 Ramps													
119.3	Concrete	Good	Yes	Yes	70	1.1	60	60	5.2	60	60	60	4.5	60	60	None

City of Framingham, Massachusetts

Concrete Ramps with no warning panel and/or repairable obstruction

Curb Ramp Inventory & Assessment

Ramp Retrofit - By Street With Inspection Data

Total: 20

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
BEACON STREET			***1 Ramps***													
At FAIRBANKS STREET			1 Ramps													
296.2	Concrete	Good	Yes	Yes	75	3.3	80	76	6.8	0	0	75	1.2	75	60	None
BEAVER STREET			***1 Ramps***													
At BLANDIN AVENUE			1 Ramps													
499.3	Concrete	Good	Yes	Yes	60	1.3	74	68	6.3	66	60	70	4.9	66	60	None
CAPRI DRIVE			***1 Ramps***													
At OLD CONNECTICUT PATH			1 Ramps													
209.2	Concrete	Fair	No	No	57	1.6	54	54	1.8	64	60	39	7.8	55	60	None
COCHITUATE ROAD			***1 Ramps***													
At SPEEN STREET			1 Ramps													
252.3	Concrete	Good	Yes	No	64	1.9	55	50	4.3	55	60	50	1.1	50	60	Curbing
FENTON STREET			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
206.1	Concrete	Good	No	No	48	2.4	82	80	4.6	0	0	86	4.5	96	60	None
206.2	Concrete	Good	No	No	48	1.6	86	82	5.2	82	60	80	7.3	0	0	None
HAMILTON STREET			***2 Ramps***													
At OLD CONNECTICUT PATH			2 Ramps													
208.3	Concrete	Fair	No	No	75	3	69	64	1.7	64	60	57	5.2	80	48	None
208.4	Concrete	Fair	No	No	66	0.1	104	108	3.5	58	60	86	3.3	74	60	Curbing
KELLOGG STREET			***2 Ramps***													
At CENTRAL STREET			2 Ramps													
309.1	Concrete	Fair	No	No	64	3.9	65	64	0.1	64	60	64	6.4	64	60	None
309.4	Concrete	Poor	No	No	60	1.8	64	57	3.7	0	0	58	6.7	62	60	None

	Ramp Material	Condition	Warning Panel		Opening			Left Ramp				Right Ramp				Obstruction
			Exists	*Damage*	*Width*	*Slope*	*Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	*Width*	*Slope*	*L_Width*	*L_Depth*	
OAK CREST DRIVE			***1 Ramps***													
At OLD WORCESTER ROAD			1 Ramps													
346.1	Concrete	Good	Yes	No	60	2.4	64	60	7.8	0	0	0	0	0	0	Curbing
OLD CONNECTICUT PATH			***8 Ramps***													
At BROWNLEA ROAD			1 Ramps													
210.4	Concrete	Fair	No	No	77	0.7	82	50	2.2	50	60	50	7.7	50	60	None
At CHAPPELLWOOD ROAD			1 Ramps													
205.1	Concrete	Good	No	No	48	3.1	96	100	7.6	55	60	100	3.9	58	60	None
At HAMILTON STREET			1 Ramps													
208.2	Concrete	Fair	No	No	49	2.7	126	117	0.7	117	60	59	2.7	59	60	None
At LAKE ROAD			1 Ramps													
202.1	Concrete	Good	No	No	60	2.8	60	65	4.7	65	54	64	3.1	65	60	None
At LOVERING AVENUE			2 Ramps													
207.4	Concrete	Fair	No	No	53	3	80	72	5.8	65	62	76	1.9	76	57	None
207.5	Concrete	Fair	No	No	50	1.1	87	86	5.8	93	60	80	3.5	72	60	None
At PINECREST ROAD			1 Ramps													
207.3	Concrete	Fair	No	No	70	4.3	70	55	3	65	62	68	2.7	68	44	None
At SAXONY TERRACE			1 Ramps													
203.2	Concrete	Good	No	No	48	1.1	68	66	5.3	60	60	60	3.4	0	0	Curbing
WATER STREET			***1 Ramps***													
At LIBRARY ENTRANCE			1 Ramps													
119.3	Concrete	Good	Yes	Yes	70	1.1	60	60	5.2	60	60	60	4.5	60	60	None

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Intersections With Sidewalks and No Ramps - Summary

	Number of Potential Ramps	Estimated Cost
ANGELA ROAD	2	$7,000.00
ANGELICA DRIVE	10	$35,000.00
ARBETTER DRIVE	1	$3,500.00
BACON ROAD	2	$7,000.00
BADGER ROAD	1	$3,500.00
BALDWIN AVENUE	4	$14,000.00
BEACON STREET	3	$10,500.00
BELKNAP ROAD	1	$3,500.00
BELLWOOD ROAD	1	$3,500.00
BERKELEY ROAD	10	$35,000.00
BETHANY ROAD	1	$3,500.00
BLACKBERRY LANE	4	$14,000.00
BROOK STREET	1	$3,500.00
CENTRAL STREET	2	$7,000.00
CHURCH STREET	1	$3,500.00
CLEARVIEW DRIVE	1	$3,500.00
CROSBY DRIVE	4	$14,000.00
DANA ROAD	1	$3,500.00
DANIELS ROAD	1	$3,500.00
EATON ROAD	1	$3,500.00
EDGELL ROAD	3	$10,500.00
EISENHOWER ROAD	1	$3,500.00
FAIRBANKS ROAD	4	$14,000.00
GRATTAN STREET	2	$7,000.00
GRIFFIN ROAD	2	$7,000.00
GROVE STREET	1	$3,500.00
GRZYBOSKA CIRCLE	1	$3,500.00
HARRISON STREET	2	$7,000.00
HASTINGS STREET	1	$3,500.00
HEMENWAY ROAD	3	$10,500.00
HICKEY DRIVE	5	$17,500.00
JOANNE DRIVE	1	$3,500.00
KELLOGG STREET	2	$7,000.00
KNIGHT ROAD	3	$10,500.00
LANEWOOD AVENUE	6	$21,000.00
LAVELLE LANE	2	$7,000.00
LEDGEWOOD ROAD	7	$24,500.00
MARY AGNES ROAD	2	$7,000.00
MCCARTHY CIRCLE	1	$3,500.00
MILLWOOD STREET	2	$7,000.00
OLD CONNECTICUT PATH	6	$21,000.00
PARMENTER ROAD	1	$3,500.00
PLEASANT STREET	3	$10,500.00
POTTER ROAD	1	$3,500.00
ROYAL MEADOW LANE	1	$3,500.00
RUSSELL ROAD	1	$3,500.00
SALEM END ROAD	10	$35,000.00
SANDRA DRIVE	1	$3,500.00

	Number of Potential Ramps	Estimated Cost
SCHOOL STREET	19	$66,500.00
SUMMER STREET	2	$7,000.00
SUN VALLEY DRIVE	2	$7,000.00
VALLENCOURT DRIVE	6	$21,000.00
WATER STREET	1	$3,500.00
WAVENEY ROAD	1	$3,500.00
WESTGATE ROAD	4	$14,000.00
WILLOW BROOK DRIVE	4	$14,000.00
WINTER STREET	9	$31,500.00
WOODMERE ROAD	4	$14,000.00
Total:	179	Total: $626,500.00

City of Framingham, Massachusetts

Curb Ramp Inventory & Assessment

Intersections With Sidewalks and No Ramps

		Number of Potential Ramps	Cost ($3,500 ea.)
ANGELA ROAD	**1 Locations**		
At ELM STREET			
172		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
ANGELICA DRIVE	**5 Locations**		
At ALAN STREET			
63		2	$7,000.00
At CURRIER DRIVE			
64		2	$7,000.00
At LANEWOOD AVENUE			
60		2	$7,000.00
At STANLEY DRIVE			
62		2	$7,000.00
At WAVENEY WAY			
61		2	$7,000.00
		Estimated Street Total Cost:	**$35,000.00**
ARBETTER DRIVE	**1 Locations**		
At SLOANE DRIVE			
145		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BACON ROAD	**1 Locations**		
At MONTGOMERY DRIVE			
122		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
BADGER ROAD	**1 Locations**		
At LOUIS W. FARLEY DRIVE			
389		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BALDWIN AVENUE	**2 Locations**		
At KAREN ROAD			
137		2	$7,000.00
At NOB HILL ROAD			
138		2	$7,000.00
		Estimated Street Total Cost:	**$14,000.00**
BEACON STREET	**2 Locations**		

		Number of Potential Ramps	Cost ($3,500 ea.)
At CHUBB ROAD			
278		1	$3,500.00
At RIDGEFIELD ROAD			
282		2	$7,000.00
		Estimated Street Total Cost:	**$10,500.00**
BELKNAP ROAD	**1 Locations**		
At WOODMERE ROAD			
32		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BELLWOOD ROAD	**1 Locations**		
At CLEARVIEW DRIVE			
39		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BERKELEY ROAD	**2 Locations**		
At JOANNE DRIVE			
34		4	$14,000.00
At WOODMERE ROAD			
33		6	$21,000.00
		Estimated Street Total Cost:	**$35,000.00**
BETHANY ROAD	**1 Locations**		
At BARBIERI ROAD			
552		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
BLACKBERRY LANE	**4 Locations**		
At BANCROFT CIRCLE			
16		1	$3,500.00
At BIRCHMEADOW CIRCLE			
17		1	$3,500.00
At BLUEBERRY CIRCLE			
18		1	$3,500.00
At GROVE STREET			
19		1	$3,500.00
		Estimated Street Total Cost:	**$14,000.00**
BROOK STREET	**1 Locations**		
At BROOKVALE ROAD			
91		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
CENTRAL STREET	**1 Locations**		
At HIGHGATE ROAD			

	Number of Potential Ramps	Cost ($3,500 ea.)
305	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**
CHURCH STREET **1 Locations**		
At STATE STREET		
382	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
CLEARVIEW DRIVE **1 Locations**		
At BERKELEY ROAD		
38	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
CROSBY DRIVE **1 Locations**		
At CAVATORTA DRIVE		
337	4	$14,000.00
	Estimated Street Total Cost:	**$14,000.00**
DANA ROAD **1 Locations**		
At LOCKLAND AVENUE		
292	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
DANIELS ROAD **1 Locations**		
At SLOANE DRIVE		
151	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
EATON ROAD **1 Locations**		
At MARY AGNES ROAD		
158	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
EDGELL ROAD **2 Locations**		
At BAYBERRY LANE		
127	1	$3,500.00
At BELKNAP ROAD		
53	2	$7,000.00
	Estimated Street Total Cost:	**$10,500.00**
EISENHOWER ROAD **1 Locations**		
At CATHERINE ROAD		
155	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
FAIRBANKS ROAD **1 Locations**		
At COCHITUATE ROAD		

		Number of Potential Ramps	Cost ($3,500 ea.)
294		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
GRATTAN STREET	**1 Locations**		
At CAVATORTA DRIVE			
336		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
GRIFFIN ROAD	**2 Locations**		
At ELMFIELD ROAD			
179		1	$3,500.00
At TEMI ROAD			
180		1	$3,500.00
		Estimated Street Total Cost:	**$7,000.00**
GROVE STREET	**1 Locations**		
At LAVELLE LANE			
20		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
GRZYBOSKA CIRCLE	**1 Locations**		
At GRZYBOSKA CIRCLE			
369		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
HARRISON STREET	**1 Locations**		
At DYER STREET			
519		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
HASTINGS STREET	**1 Locations**		
At PITT ROAD			
263		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
HEMENWAY ROAD	**2 Locations**		
At COLONIAL DRIVE			
153		1	$3,500.00
At WHITTEMORE ROAD			
139		2	$7,000.00
		Estimated Street Total Cost:	**$10,500.00**
HICKEY DRIVE	**2 Locations**		
At PLEASANT STREET			
29		1	$3,500.00
At VALLENCOURT DRIVE			

		Number of Potential Ramps	Cost ($3,500 ea.)
25		4	$14,000.00
		Estimated Street Total Cost:	**$17,500.00**
JOANNE DRIVE	**1 Locations**		
At WOODMERE ROAD			
35		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
KELLOGG STREET	**1 Locations**		
At PROSPECT STREET			
308		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
KNIGHT ROAD	**2 Locations**		
At BELKNAP ROAD			
42		2	$7,000.00
At BELLWOOD WAY			
43		1	$3,500.00
		Estimated Street Total Cost:	**$10,500.00**
LANEWOOD AVENUE	**3 Locations**		
At ALAN STREET			
68		2	$7,000.00
At ROLLING DRIVE			
67		2	$7,000.00
At STANLEY DRIVE			
69		2	$7,000.00
		Estimated Street Total Cost:	**$21,000.00**
LAVELLE LANE	**1 Locations**		
At SURRO DRIVE			
21		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
LEDGEWOOD ROAD	**3 Locations**		
At BRIDLE PATH CIRCLE			
72		2	$7,000.00
At CURRIER DRIVE			
70		1	$3,500.00
At ROLLING DRIVE			
71		4	$14,000.00
		Estimated Street Total Cost:	**$24,500.00**
MARY AGNES ROAD	**1 Locations**		
At CATHERINE ROAD			

	Number of Potential Ramps	Cost ($3,500 ea.)
156	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**

MCCARTHY CIRCLE — 1 Locations

At SALEM END ROAD		
394	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

MILLWOOD STREET — 1 Locations

At BLACKBERRY LANE		
15	2	$7,000.00
	Estimated Street Total Cost:	**$7,000.00**

OLD CONNECTICUT PATH — 3 Locations

At GREENLEAF CIRCLE		
226	4	$14,000.00
At OLD CONNECTICUT PATH		
225	1	$3,500.00
At ROYCE ROAD #2		
257	1	$3,500.00
	Estimated Street Total Cost:	**$21,000.00**

PARMENTER ROAD — 1 Locations

At DARTMOUTH DRIVE		
2	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

PLEASANT STREET — 2 Locations

At ASPEN CIRCLE		
330	1	$3,500.00
At CHURCH GREEN		
326	2	$7,000.00
	Estimated Street Total Cost:	**$10,500.00**

POTTER ROAD — 1 Locations

At LARNIS ROAD		
178	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

ROYAL MEADOW LANE — 1 Locations

At PLEASANT STREET		
28	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**

RUSSELL ROAD — 1 Locations

At SALEM END ROAD		

	Number of Potential Ramps	Cost ($3,500 ea.)
372	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
SALEM END ROAD **8 Locations**		
At ADAMS ROAD		
376	2	$7,000.00
At GRZYBOSKA CIRCLE		
363	1	$3,500.00
364	1	$3,500.00
At LANTERN ROAD		
390	1	$3,500.00
At LINWOOD ROAD		
393	1	$3,500.00
At SALEM END WAY		
371	1	$3,500.00
At STALKER LANE		
392	1	$3,500.00
At TEMPLE STREET		
367	2	$7,000.00
	Estimated Street Total Cost:	**$35,000.00**
SANDRA DRIVE **1 Locations**		
At SLOANE DRIVE		
150	1	$3,500.00
	Estimated Street Total Cost:	**$3,500.00**
SCHOOL STREET **7 Locations**		
At COLBY AVENUE		
212	2	$7,000.00
At COTTAGE STREET		
216	4	$14,000.00
At FENTON STREET		
214	1	$3,500.00
At FENWOOD STREET		
213	2	$7,000.00
At MEADOW STREET		
215	2	$7,000.00
At NORTH STREET		
217	4	$14,000.00
At PARKING LOT		
218	4	$14,000.00
	Estimated Street Total Cost:	**$66,500.00**

		Number of Potential Ramps	Cost ($3,500 ea.)
SUMMER STREET	**1 Locations**		
At HIGHGATE ROAD			
304		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
SUN VALLEY DRIVE	**1 Locations**		
At SUN DIAL PLACE			
332		2	$7,000.00
		Estimated Street Total Cost:	**$7,000.00**
VALLENCOURT DRIVE	**2 Locations**		
At FORD LANE			
26		4	$14,000.00
At PLEASANT STREET			
24		2	$7,000.00
		Estimated Street Total Cost:	**$21,000.00**
WATER STREET	**1 Locations**		
At RINER STREET			
112		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
WAVENEY ROAD	**1 Locations**		
At WAVENEY WAY			
58		1	$3,500.00
		Estimated Street Total Cost:	**$3,500.00**
WESTGATE ROAD	**1 Locations**		
At OLD WOOD ROAD			
345		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
WILLOW BROOK DRIVE	**3 Locations**		
At FOOTHILL ROAD			
395		2	$7,000.00
At PARKER ROAD			
396		1	$3,500.00
At SALEM END ROAD			
391		1	$3,500.00
		Estimated Street Total Cost:	**$14,000.00**
WINTER STREET	**5 Locations**		
At CREST ROAD			
397		4	$14,000.00
398		2	$7,000.00

		Number of Potential Ramps	Cost ($3,500 ea.)
At	RUSSELL ROAD EXTENSION		
385		1	$3,500.00
At	WINTER LANE		
383		1	$3,500.00
At	WINTER TERRACE		
384		1	$3,500.00
		Estimated Street Total Cost:	**$31,500.00**

WOODMERE ROAD 1 Locations

At	DOYLE CIRCLE		
36		4	$14,000.00
		Estimated Street Total Cost:	**$14,000.00**
		Total Estimated Cost:	**$626,500.00**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 1

(1) **PROJECT NAME:** Roadway Improvements FY24
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This funding provides ongoing roadway, curb, sidewalk and related infrastructure rehabilitation and improvements necessary to retain an overall State of Good Repair citywide, as well as safety and accessibility improvements. The majority of this work provides roadway resurfacing such as mill and overlay, stress absorbing membrane interlayer, bonded wearing course, rubber chip seal, mill and fill and crack sealing. Without substantial and appropriate ongoing roadway work, this infrastructure deteriorates rapidly, costs more to raise back up to a State of Good Repair, and increases the annual needs and costs for roadway maintenance, including emergency and other corrective repairs.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	8,500,000	8,500,000	8,500,000	8,500,000	8,500,000	
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	8,500,000	8,500,000	8,500,000	8,500,000	8,500,000	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel	25,000						
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**
1) **Bond**
2) **Grants**
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**
See background material

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

Various Road and Sidewalk Improvements FY2024

Request Amount: $5,500,000

This program provides funding for the roadway resurfacing and roadway surface treatment improvements on of the City's arterial and secondary road segments, including pavement, curbing, sidewalks, drainage, signage and pavement markings. Public Works is responsible for the maintenance of the City of Framingham's roadway network and management of the Roadway Capital Improvement Program.

The roadway network is a critical piece of the City's infrastructure, requiring considerable maintenance, as identified and prioritized according to the City's Road Surface Rating (RSR) reported in the Pavement Management Program. Roadways are identified for rehabilitation based on traffic volume, repair costs, repair life expectancy and road condition, and are selected based on their benefit to the City.

This list is for planning purposes in conjunction with other utilities including water and sewer, gas, communications, drainage, and private development, all of which impact the Department's ability to perform work. Other locations may be identified requiring prioritization under this appropriation. Funding also incorporates Mill and Fill operations at various locations as part of the pavement management planning for the road program.

The following roadwork is tentatively scheduled for the upcoming fiscal year:

Surface Treatment: Bonded Wearing Course (NovaChip)

Elm Street, Concord Street to the Sudbury Townline
Pavement and ADA Compliant Curb Cut Improvements

According to the City's Pavement Management Program, Elm Street has an RSR of 58.21 with 80% of the roadway requiring repair. Additionally, the City's Curb Ramp & Sidewalk Inventory & Assessment and Preliminary Compliance Report lists several missing and/or non-compliant curb cuts along Elm Street. The DPW Preliminary Prioritization plan for ADA Compliance focuses on walking routes within one (1) mile of schools as transportation is not provided to students who live within 1 mile of their assigned school in accordance with the Framingham Public School (FPS) transportation policy. Both the Stapleton Elementary School at 25 Elm Street and the Cameron Middle School at 215 Elm Street are within one mile of Elm Street so this location ranks as high priority. The Disability Commission also considers Elm Street high on their list of priorities. Furthermore, accessibility improvements will provide connectivity to access shopping, open spaces, places of worship, and access to MWRTA bus routes.

The DPW Highway Division applied for a Municipal ADA Improvement Grant submitted to the Massachusetts Office on Disability (MOD) in September 2022.



Elm Street

Roadway Rehabilitation

<u>Frost Street from Edgell Road to Brook Street</u>
Pavement improvements, ADA compliant sidewalks and curb ramps and new dedicated bicycle lanes

According to the City's Pavement Management Program, Frost Street has an RSR of 46.36. Additionally, the City's Curb Ramp & Sidewalk Inventory & Assessment and Preliminary Compliance Report lists the sidewalks along Frost Drive in Fair to Poor Condition with several missing and/or non-compliant curb cuts. The DPW Preliminary Prioritization plan for ADA Compliance focuses on walking routes within one (1) mile of schools as transportation is not provided to students who live within 1 mile of their assigned school in accordance with the Framingham Public School (FPS) transportation policy. Both the Dunning Elementary School at 48 Frost Street and the Walsh Middle School at 301 Brook Street are within one mile of the Frost Street sidewalks so this location ranks as high priority. The Disability Commission also considers Frost Street high on their list of priorities. Furthermore, sidewalk improvements will provide connectivity to access open spaces, places of worship, and access to MWRTA bus routes. Frost Street lies within a 2020 block group in Framingham that is characterized as an Environmental Justice (EJ) population with the criteria: Minority.



Frost Roadway



Frost Sidewalk



Frost Street missing Curb Cuts.

Linda Avenue Wickford Road Intersection
Pavement improvements

According to the City's Pavement Management Program, the Linda Avenue/Wickford Road Intersection has an RSR of 33.00. The pavement here has deteriorated significantly and shows evidence of rutting, raveling, transverse cracking, alligator cracking and potholes. The DPW pothole and pavement crews frequently respond to calls at this intersection to address the roadway condition and provide temporary fixes. The Linda Avenue/Wickford Road intersection lies within a 2020 block group in Framingham that is characterized as an EJ population with the criteria: Minority.



LindaAvenue/Wickford Road Intersection

<u>Edmands Road, Garvey Road east to Edgell Road</u>
Pavement improvements

According to the City's Pavement Management Program, this section of Edmands Road has an RSR of 53.00. The pavement here has deteriorated over time. Extensive utility work has also left the roadway with several trench patches. The rehabilitation of Edmands Road began in FY23. This work will complete the entire length of Edmands Road from the Southborough Town Line to the Nobscot Intersection. DPW crews frequently respond to Edmands Road to address the roadway condition and provide temporary fixes such as pothole repairs. This section of Edmands Road lies within a 2020 block group in Framingham that is characterized as an EJ population with the criteria: Minority.



Edmands Road



Edmands Road

<u>Fountain Street from Winter Street to Ashland Townline</u>
Pavement improvements, ADA compliant sidewalks and curb ramps.

According to the City's Pavement Management Program, Fountain Street has an RSR of 51. Additionally, the City's Curb Ramp & Sidewalk Inventory & Assessment and Preliminary Compliance Report lists the sidewalks along this section of Fountain Street Drive in Poor Condition with missing and/or non-compliant curb cuts. The DPW Preliminary Prioritization plan for ADA Compliance focuses on walking routes within one (1) mile of schools. Keefe Regional Technical School is located at 750 Winter Street and the Barbieri Elementary School located at 100 Dudley Road are within one mile of the Fountain Street sidewalks so this location ranks as high priority. Fountain Street lies within a 2020 block group in Framingham that is characterized as an EJ population with the criteria: Minority.



Fountain Street

Surface Treatment: Rubber Chip Seal

<u>Pinefield Area</u>
Pavement and ADA Compliant Curb Cut Improvements

Alfred Road (RSR 51)
Ashmont Drive (RSR 47)
Bradford Road (RSR 36)
Clara Road (RSR 37)
Costa Circle (RSR 5)
Craig Road (RSR 35)
Doris Road (RSR 18)
Edith Road (RSR 42)
Francine Road (RSR 35)
Horrigan Drive (RSR 22)
Joseph Road (RSR 40)
Little Farms Road (RSR 60)

Lowe Circle (RSR 28)
Mark Road (RSR 45)
Michael Road (RSR 17)
Nadine Road (RSR 42)
Oakwood Court (RSR 62)
Pinewood Drive (RSR 34)
Sheffield Road (RSR 45)
Swanson Road (RSR 23)
Tartufi Circle (RSR 43)
Temi Road (RSR 51)
Turner Road (RSR 48)



Michael Road

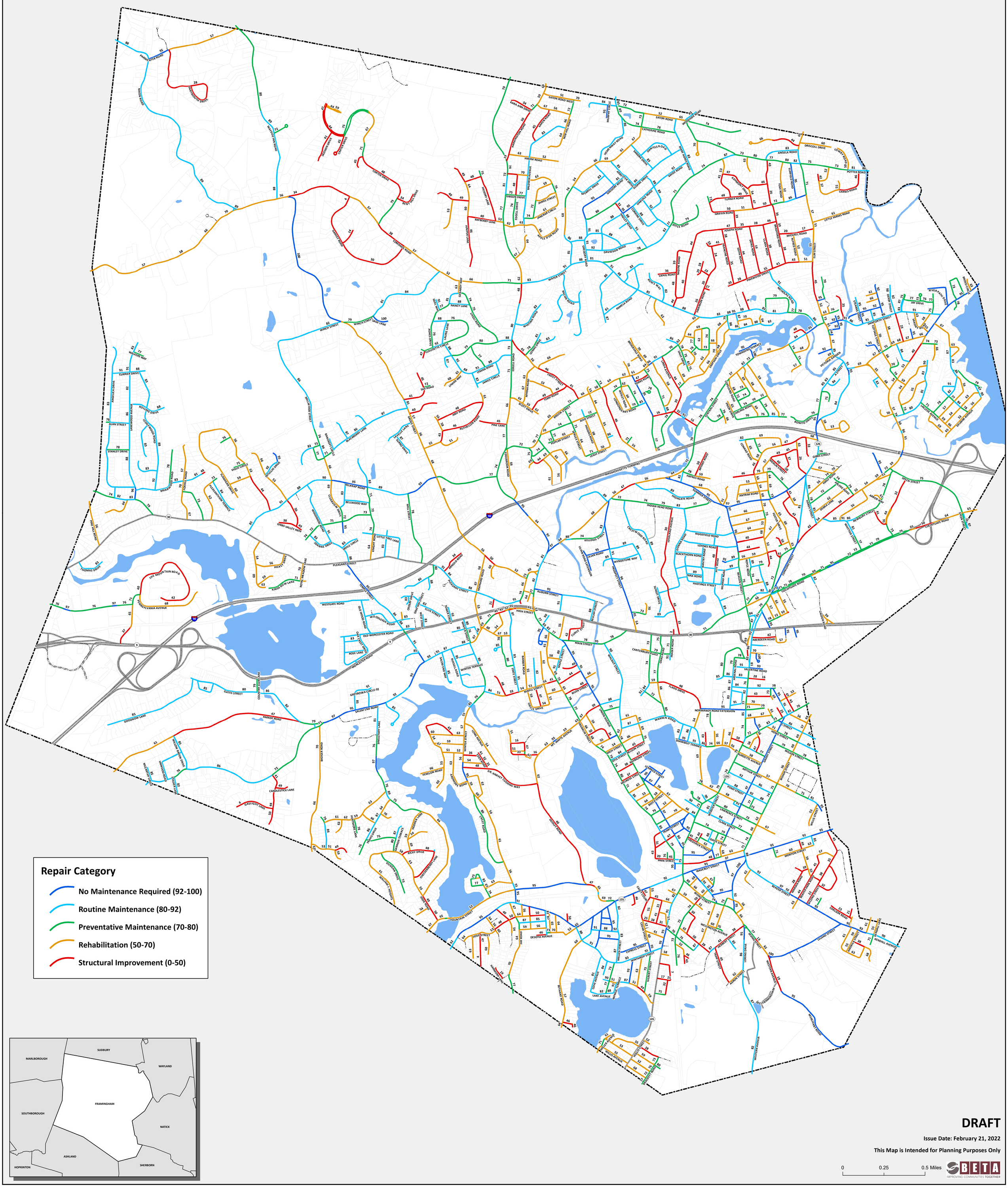


Pinewood Drive

Framingham, Massachusetts

Pavement Management Program

Road Surface Ratings & Repair Categories



Repair Category

- No Maintenance Required (92-100)
- Routine Maintenance (80-92)
- Preventative Maintenance (70-80)
- Rehabilitation (50-70)
- Structural Improvement (0-50)

DRAFT

Issue Date: February 21, 2022

This Map is Intended for Planning Purposes Only

0 0.25 0.5 Miles

BETA
IMPROVING COMMUNITIES TOGETHER

Framingham, MA

City Accepted: Roadway Repair Backlog Summary

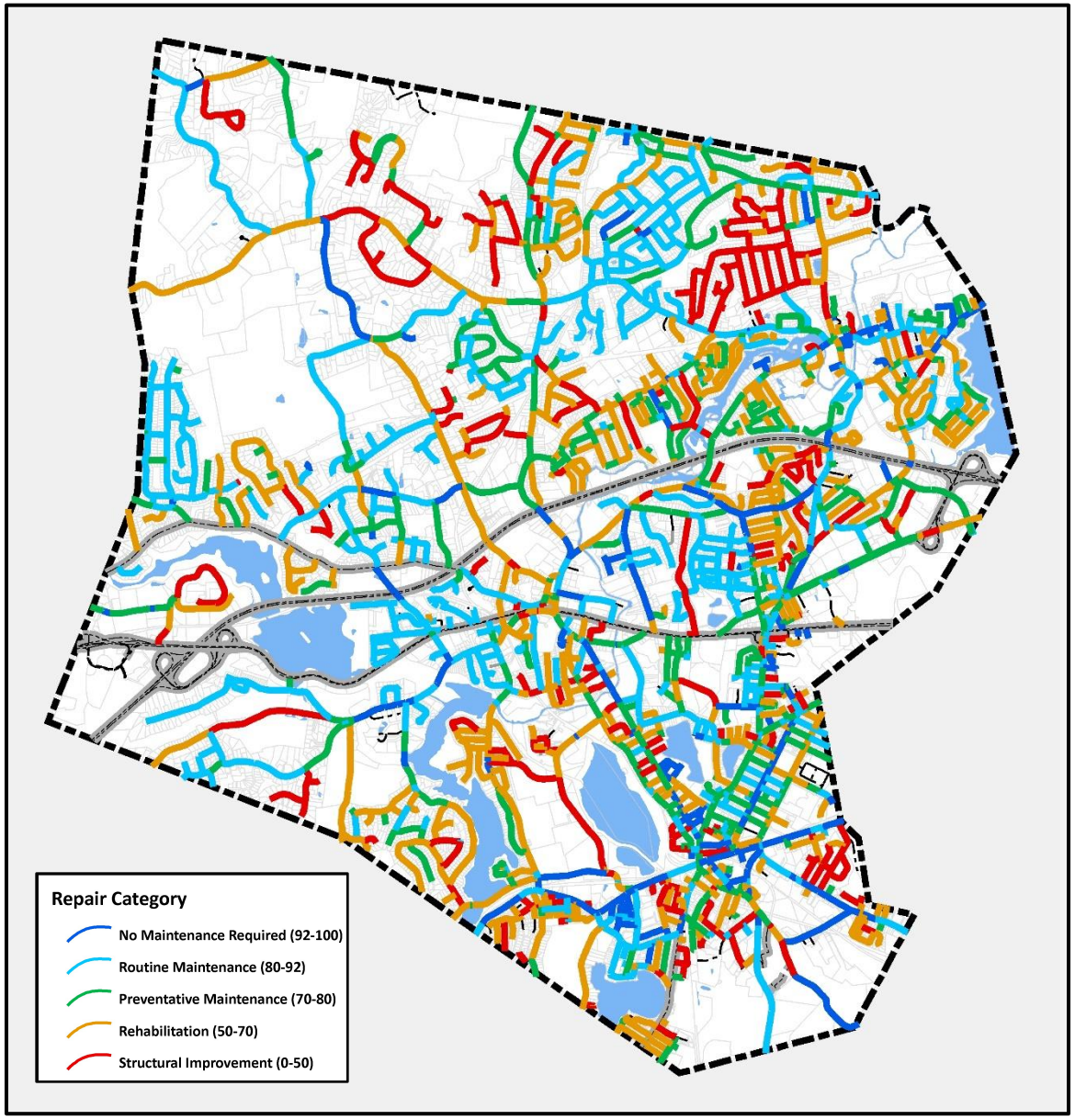
Repair Method	Length (Miles)	Square Yards	Percent Repair	Estimated Cost
Structural Improvement	35.75	583,660.69	15.92%	$52,529,462.16
Rehabilitation	65.91	1,064,617.50	29.36%	$31,938,524.99
Preventative Maintenance	43.16	722,911.86	19.22%	$10,048,474.80
Routine Maintenance	60.11	963,351.46	26.77%	$963,351.46
No Maintenance Required	19.58	338,679.40	8.72%	$0.00
Total:	**224.51**	**3,673,220.91**	**100.00%**	**$95,479,813.41**

Average RSR By Segment:	**69.35**

RSR - Road Surface Rating (0-100)

Please Note: Unit pricing accounts for curb to curb improvements only; Does not include any drainage, sidewalk, ADA, gravel subbase or utility improvements.

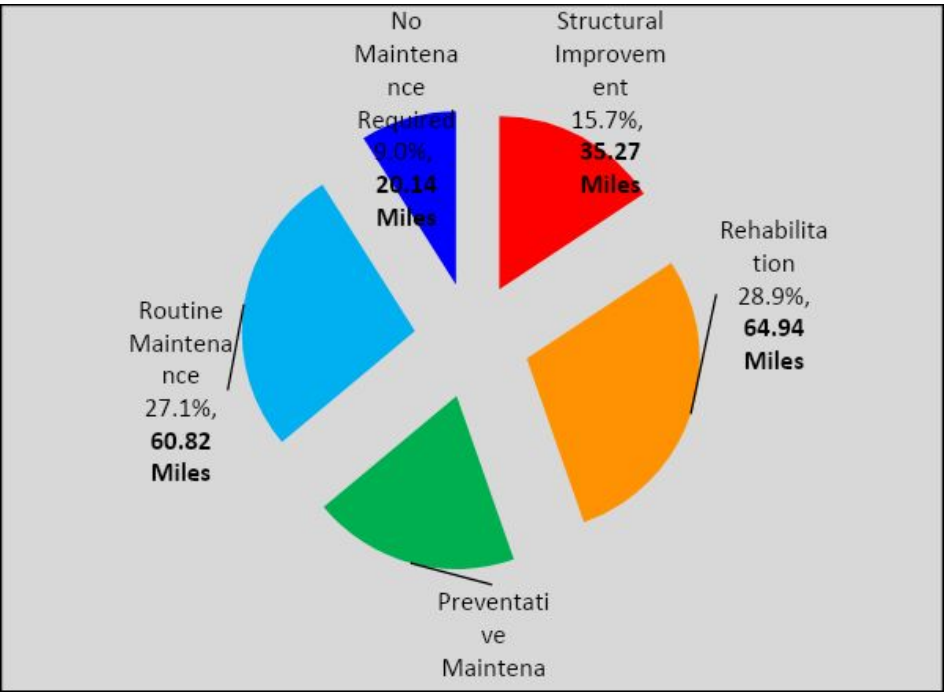
Pavement Condition Map



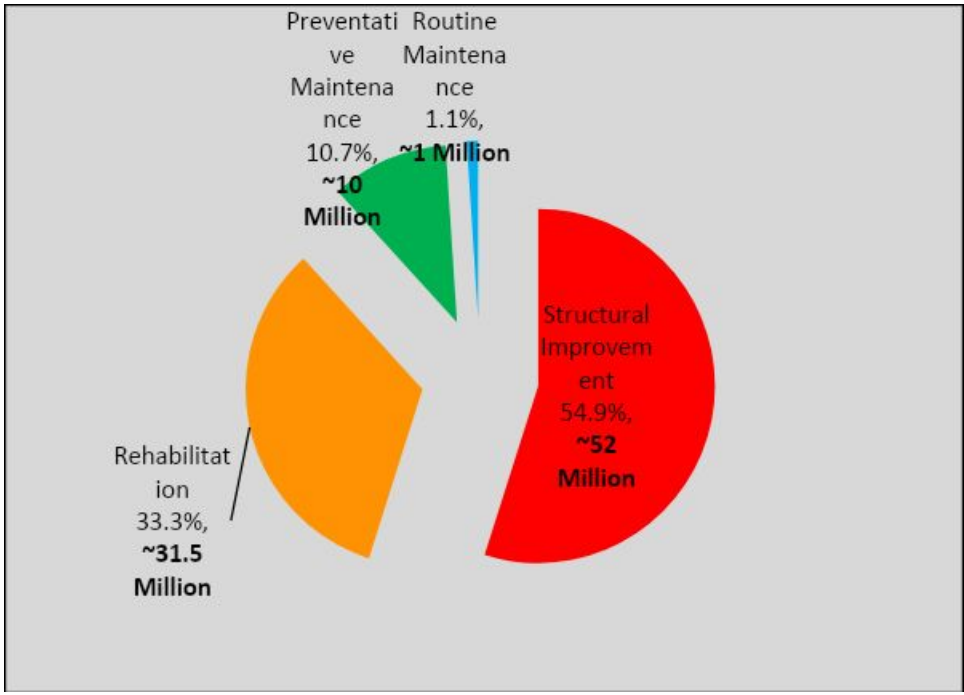
The Department prioritizes maintenance on roads with a roadway surface rating (RSR) of 50-80 (pictured in orange and green)

The Pavement Condition Map was most recently updated in February 2022 and is continually updated when roadway maintenance is performed.

Outstanding Work



Miles of Outstanding Work

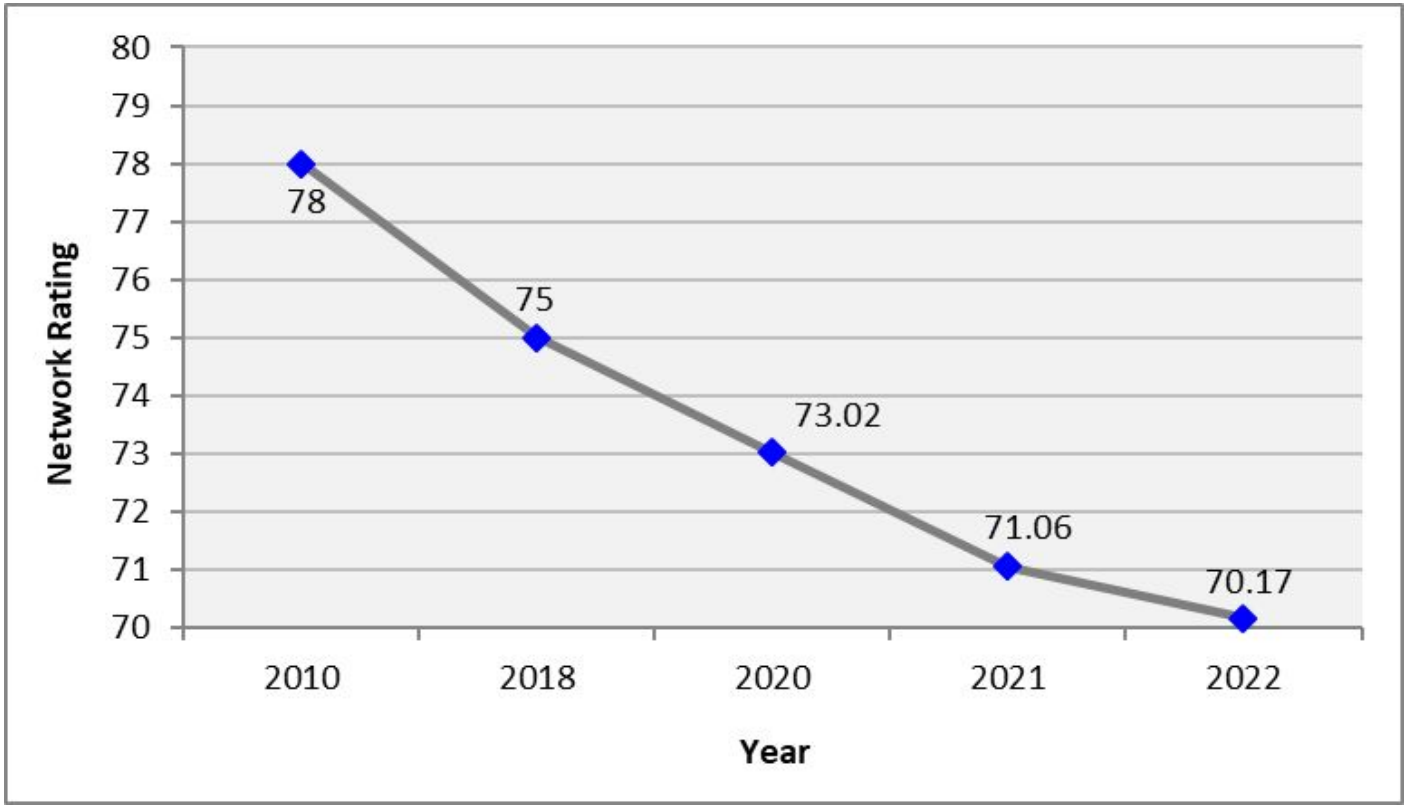


Dollars of Outstanding Work

While only approximately 16% of the City's roads are in need of structural improvement repair, they account for 55% of the outstanding backlog of work in terms of dollars.

Structural Improvement is the most expensive category of street repair. It should also be noted that approximately 46.5% of the City's road miles are in need of preservation treatments. It makes good fiscal sense to spend the relatively limited funds required to extend the lives of a large quantity of street in need of maintenance.

Network Rating Over Time



10 Year Forecast

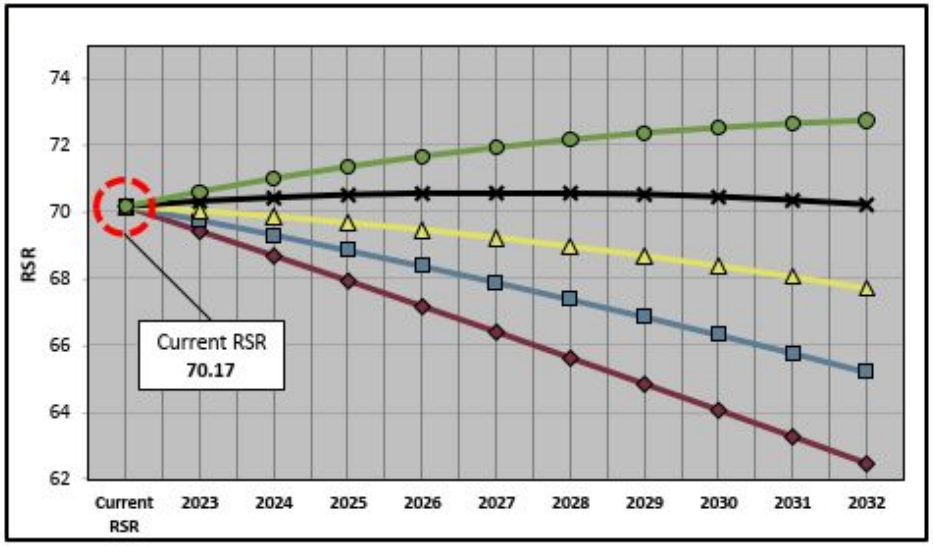
Roadway Forecast Model
Framingham, MA

ManageMyRoads by BETA

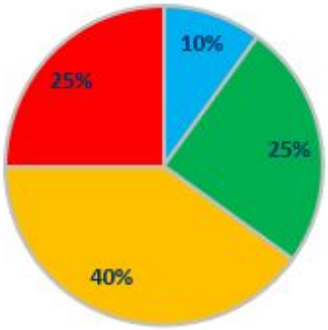
Community Profile

Road Miles = 224.51

Est. Backlog = $94,500,000



Funding Distribution by Repair Type



Routine Maintenance
Preventative Maintenance
Rehabilitation
Structural Improvement

Annual Funding Scenarios

*Scenario 1**	$1,828,602
Scenario 2	$4,000,000
Scenario 3	$6,000,000
Scenario 4	$8,000,000
Scenario 5	$10,000,000

Approximate FY22 Ch. 90 Allotment

**Please Note: Unit pricing accounts for curb to cub improvements only; does not include drainage, sidewalk, ADA, gravel sub-base or utility improvements.*

***Model Accounts for 3% Annual Inflation*

Community Type: U

2/21/2022

BETA

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 19

(1) **PROJECT NAME:** Rt 126/135 & Railroads Intersection Improvements – Preliminary Design FY24

PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The intersection of Routes 126 and 135 and the MBTA and CSX railroad is a source of significant congestion. After being studied for over a century, the State's Long Range Transportation Plan includes this construction project (MassDOT Project No. 606109) to depress Route 135 under Route 126, with an estimated construction cost of $115 million. This project would initiate design activities through the investigation of public and private utility conflicts, preliminary highway and bridge design, evaluation of right-of-way impacts and coordination with the MBTA and private utility companies.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

x	Replace existing infrastructure
x	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
x	New infrastructure
	New capital asset
	New vehicle
	New equipment
x	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility	500,000					
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	500,000	-	-	-	-	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:** **Concord St. at Waverly St.**

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM

DEPARTMENT OF PUBLIC WORKS | ADMINISTRATION

DPW ADMINISTRATION & ENGINEERING BUILDING
110 Western Avenue
Framingham, MA 01702

508-532-5600
dpwgeneral@framinghamma.gov
www.framinghamma.gov

MEMORANDUM

DATE: October 15, 2022

TO: Louise Miller, Chief Financial Officer

FROM: William Sedewitz, Chief Engineer

RE: **FY24 Capital Request – Routes 126/135 & Railroad Intersection Improvements – Concept Design**

The Commonwealth's Long-Range Transportation Plan includes the above referenced project to address significant congestion in this location. The estimated construction cost is $115,000,000.00. Framingham would be responsible for funding the design, permitting, and necessary right of way acquisitions. To continue advancement of the project, funding is necessary for utility conflict identification and relocation design, furthering traffic assessments and the transportation design, environmental reviews, public outreach, and right of way acquisitions.

Cc: Robert Lewis | DPW Director

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 16

(1) **PROJECT NAME:** Saxonville Intersection Improvements - Construct FY24
PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

This is for final design and construction of improvements to intersection of Central St, Elm St, & Concord St., including pedestrian access, road and sidewalk improvements, accessibility, parking, and aesthetic upgrades. Improvements are based on a need to improve the safety of this intersection for pedestrians and vehicles, as well as rejuvenate the surrounding commercial area.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

Recommend moving from FY25 to FY24

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
X	New infrastructure
X	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	4,150,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	4,150,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

Saxonville

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

CONSTRUCTION COST ESTIMATE
85% DESIGN SUBMISSION

SAXONVILLE IMPROVEMENTS PROJECT
Proposed Roadway Improvements
To Central Street and Concord Street

Green Project File No. 20034



Prepared for

City of Framingham Department of Public Works

October 2021

Prepared by

GREEN INTERNATIONAL AFFILIATES, INC.
Civil and Structural Engineers

Saxonville Intersection Improvements Project
Framingham MA
City of Framingham -
ENGINEER'S ESTIMATE - 85% Design

Prepared by:
GREEN INTERNATIONAL AFFILIATES, INC.
Civil and Structural Engineers

Date: 10/19/2021

Green Project No: 20034

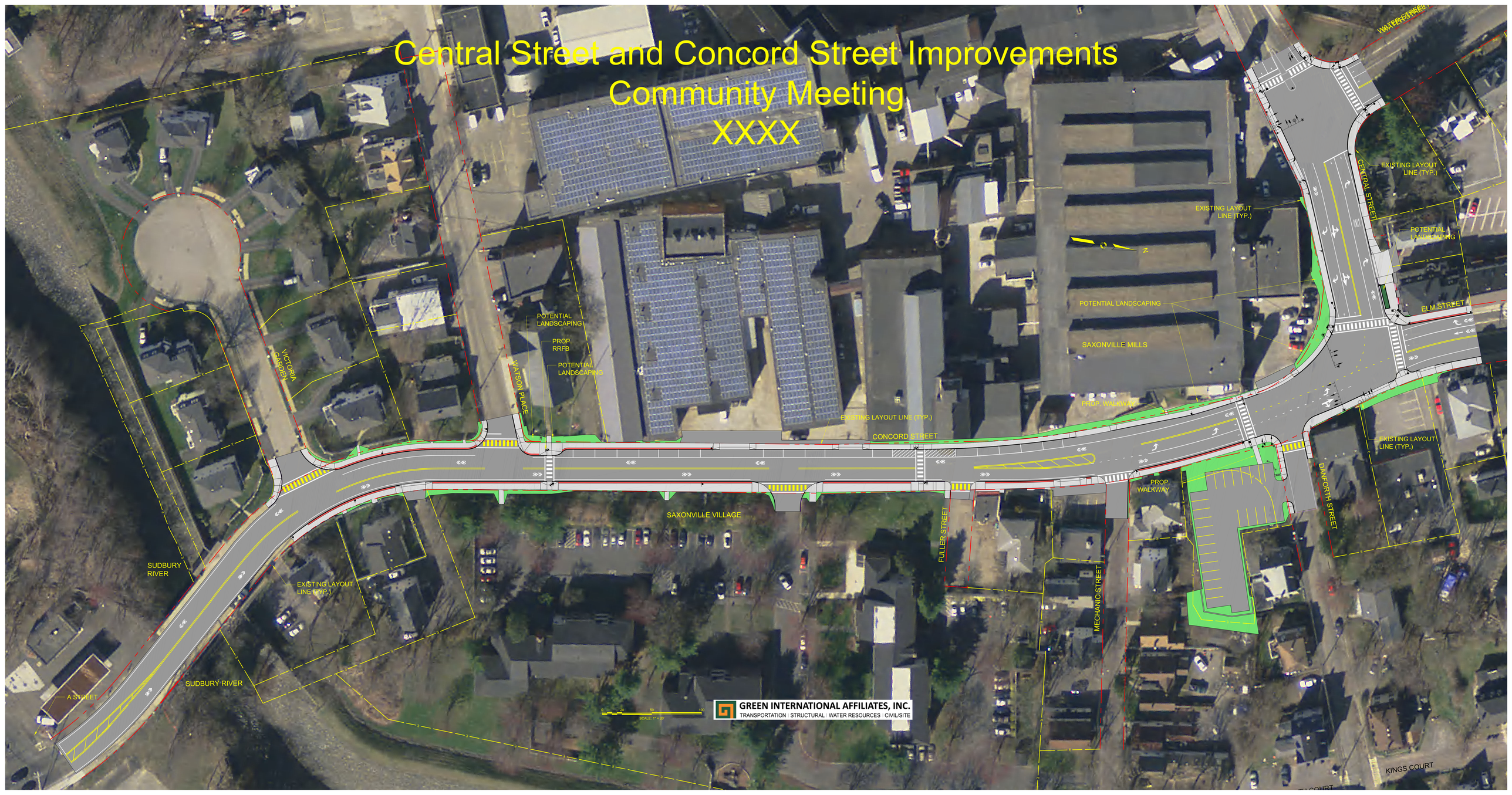
ITEM NO.	QUANTITY	UNIT	ITEM DESCRIPTION	UNIT PRICE	AMOUNT
102.511	1	EA	TREE PROTECTION - ARMORING & PRUNING	$375.00	$375.00
120.1	5600	CY	UNCLASSIFIED EXCAVATION	$36.00	$201,600.00
141.1	100	CY	TEST PIT FOR EXPLORATION	$115.00	$11,500.00
142.	30	CY	CLASS B TRENCH EXCAVATION	$35.00	$1,050.00
144.	60	CY	CLASS B ROCK EXCAVATION	$150.00	$9,000.00
146.	25	EA	DRAINAGE STRUCTURE REMOVED	$725.00	$18,125.00
151.	4000	CY	GRAVEL BORROW	$45.00	$180,000.00
153.	25	CY	CONTROLLED DENSITY FILL - EXCAVATABLE	$175.00	$4,375.00
156.	600	TON	CRUSHED STONE	$50.00	$30,000.00
170.	10350	SY	FINE GRADING AND COMPACTING	$6.00	$62,100.00
180.4	10	CY	MONITORING/HANDLING AND STOCKPILING OF CONTAMINATED SOILS	$1,000.00	$10,000.00
183.	1	DAY	DEWATERING	$1,500.00	$1,500.00
183.3	10	FT	ASBESTOS PIPE REMOVAL	$400.00	$4,000.00
183.5	20	CY	SOIL AND WASTE MANAGEMENT	$1,000.00	$20,000.00
201.	14	EA	CATCH BASIN (SINGLE GRATE CATCH BASIN)	$4,500.00	$63,000.00
202.	14	EA	MANHOLE (DRAIN MANHOLE)	$5,500.00	$77,000.00
202.5	1	EA	MANHOLE (5 FOOT DIAMETER)	$6,000.00	$6,000.00
202.6	1	EA	MANHOLE (6 FOOT DIAMETER)	$7,000.00	$7,000.00
202.7	2	EA	MANHOLE (7 FOOT DIAMETER)	$10,000.00	$20,000.00
202.8	1	EA	MANHOLE WITH DEEP SUMP	$6,500.00	$6,500.00
204.	2	EA	GUTTER INLET (DIRECT INLET CATCH BASIN)	$3,500.00	$7,000.00
220.	35	EA	DRAINAGE STRUCTURE ADJUSTED (RAISING CASTINGS)	$450.00	$15,750.00
220.7	20	EA	SANITARY STRUCTURE ADJUSTED	$450.00	$9,000.00
222.3	45	EA	FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD	$950.00	$42,750.00
223.1	25	EA	FRAME AND GRATE (OR COVER) REMOVED AND STACKED	$150.00	$3,750.00
224.12	15	EA	12 INCH HOOD	$550.00	$8,250.00
227.3	17	CY	REMOVAL OF DRAINAGE STRUCTURE SEDIMENT	$250.00	$4,250.00
227.4	10	SF	MASONRY PLUG	$125.00	$1,250.00
238.12	320	FT	12 INCH DUCTILE IRON PIPE	$165.00	$52,800.00
241.12	750	FT	12 INCH REINFORCED CONCRETE PIPE	$110.00	$82,500.00
241.15	260	FT	15 INCH REINFORCED CONCRETE PIPE	$120.00	$31,200.00
244.12	150	FT	12 INCH REINFORCED CONCRETE PIPE CLASS V	$130.00	$19,500.00
357.12	4	EA	12 INCH GATE BOX	$500.00	$2,000.00
358.	38	EA	GATE BOX ADJUSTED	$250.00	$9,500.00
376.5	4	EA	HYDRANT - ADJUSTED	$1,800.00	$7,200.00
381.3	10	EA	SERVICE BOX ADJUSTED	$230.00	$2,300.00
415.3	2500	SY	PAVEMENT MICRO MILLING	$12.00	$30,000.00
440.	34000	LB	CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL	$0.40	$13,600.00
443.	76	MGL	WATER FOR ROADWAY DUST CONTROL	$70.00	$5,320.00
450.23	1500	TON	SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5)	$140.00	$210,000.00
450.32	2100	TON	SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)	$135.00	$283,500.00
451.	15	TON	HMA FOR PATCHING	$225.00	$3,375.00
452.	1400	GAL	ASPHALT EMULSION FOR TACK COAT	$8.50	$11,900.00
453.	5200	FT	HMA JOINT SEALANT	$1.50	$7,800.00
472.	260	TON	HOT MIX ASPHALT FOR MISCELLANEOUS WORK	$200.00	$52,000.00
504.	1950	FT	GRANITE CURB TYPE VA4 - STRAIGHT	$52.00	$101,400.00
504.1	300	FT	GRANITE CURB TYPE VA4 - CURVED	$60.00	$18,000.00
509.	300	FT	GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS - STRAIGHT	$55.00	$16,500.00
509.1	225	FT	GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS - CURVED	$65.00	$14,625.00
580.	225	FT	CURB REMOVED AND RESET	$30.00	$6,750.00
594.	2475	FT	CURB REMOVED AND DISCARDED	$8.00	$19,800.00
670.	152	FT	FENCE REMOVED AND RESET	$75.00	$11,400.00
697.1	44	EA	SILT SACK	$200.00	$8,800.00
701.	1440	SY	CEMENT CONCRETE SIDEWALK	$65.00	$93,600.00
701.1	360	SY	CEMENT CONCRETE SIDEWALK AT DRIVEWAYS	$75.00	$27,000.00

701.2	420	SY	CEMENT CONCRETE PEDESTRIAN CURB WHEELCHAIR RAMP	$105.00	$44,100.00
702.	105	TON	HOT MIX ASPHALT SIDEWALK OR DRIVEWAY	$230.00	$24,150.00
706.01	135	SY	BRICK PAVER ACCENT STRIP	$300.00	$40,500.00
706.9	315	SY	TEXTURED DECORATIVE PAVEMENT CROSSWALK	$120.00	$37,800.00
710.4	15	EA	BOUND - PLAIN GRANITE	$650.00	$9,750.00
711.	15	EA	BOUND REMOVED AND RESET	$550.00	$8,250.00
748.	1	LS	MOBILIZATION	$122,000.00	$122,000.00
751.	135	CY	LOAM BORROW	$58.00	$7,830.00
756.	15	LS	NPDES STORMWATER POLLUTION PREVENTION PLAN	$6,000.00	$90,000.00
765.	915	SY	SEEDING	$2.00	$1,830.00
767.6	15	CY	AGED PINE BARK MULCH	$85.00	$1,275.00
772.037	15	EA	ARBORVITAE - DARK AMERICAN 6-7 FEET	$620.00	$9,300.00
775.431	15	EA	LOCUST - HONEY - 'SHADEMASTER' 2-2.5 INCH CALIPER	$800.00	$12,000.00
777.036	15	EA	OAK - NORTHERN RED 2-2.5 INCH CALIPER	$800.00	$12,000.00
778.027	15	EA	GINKGO - 'GOLD SPIRE' 2-2.5 INCH CALIPER	$800.00	$12,000.00
778.169	15	EA	BIRCH - RIVER 'HERITAGE' 2-2.5 INCH CALIPER	$850.00	$12,750.00
785.591	15	EA	HOLLY – 'SOFT TOUCH' 18-24 INCH CALIPER	$90.00	$1,350.00
785.637	15	EA	INKBERRY - 'SHAMROCK' 18-24 INCH	$90.00	$1,350.00
786.475	15	EA	JUNIPER - 'SEA GREEN' 2.5-3 FEET	$96.00	$1,440.00
789.741	30	EA	CHOKEBERRY-'LOWSCAPE MOUND'- 18-24 INCH SPREAD	$110.00	$3,300.00
791.321	15	EA	FOTHERGILLA - 'MOUNT AIRY' 3-4 FEET	$450.00	$6,750.00
793.055	15	EA	NINEBARK SHRUB - 'TINY WINE' 2-3 FEET	$110.00	$1,650.00
794.322	15	EA	SUMAC SHRUB – FRAGRANT 'GRO LOW' 18-24 INCH	$72.00	$1,080.00
794.741	45	EA	SUMMERSWEET SHRUB 'SUGARTINA' 18-24 INCH	$110.00	$4,950.00
794.815	15	EA	SWEETSPIRE-'MERLOT' 2-3 FEET	$110.00	$1,650.00
796.425	195	EA	DWARF FOUNTAIN GRASS - LITTLE BUNNY 1 GALLON	$26.00	$5,070.00
796.457	45	EA	SWITCH GRASS – 'HEAVY METAL' 1 GALLON	$38.00	$1,710.00
796.459	60	EA	SWITCH GRASS – 'SHENANDOAH' 1 GALLON	$38.00	$2,280.00
796.753	255	EA	DAYLILLY - 'HAPPY RETURNS' 1 GALLON	$26.00	$6,630.00
796.754	180	EA	DAYLILLY - 'PURPLE D-ORO' 1 GALLON	$26.00	$4,680.00
796.788	60	EA	LAVENDER - HIDCOTE 1 GALLON	$38.00	$2,280.00
804.3	5000	FT	3 INCH ELECTRICAL CONDUIT TYPE NM - PLASTIC -(UL)	$45.00	$225,000.00
811.27	39	EA	ELECTRIC HANDHOLE - (MUNICIPAL STANDARD)	$1,600.00	$62,400.00
811.28	4	EA	FIBER OPTIC HANDHOLE POLYMER CONCRETE WITH COVER	$1,600.00	$6,400.00
811.31	22	EA	PULL BOX 12 X 12 INCHES - SD2.031	$1,000.00	$22,000.00
812.16	39	EA	LIGHT STANDARD FOUNDATION - CONCRETE	$2,000.00	$78,000.00
813.8	1	LS	SERVICE CONNECTION (OVERHEAD)	$13,000.00	$13,000.00
815.11	2	EA	ELECTRONIC BLANK-OUT SIGN	$6,000.00	$12,000.00
816.01	1	LS	TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. 1	$175,000.00	$175,000.00
816.02	1	LS	TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. 2	$255,000.00	$255,000.00
816.8	1	LS	TRAFFIC CONTROL SIGNAL REMOVED AND STACKED	$12,000.00	$12,000.00
821.93	26	EA	ORNAMENTAL LIGHT POLE - POST TOP (MUNICIPAL STANDARD)	$7,500.00	$195,000.00
821.94	13	EA	ORNAMENTAL LIGHT POLE - POST TOP DOUBLE LUMINAIRE (MUNICIPAL STANDARD)	$8,500.00	$110,500.00
823.61	1	LS	HIGHWAY LIGHTING LOAD CENTER	$16,000.00	$16,000.00
823.913	52	EA	ORNAMENTAL POST TOP ACORN LUMINAIRE, 93 W LED (MUNICIPAL STANDARD)	$2,000.00	$104,000.00
824.221	3	EA	RECTANGULAR RAPID FLASHING BEACON (SOLAR POWERED)	$12,500.00	$37,500.00
824.222	1	EA	RECTANGULAR RAPID FLASHING BEACON (AC POWERED)	$12,500.00	$12,500.00
827.991	2	EA	SMALL GATEWAY SIGN	$4,000.00	$8,000.00
827.992	2	EA	LARGE GATEWAY SIGN	$7,500.00	$15,000.00
832.	140	SF	WARNING-REGULATORY AND ROUTE MARKER - ALUM. PANEL (TYPE A)	$14.00	$1,960.00
847.1	18	EA	SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL	$150.00	$2,700.00
851.1	270	DAY	TRAFFIC CONES FOR TRAFFIC MANAGEMENT	$100.00	$27,000.00
852.	325	SF	SAFETY SIGNING FOR TRAFFIC MANAGEMENT	$24.00	$7,800.00
853.1	4	EA	PORTABLE BREAKAWAY BARRICADE TYPE III	$150.00	$600.00
854.016	5500	FT	TEMPORARY PAVING MARKINGS - 6 INCH (PAINTED)	$0.50	$2,750.00
856.12	1600	DAY	PORTABLE CHANGEABLE MESSAGE SIGN	$25.00	$40,000.00
859.	13500	DAY	REFLECTORIZED DRUM	$0.25	$3,375.00
859.1	2700	DAY	REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS	$5.00	$13,500.00
860.106	450	FT	6 INCH REFLECTORIZED WHITE LINE (PAINTED)	$1.00	$450.00
861.106	550	FT	6 INCH REFLECTORIZED YELLOW LINE (PAINTED)	$1.00	$550.00
864.04	450	SF	PAVEMENT ARROWS AND LEGENDS REFL. WHITE (THERMOPLASTIC)	$8.50	$3,825.00
866.106	2800	FT	6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	$1.00	$2,800.00
866.112	2000	FT	12 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC)	$4.00	$8,000.00
867.106	2500	FT	6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	$1.00	$2,500.00
867.112	720	FT	12 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC)	$4.00	$2,880.00

868.12	1050	FT	12 INCH REFLECTORIZED WHITE LINE (EPOXY)	$2.00	$2,100.00
874.01	3	EA	STREET NAME SIGN - TOWN STANDARD	$125.00	$375.00
874.1	2	EA	STREET SIGN REMOVED AND RESET	$190.00	$380.00
874.4	12	EA	TRAFFIC SIGN REMOVED AND STACKED	$30.00	$360.00
875.	1	LS	PARKING KIOSK	$10,000.00	$10,000.00
999.001	5500	HR	POLICE DETAIL	$60.00	$330,000.00

SUBTOTAL:	$4,282,405.00
10% Contingency & Inflation:	$428,241.00
TOTAL:	$4,710,646.00

Central Street and Concord Street Improvements
Community Meeting
XXXX






LEFT
TURN
SIGNAL
CENTRAL ST
1-800-622-3333


SAXONVILLE INDUSTRIAL PARK
LEFT LANE MUST TURN LEFT
ONLY

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 17

(1) **PROJECT NAME:** School St Bridge Replacement - Design
PROJECT STATUS: Existing in Edmunds

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The School Street Bridge over Cochituate Brook is a reinforced concrete slab bridge that is almost 100 years old and at the end of its reliable life. Located just east of the signalized intersection of Concord and School Streets and the northern terminus of the Cochituate Rail Trail (CRT), the bridge is a key link in the City's transportation network. The existing structure is narrow, allowing for only two travel lanes, with no shoulders and one sidewalk. The proposed new bridge will enhance its structural integrity and avoid the potential for future weight restrictions for vehicles. The project will also provide shoulders and sidewalks on both sides connecting to the CRT, as well as 5-foot wide shoulders for bicycle accommodation along School Street and replacement of outdated (1920s) utilities in the area. The project will improve pedestrian mobility and safety by providing ADA/AAB compliant sidewalks along both sides of the street.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design	500,000					
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	500,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

School St and Concord St.

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8)	**PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
	Robert A. Lewis
(9)	**FINANCE DEPARTMENT NOTES:**

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
STRUCTURES INSPECTION FIELD REPORT
ROUTINE INSPECTION

2-DIST	B.I.N.	BR. DEPT. NO.
03	7PA	F-07-022

CITY/TOWN	8.-STRUCTURE NO.	11-Kilo. POINT	41-STATUS	90-ROUTINE INSP. DATE
FRAMINGHAM	F07022-7PA-MUN-BRI	000.000	P:POSTED	JUN 4, 2021

07-FACILITY CARRIED	MEMORIAL NAME/LOCAL NAME	27-YR BUILT	106-YR REBUILT	YR REHAB'D (NON 106)
ST126 SCHOOL ST		1850	1900	0000

06-FEATURES INTERSECTED	26-FUNCTIONAL CLASS	DIST. BRIDGE INSPECTION ENGINEER
WATER COCHITUATE BROOK	Urban Minor Arterial	M. Azizi

43-STRUCTURE TYPE	22-OWNER	21-MAINTAINER	TEAM LEADER D. Simkhovich
101 : Concrete Slab	Town Agency	Town Agency	

107-DECK TYPE	WEATHER	TEMP. (air)	TEAM MEMBERS
1 : Concrete Cast-in-Place	Cloudy	24°C	T. TOLOCZKO

ITEM 58 — DECK — 5

		DEF
1.Wearing surface	6	M-P
2.Deck Condition	5	S-P
3.Stay in Place Forms	N	-
4.Curbs	7	-
5.Median	N	-
6.Sidewalks	6	M-P
7.Parapets	6	M-P
8.Railing	N	-
9.Anti Missile Fence	N	-
10.Drainage System	N	-
11.Lighting Standards	N	-
12.Utilities	5	M-P
13.Deck Joints	N	-
14.	N	-
15.	N	-
16.	N	-

CURB REVEAL (In millimeters)	N	S
	0	25

APPROACHES

		DEF
a. Appr. pavement condition	6	M-P
b. Appr. Roadway Settlement	6	M-P
c. Appr. Sidewalk Settlement	7	-
d.	N	-

OVERHEAD SIGNS (Attached to bridge) (Y/N) N

		DEF
a. Condition of Welds	N	-
b. Condition of Bolts	N	-
c. Condition of Signs	N	-

ITEM 59 — SUPERSTRUCTURE — 5

		DEF
1.CIP Slab	5	S-P
2.Floorbeams	N	-
3.Floor System Bracing	N	-
4.Girders or Beams	N	-
5.Trusses - General	N	-
a. Upper Chords	N	-
b. Lower Chords	N	-
c. Web Members	N	-
d. Lateral Bracing	N	-
e. Sway Bracings	N	-
f. Portals	N	-
g. End Posts	N	-
6.Pin & Hangers	N	-
7.Conn Plt's, Gussets & Angles	N	-
8.Cover Plates	N	-
9.Bearing Devices	N	-
10.Diaphragms/Cross Frames	N	-
11. Rivets & Bolts	N	-
12.Welds	N	-
13.Member Alignment	7	-
14.Paint/Coating	N	-
15.	N	-

Year Painted	N

COLLISION DAMAGE: *Please explain*
None (X) Minor ( ) Moderate ( ) Severe ( )

LOAD DEFLECTION: *Please explain*
None (X) Minor ( ) Moderate ( ) Severe ( )

LOAD VIBRATION: *Please explain*
None (X) Minor ( ) Moderate ( ) Severe ( )

Any Fracture Critical Member: (Y/N) N

Any Cracks: (Y/N) N

ITEM 60 — SUBSTRUCTURE — 6

	Dive	Cur		DEF
1. Abutments			6	
a. Pedestals	N	N		-
b. Bridge Seats	N	N		-
c. Backwalls	N	N		-
d. Breastwalls	N	6		M-P
e. Wingwalls	N	5		M-P
f. Slope Paving/Rip-Rap	N	N		-
g. Pointing	N	N		-
h. Footings	N	7		-
i. Piles	N	X		-
j. Scour	N	6		M-P
k. Settlement	N	6		M-P
l.	N	N		-
m.	N	N		-
2. Piers or Bents			N	
a. Pedestals	N	N		-
b. Caps	N	N		-
c. Columns	N	N		-
d. Stems/Webs/Pierwalls	N	N		-
e. Pointing	N	N		-
f. Footing	N	N		-
g. Piles	N	N		-
h. Scour	N	N		-
i. Settlement	N	N		-
j.	N	N		-
k.	N	N		-
3. Pile Bents			N	
a. Pile Caps	N	N		-
b. Piles	N	N		-
c. Diagonal Bracing	N	N		-
d. Horizontal Bracing	N	N		-
e. Fasteners	N	N		-

UNDERMINING (Y/N) If YES please explain N

COLLISION DAMAGE:
None (X) Minor ( ) Moderate ( ) Severe ( )

SCOUR: *Please explain*
None (X) Minor ( ) Moderate ( ) Severe ( )

I-60 (Dive Report): N *I-60 (This Report):* 6

93B-U/W (DIVE) Insp 00/00/0000

X=UNKNOWN N=NOT APPLICABLE H=HIDDEN/INACCESSIBLE R=REMOVED

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
FRAMINGHAM	7PA	F-07-022	F07022-7PA-MUN-BRI	JUN 4, 2021

ITEM 61 — CHANNEL & CHANNEL PROTECTION — 6

	Dive	Cur	DEF
1.Channel Scour	N	7	-
2.Embankment Erosion	N	6	M-P
3.Debris	N	7	-
4.Vegetation	N	6	M-P
5.Utilities	N	X	-
6.Rip-Rap/Slope Protection	N	N	-
7.Aggradation	N	7	-
8.Fender System	N	N	-
9. Channel wall	N	7	-

STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate (X) Low ( ) None ( )

ITEM 61 (Dive Report): N *ITEM 61 (This Report):* 6

93b-U/W INSP. DATE: 00/00/0000

ITEM 36 — TRAFFIC SAFETY

	36	COND	DEF
A. Bridge Railing	0	6	M-P
B. Transitions	0	7	-
C. Approach Guardrail	1	6	M-P
D. Approach Guardrail Ends	1	6	M-P

WEIGHT POSTING — Not Applicable ☐

	H	3	3S2	Single
Actual Posting	19	30	47	N
Recommended Posting	N	N	N	N

Waived Date: 00/00/0000 EJDMT Date: 00/00/0000

Signs In Place (Y=Yes,N=No, NR=NotRequired) / Legibility/ Visibility	At bridge E	At bridge W	Other Advance E	Other Advance W
	Y	Y	Y	NR
	7/7	7/7	7/7	

CLEARANCE POSTING

Not X

	N ft	N in	S ft	S in	meter
Actual Field Measurement		0		0	
Posted Clearance		0		0	

Signs In Place (Y=Yes,N=No, NR=Not Required) / Legibility/ Visibility	At bridge N	At bridge S	Advance N	Advance S

ACCESSIBILITY (Y/N/P)

	Needed	Used
Lift Bucket	N	N
Ladder	N	N
Boat	N	N
Waders	Y	Y
Inspector 50	N	N
Rigging	N	N
Staging	N	N
Traffic Control	N	N
RR Flagger	N	N
Police	N	N
Other:		
	N	N

TOTAL HOURS 8

PLANS (Y/N): N

(V.C.R.) (Y/N): N

TAPE#:

List of field tests performed:

RATING

Rating Report (Y/N): Y

Date: 11/01/2019

Inspection data at time of existing rating

I 58: 5 I 59: 5 I 60: 6 Date :02/08/2018

Recommend for Rating or Rerating (Y/N): N

If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

REASON:

CONDITION RATING GUIDE (For Items 58, 59, 60 and 61)

	CODE	CONDITION	DEFECTS
	N	NOT APPLICABLE	
G	9	EXCELLENT	Excellent condition.
G	8	VERY GOOD	No problem noted.
G	7	GOOD	Some minor problems.
F	6	SATISFACTORY	Structural elements show some minor deterioration.
F	5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P	4	POOR	Advanced section loss, deterioration, spalling or scour.
P	3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C	2	CRITICAL	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C	1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stablility. Bridge is closed to traffic but corrective action may put it back in light service.
	0	FAILED	Out of service - beyond corrective action.

DEFICIENCY REPORTING GUIDE

DEFICIENCY: A defect in a structure that requires corrective action.

CATEGORIES OF DEFICIENCIES:

M= Minor Deficiency - Deficiencies which are minor in nature, generally do not impact the structural integrity of the bridge and could easily be repaired. Examples include but are not limited to: Spalled concrete, Minor pot holes, Minor corrosion of steel, Minor scouring, Clogged drainage, etc.

S= Severe/Major Deficiency - Deficiencies which are more extensive in nature and need more planning and effort to repair. Examples include but are not limited to: Moderate to major deterioration in concrete, Exposed and corroded rebars, Considerable settlement, Considerable scouring or undermining, Moderate to extensive corrosion to structural steel with measurable loss of section, etc.

C-S= Critical Structural Deficiency - A deficiency in a structural element of a bridge that poses an extreme unsafe condition due to the failure or imminent failure of the element which will affect the structural integrity of the bridge.

C-H= Critical Hazard Deficiency - A deficiency in a component or element of a bridge that poses an extreme hazard or unsafe condition to the public, but does not impair the structural integrity of the bridge. Examples include but are not limited to: Loose concrete hanging down over traffic or pedestrians, A hole in a sidewalk that may cause injuries to pedestrians, Missing section of bridge railing, etc.

URGENCY OF REPAIR:

I = Immediate- [Inspector(s) immediately contact District Bridge Inspection Engineer (DBIE) to report the Deficiency and to receive further instruction from him/her].

A = ASAP- [Action/Repair should be initiated by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) upon receipt of the Inspection Report].

P = Prioritize- [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available].

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
FRAMINGHAM	7PA	F-07-022	F07022-7PA-MUN-BRI	JUN 4, 2021

REMARKS

BRIDGE ORIENTATION

According to the rating report, the approaches are East and West. The Cochituate Brook flows from South to North. The structure is a cast in place concrete slab with a raised sidewalk.

GENERAL REMARKS

Posting Note: According to the rating report this structure does not need to be posted. Currently the structure is posted. **See photo 1.**

ITEM 58 - DECK

Item 58.1 - Wearing surface

The wearing surface has some minor longitudinal cracking in the Westbound travel lane that has been sealed. There is a full length x 4 foot wide bit. conc. patch at the North end of the wearing surface that extends into the sidewalk. **See Photo 2.**

Item 58.2 - Deck Condition

There is minor longitudinal hairline cracking, rust staining at the North and South ends of the deck slab, approximately 1/4 of the deck slab area. **See Photo 3.** There is moderate scale at the North end of the slab with isolated delaminations. **See Photo 4.** There is a 3 foot long x 6 inch wide x 2 inch deep spall along the bottom edge of the deck slab at the South end near the West breastwall. **See Photo 5.**

Item 58.6 - Sidewalks

There is moderate rust staining, concrete scale throughout the underside of the raised sidewalk slab. There is a longitudinal full-length crack on the North sidewalk along the parapet. **See Photo 6.**

Item 58.7 - Parapets

There is minor scaling throughout with a 1 foot diameter chip out at the East and the West end of the North railing.

Item 58.12 - Utilities

There are many disconnected and missing utility hanging supports. **See Photo 7.**

APPROACHES

Approaches a - Appr. pavement condition

There is moderate transverse and longitudinal cracking throughout the East approach that has been sealed. There is a 10 foot long x 5 foot wide bit. conc. utility trench patch at the South end of the East approach with minor settlement in the patched area. **See Photo 8.**

ITEM 59 - SUPERSTRUCTURE

Item 59.1 - CIP Slab

See 58.2 for comments.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
FRAMINGHAM	7PA	F-07-022	F07022-7PA-MUN-BRI	JUN 4, 2021

REMARKS

ITEM 60 - SUBSTRUCTURE

Item 60.1 - Abutments

Item 60.1.d - Breastwalls

There is minor efflorescence staining along the abutment at the deck slab interface. There is minor abrasion along the waterline.

There is a full height settlement crack to the East breastwall, up to 1/4 inch wide, at the utility cutout. **See Photo 9.** There is moderate surface cracking and spalling to the top of the East breastwall at the North end, **See Photo 10.**

The West breastwall has a settlement crack, 1/8 inch wide, at the waterline tapering to hairline at the utility cutout at the South end. The West breastwall also has a 1 foot x 1 foot x 8 inch deep spall under the drainpipe at the North end and there is a full height x 1/4 inch full-height settlement crack 6 feet from the North end, **See Photo 11.**

Item 60.1.e - Wingwalls

The Southwest rubble wingwall has moderate vegetation (2 trees) growing out of it.

Item 60.1.j - Scour

There is a minor scour near the center of the East breastwall, under the drain pipe.

Item 60.1.k - Settlement

See item 60.1.d.

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.2 - Embankment Erosion

There is moderate embankment erosion at the Southeast embankment. Some of the embankment erosion has been abated by rip-rap. **See Photo 12.**

Item 61.4 - Vegetation

See Item 60.1.e.

TRAFFIC SAFETY

Item 36a - Bridge Railing

See Item 58.7.

Item 36c - Approach Guardrail

The Northeast approach guardrail has minor denting and misalignment.

Item 36d - Approach Guardrail Ends

See Item 36.C.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
FRAMINGHAM	7PA	F-07-022	F07022-7PA-MUN-BRI	JUN 4, 2021

REMARKS

Photo Log

Photo 1 : Typical posting signs at the bridge.
Photo 2 : View of the wearing surface repairs.
Photo 3 : South end of the concrete slab. Southeast corner.
Photo 4 : Scale to the slab underside at the North end.
Photo 5 : A spall at the Southwest corner of the slab.
Photo 6 : Crack in the North sidewalk.
Photo 7 : Broken utilities supports.
Photo 8 : Utility trench patch in East approach.
Photo 9 : The East breastwall near the North end.
Photo 10 : Crack on the North end of the East Breastwall.
Photo 11 : Spall under drainpipe on West breastwall and full height settlement crack.
Photo 12 : Erosion at Southeast embankment.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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PHOTOS



Photo 1: Typical posting signs at the bridge.



Photo 2: View of the wearing surface repairs.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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PHOTOS



Photo 3: South end of the concrete slab. Southeast corner.



Photo 4: Scale to the slab underside at the North end.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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PHOTOS



Photo 5: A spall at the Southwest corner of the slab.



Photo 6: Crack in the North sidewalk.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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PHOTOS



Photo 7: **Broken utilities supports.**



Photo 8: **Utility trench patch in East approach.**

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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PHOTOS



Photo 9: Crack on the North end of the East Breastwall.



Photo 10: The East breastwall near the North end.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
FRAMINGHAM	7PA	F-07-022	F07022-7PA-MUN-BRI	JUN 4, 2021

PHOTOS



Photo 11: Spall under drainpipe on West breastwall and full height settlement crack.



Photo 12: Erosion at Southeast embankment.

Report Date: May 24, 2021

State Information

BDEPT#= F07022 Agency Br.No.

Town= Framingham L.O.

B.I.N= 7PA AASHTO= 064.0

RANK= 0 H.I.= 100.0 % FHWA Select List= N (6/21/17)

Identification

(8) Structure Number	F070227PAMUNBRI
(5) Inventory Route	151000000
(2) State Highway Department District	03
(3) County Code 017 (4) Place code	24925
(6) Features Intersected	**WATER COCHITUATE BROOK**
(7) Facility Carried	**ST126 SCHOOL ST**
(9) Location	500' EAST OF CONCORD ST
(11) Kilometerpoint	0000.000
(12) Base Highway Network	N
(13) LRS Inventory Route & Subroute	000000000000
(16) Latitude	42 DEG 19 MIN 16.83 SEC
(17) Longitude	71 DEG 23 MIN 46.71 SEC
(98) Border Bridge State Code	Share %
(99) Border Bridge Structure No. #	

Structure Type and Material

(43) Structure Type Main:	Concrete	Code	101
Slab	Jointless bridge type:	Not applicable	
(44) Structure Type Appr:			
Other		Code	000
(45) Number of spans in main unit			001
(46) Number of approach spans			0000
(107) Deck Structure Type -	Concrete Cast-in-Place	Code	1
(108) Wearing Surface / Protective System:			
A) Type of wearing surface -	Bituminous	Code	6
B) Type of membrane -	Unknown	Code	8
C) Type of deck protection -	None	Code	0

Age and Service

(27) Year Built			1850
(106) Year Reconstructed			1900
(42) Type of Service: On -	Highway-Ped		
Under -	Waterway	Code	55
(28) Lanes: On Structure	02	Under structure	00
(29) Average Daily Traffic			026000
(30) Year of ADT 2010	(109) Truck ADT		00 %
(19) Bypass, detour length			000 KM

Geometric Data

(48) Length of maximum span				0004.0 M
(49) Structure Length				00005.2 M
(50) Curb or sidewalk:	Left	01.8 M	Right	00.0 M
(51) Bridge Roadway Width Curb to Curb				009.1 M
(52) Deck Width Out to Out				011.6 M
(32) Approach Roadway Width (w/shoulders)				011.6 M
(33) Bridge Median -	No median		Code	0
(34) Skew 00 DEG	(35) Structure Flared			N
(10) Inventory Route MIN Vert Clear				00.00 M
(47) Inventory Route Total Horiz Clear				00.0 M
(53) Min Vert Clear Over Bridge Rdwy				00.00 M
(54) Min Vert Underclear ref	N			00.00 M
(55) Min Lat Underclear RT ref	N			00.0 M
(56) Min Lat Underclear LT				00.0 M

Navigation Data

(38) Navigation Control -	No navigation control on waterway	Code 0
(111) Pier Protection		Code
(39) Navigation Vertical Clearance		000.0 M
(116) Vert-lift Bridge Nav Min Vert Clear		M
(40) Navigation Horizontal Clearance		0000.0 M

Classification

		Code
(112) NBIS Bridge Length		N
(104) Highway System		N
(26) Functional Class -	Urban Minor Arterial	16
(100) Defense Highway		1
(101) Parallel Structure		N
(102) Direction of Traffic -	2-way traffic	2
(103) Temporary Structure		N
(105) Federal Lands Highways		0
(110) Designated National Network		N
(20) Toll -	On free road	3
(21) Maintain -	Town Agency	03
(22) Owner -	Town Agency	03
(37) Historical Significance	undetermined	

Condition

	Code
(58) Deck	5
(59) Superstructure	5
(60) Substructure	6
(61) Channel & Channel Protection	~~7~~ 6
(62) Culverts	N

Load Rating and Posting

		Code
(31) Design Load -	Unknown	0
(63) Operating Rating Method -	Load Factor (LF)	1
(64) Operating Rating		99.9
(65) Inventory Rating Method -	Load Factor (LF)	1
(66) Inventory Rating		74.0
(70) Bridge Posting		5
(41) Structure -	Posted for load	P

Appraisal

	Code
(67) Structural Evaluation	5
(68) Deck Geometry	2
(69) Underclearances, vert. and horiz.	N
(71) Waterway adequacy	6
(72) Approach Roadway Alignment	6
(36) Traffic Safety Features	0 0 1 1
(113) Scour Critical Bridges	6

Inspections

(90) Inspection Date ~~06/12/19~~ 06/04/21 (91) Frequency 24 MO

(92) Critical Feature Inspection: (93) CFI DATE

(A) Fracture Critical Detail	N	00	MO A)	00/00/00
(B) Underwater Inspection	N	00	MO B)	05/01/87
(C) Other Special Inspection	N	00	MO C)	00/00/00
(*) Other Inspection ()	N	00	MO *)	00/00/00
(*) Closed Bridge	N	00	MO *)	00/00/00
(*) UW Special Inspection	N	00	MO *)	00/00/00
(*) Damage Inspection			MO *)	00/00/00

Rating Loads

Report Date 11/01/19	H20	Type 3	Type 3S2	Type HS
Operating	15.0	24.0	38.0	27.0
Inventory	48.0	76.0	99.0	86.0

Field Posting

Status LEGAL Posting Date 04/24/20

	2 Axle	3 Axle	5 Axle	Single
Actual	19	30	47	
Recommended				

Missing Signs N

Misc.

Bridge Name

N Anti-missile fence N Acrow Panel N Jointless Bridge

Freeze/Thaw N : Not Applicable

Accessibility (Needed/Used)

N / N Liftbucket	N / N Rigging	N / N Other
N / N Ladder	N / N Staging	
N / N Boat	N / N Traffic Control	
Y / Y Wader	N / N RR Flagperson	Inspection Hours: 008
N / N Inspector 50	N / N Police	

Report Date: June 4, 2021

State Information

BDEPT#= ' F07022 Agency Br.No.

Town= Framingham L.O.

B.I.N= 7PA AASHTO= 064.0

RANK= 0 H.I.= 100.0 % FHWA Select List= N (6/21/17)

Identification

(8) Structure Number	F070227PAMUNBRI
(5) Inventory Route	151000000
(2) State Highway Department District	03
(3) County Code 017 (4) Place code	24925
(6) Features Intersected	**WATER COCHITUATE BROOK**
(7) Facility Carried	**ST126 SCHOOL ST**
(9) Location	500' EAST OF CONCORD ST
(11) Kilometerpoint	0000.000
(12) Base Highway Network	N
(13) LRS Inventory Route & Subroute	000000000000
(16) Latitude	42 DEG 19 MIN 16.83 SEC
(17) Longitude	71 DEG 23 MIN 46.71 SEC
(98) Border Bridge State Code	Share %
(99) Border Bridge Structure No. #	

Structure Type and Material

(43) Structure Type Main: Concrete Code 101

Slab Jointless bridge type: Not applicable

(44) Structure Type Appr:

Other Code 000

(45) Number of spans in main unit	001
(46) Number of approach spans	0000
(107) Deck Structure Type - Concrete Cast-in-Place	Code 1

(108) Wearing Surface / Protective System:

A) Type of wearing surface - Bituminous	Code 6
B) Type of membrane - Unknown	Code 8
C) Type of deck protection - None	Code 0

Age and Service

(27) Year Built	1850
(106) Year Reconstructed	1900
(42) Type of Service: On - Highway-Ped	
Under - Waterway	Code 55
(28) Lanes: On Structure 02	Under structure 00
(29) Average Daily Traffic	026000
(30) Year of ADT 2010 (109) Truck ADT	00 %
(19) Bypass, detour length	000 KM

Geometric Data

(48) Length of maximum span	0004.0 M
(49) Structure Length	00005.2 M
(50) Curb or sidewalk: Left 01.8 M	Right 00.0 M
(51) Bridge Roadway Width Curb to Curb	009.1 M
(52) Deck Width Out to Out	011.6 M
(32) Approach Roadway Width (w/shoulders)	011.6 M
(33) Bridge Median - No median	Code 0
(34) Skew 00 DEG (35) Structure Flared	N
(10) Inventory Route MIN Vert Clear	00.00 M
(47) Inventory Route Total Horiz Clear	00.0 M
(53) Min Vert Clear Over Bridge Rdwy	00.00 M
(54) Min Vert Underclear ref N	00.00 M
(55) Min Lat Underclear RT ref N	00.0 M
(56) Min Lat Underclear LT	00.0 M

Navigation Data

(38) Navigation Control - No navigation control on waterway	Code 0
(111) Pier Protection	Code
(39) Navigation Vertical Clearance	000.0 M
(116) Vert-lift Bridge Nav Min Vert Clear	M
(40) Navigation Horizontal Clearance	0000.0 M

Classification

	Code
(112) NBIS Bridge Length	N
(104) Highway System	N
(26) Functional Class - Urban Minor Arterial	16
(100) Defense Highway	1
(101) Parallel Structure	N
(102) Direction of Traffic - 2-way traffic	2
(103) Temporary Structure	N
(105) Federal Lands Highways	0
(110) Designated National Network	N
(20) Toll - On free road	3
(21) Maintain - Town Agency	03
(22) Owner - Town Agency	03
(37) Historical Significance undetermined	

Condition

	Code
(58) Deck	5
(59) Superstructure	5
(60) Substructure	6
(61) Channel & Channel Protection	6
(62) Culverts	N

Load Rating and Posting

	Code
(31) Design Load - Unknown	0
(63) Operating Rating Method - Load Factor (LF)	1
(64) Operating Rating	99.9
(65) Inventory Rating Method - Load Factor (LF)	1
(66) Inventory Rating	74.0
(70) Bridge Posting	5
(41) Structure - Posted for load	P

Appraisal

	Code
(67) Structural Evaluation	5
(68) Deck Geometry	2
(69) Underclearances, vert. and horiz.	N
(71) Waterway adequacy	6
(72) Approach Roadway Alignment	6
(36) Traffic Safety Features	0 0 1 1
(113) Scour Critical Bridges	6

Inspections

(90) Inspection Date 06/04/21 (91) Frequency 24 MO

(92) Critical Feature Inspection: (93) CFI DATE

(A) Fracture Critical Detail	N	00	MO A)	00/00/00
(B) Underwater Inspection	N	00	MO B)	05/01/87
(C) Other Special Inspection	N	00	MO C)	00/00/00
(*) Other Inspection ()	N	00	MO *)	00/00/00
(*) Closed Bridge	N	00	MO *)	00/00/00
(*) UW Special Inspection	N	00	MO *)	00/00/00
(*) Damage Inspection			MO *)	00/00/00

Rating Loads

Report Date 11/01/19	H20	Type 3	Type 3S2	Type HS
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Misc.

Bridge Name

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Freeze/Thaw N : Not Applicable

Accessibility (Needed/Used)

N / N Liftbucket	N / N Rigging	N / N Other
N / N Ladder	N / N Staging	
N / N Boat	N / N Traffic Control	
Y / Y Wader	N / N RR Flagperson	Inspection Hours: 008
N / N Inspector 50	N / N Police	

School Street Bridge Design – FY24 Capital Project Submission – Framingham Public Works

Existing Conditions



GREEN INTERNATIONAL AFFILIATES, INC.
239 LITTLETON ROAD, SUITE 3 WESTFORD, MA 01886
T: (978) 923-0400 | F: (978) 399-0033 | WWW.GREENINTL.COM

August 12, 2021

Mr. Simon Alexandrovich, PE
Director of Transportation Engineering
City of Framingham Department of Public Works
110 Western Avenue
Framingham, MA 01702

Subject: FY-2023 Capital Improvements
School Street Bridge over the
Cochituate Brook
Funding Request Letter

Dear Mr. Alexandrovich :

The purpose of this letter is to provide a brief project description, need, and the estimated design cost to replace the existing bridge along School Street over the Cochituate Brook.

Bridge No. F-07-022, carries School Street over the Cochituate Brook in Framingham, Massachusetts. State Route 126 runs along School Street through the project area; Route 126 serves as a critical regional transportation route that carries traffic in the north/south direction through the City. The bridge is located approximately 250 feet east of the Concord Street and School Street intersection and the beginning of the Cochituate Rail Trail. The 38'-6" single-span bridge was originally constructed in 1925. The bridge was rated to be in fair condition based on inspections performed in 2010, 2013, 2019, and 2021. The 2013 Town-Wide Bridge Inspection Master Plan recommended this bridge for replacement because "The bridge is approximately 88 years old and is nearing the end of its effective lifespan due to accelerating deterioration". The bridge currently does not provide accommodation for bicyclists and pedestrians are only accommodated on the north side of School Street. A direct connection between the trail and the residential areas east of the bridge is not provided and because the beginning of the Cochituate Rail Trail is located on the south side of School Street, one is needed.

The proposed bridge replacement project could help prevent the City from spending resources on bridge repair and rehabilitation on top of funding the eventual replacement work itself in the future. In addition, a new bridge will provide an opportunity to provide pedestrian and bicycle accommodations across the bridge and a provide an important direct connection to the Cochituate Rail Trail. Aging City owned utilities on the bridge will also be replaced as part of the project.

Please note that even if the City ultimately funds the entire design and construction cost to replace the bridge, the design of the bridge will still need to go through the Chapter 85 review process by MassDOT and as a result, more efforts are required to prepare the design documents because they will need to follow all relevant MassDOT requirements.

The total cost for the design is estimated to be approximately $500,000. Green recommends a total FY-2023 ATM appropriation request of $500,000.

Should you have any questions regarding this letter, please do not hesitate to contact me, or Michael Cruz, P.E.

Sincerely,

Green International Affiliates, Inc.



Wing C. Wong, P.E., PTOE
Transportation Planning Group Leader

L:\Proposal\Municipalities\Framingham\Transportation And Utility Consultant\ASSN-XX Route 126 Bridge Over Cochituate Brook\School Street_Funding Letter_Ver02.Docx

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 28

(1) **PROJECT NAME:** Simpson Park Improvements FY24
PROJECT STATUS: NEW Project This Year

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

Project to include pedestrian crossing of Central Street at Fenwick Street, parking, and improvements to interior of the park.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
X	New infrastructure
X	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	50,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	50,000	-	-	-	-	-

(5) **PRIORITY:**

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Bond**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:** **Central St @ Fenwick St**

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**
Robert A. Lewis

(9) **FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 25

(1) PROJECT NAME: St Tarciscius Wetlands Restoration (Lake Waushakum) FY24 ARPA

PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

Outfall 2012000 discharges to a wetland tributary to Lake Waushakum. Perform a condition assessment of the wetland and perform wetland restoration to improve water quality in Lake Waushakum.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

New Project focused on Lake Waushakum water quality

(3) PURPOSE OF PROJECT:

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	200,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	200,000	-	-	-	-	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

1) **Bond**
2) **Grants**
3)

(10) PROJECT OR EQUIPMENT LOCATION:

Tribtary to Lake Waushakum

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

ARPA

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 18

(1) PROJECT NAME: Stormwater Master Plan FY24 ARPA
PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

The City Stormwater Master Plan will be a comprehensive plan including condition assessment of the infrastructure, hydraulic modeling of known flooding areas, updated mapping, and review for water quality improvements. The project will then develop specific recommendations for improvements to the system. The comprehensive plan will address regulatory requirements for stormwater quality and climate change predictions for flood mitigation.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

New project for comprehensive assessment of city's stormwater system.

(3) PURPOSE OF PROJECT:

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility	800,000					
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	800,000	-	-	-	-	-

(5) PRIORITY:

a.		**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.		**level service maintenance**	maintains City desired level of service
c.		**economic development**	adds to the City's economic vibrancy
d.		**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

1) **Bond**
2) **Grants**
3)

(10) PROJECT OR EQUIPMENT LOCATION:

City-wide

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

ARPA, SRF

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:**

(1) **PROJECT NAME:** Traffic Calming - FY24
PROJECT STATUS:

(2) **PROJECT DESCRIPTION AND JUSTIFICATION:**

The goal of traffic calming is to improve safety for motorists, pedestrians, and cyclists. Measures include signage, speed humps, pedestrian crossing lights, and reconfiguring intersections. This project provides for the study, design and construction of traffic calming measures and other related safety improvements to public roadways following the City's Traffic Calming Policy and recommendations from the Traffic Commission and City departments. These measures contribute to improved safety and livability for Framingham's streets and neighborhoods. While new traffic concerns are brought forward by residents and business owners on an ongoing basis, current areas of concern are excessive accident counts on Grant Street and speeding on Grove Street, Brook Street, Potter Road, Winter Street, and Old Connecticut Path.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) **PURPOSE OF PROJECT:**

- Replace existing infrastructure
- Replace existing capital asset
- Replace existing vehicle
- Replace equipment
- New infrastructure
- New capital asset
- New vehicle
- New equipment
- Strategic/Comprehensive/Master plan

(4) **BUDGET REQUEST BY YEAR:**

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other	150,000		150,000		150,000	
	TOTAL	150,000	-	150,000	-	150,000	-

(5) **PRIORITY:**

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) **EFFECTS ON ANNUAL OPERATING BUDGET:**

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) **PROPOSED FUNDING SOURCE(S):**

1) **Free Cash**
2)
3)

(10) **PROJECT OR EQUIPMENT LOCATION:**

(11) **ASSET TYPE:**

(7a) **POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)**

(8) **PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)**

(9)	**FINANCE DEPARTMENT NOTES:**

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works

DEPARTMENT PRIORITY:

(1) PROJECT NAME: Unaccepted Streets Improvements - Candlestick Ln, Gaslight Ln, Lantern Rd FY24

PROJECT STATUS:

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

These funds will allow the City to improve Candlestick Lane, Gaslight Lane, and Lantern Road to City roadway standards. Work will include paving, curbing, drainage improvements, and signage. These funds will also support the surveying and legal services to support public acceptance. These roads are currently private roads in the City of Framingham. These roads were created under subdivision control and were intended for eventual acceptance. These roads were not maintained by a homeowners association or other consolidated entity and have therefore deteriorated to an unacceptable level of disrepair. The property owners in this area have requested that the City accept the roads as public roadways.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

(3) PURPOSE OF PROJECT:

	Replace existing infrastructure
	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
	New infrastructure
	New capital asset
	New vehicle
	New equipment
	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction						
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other		1,100,000				
	TOTAL	-	1,100,000	-	-	-	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

1)
2)
3)

(10) PROJECT OR EQUIPMENT LOCATION:

(11) ASSET TYPE:

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

(9) FINANCE DEPARTMENT NOTES:

CITY OF FRAMINGHAM
CAPITAL PROJECT/EQUIPMENT REQUEST - FY2024-2033 CIP

DEPARTMENT: Public Works **DEPARTMENT PRIORITY:** 14

(1)	**PROJECT NAME:**	Walnut Street Neighborhood Flood Mitigation projects - construction FY24
	PROJECT STATUS:	NEW Project This Year

(2) PROJECT DESCRIPTION AND JUSTIFICATION:

This flood mitigation & climate resiliency project includes three parts which can be completed together or in phases:1) Replace earthern berm between Walnut Street and Stonybrook Rd (aka the "School Path" between Fuller Middle School and Bowditch Field) with an elevated boardwalk. ($1.4M); 2) Stream channel and streambank restorations to reduce flooding and enhance conveyance capacity in the Walnut Street/Sucker Brook Drainage Area. ($1.2M); 3) Main Street culvert replacement, from under Main Street to outlet at Sudbury River, including portion under the parking lot that required emergency repairs in March 2022. ($850,0000). Co-funded by a FY20/21 MVP Action Grant and a FEMA Flood Mitigation Assistance grant, the City compelted the Walnut Street Area Flood Mitigation Study in June 2021. In FY22, the City was awarded a MVP Action Grant to complete design of preferred alternatives. This project builds upon the previous grants to take the project from design to implementation. This is the total amount, the $2.4 million for the MVP grant and $800,000 matching from the City.

PROJECT ADDITIONS/CHANGES JUSTIFICATION:

New project. Will seek MVP grant funding for majority of this cost.

(3) PURPOSE OF PROJECT:

X	Replace existing infrastructure
X	Replace existing capital asset
	Replace existing vehicle
	Replace equipment
X	New infrastructure
X	New capital asset
	New vehicle
	New equipment
X	Strategic/Comprehensive/Master plan

(4) BUDGET REQUEST BY YEAR:

		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29-33
a.	Land Acquisition						
b.	Planning / Feasibility						
c.	Design						
d.	Construction	3,200,000					
e.	Equipment/Vehicles						
f.	Contingency						
g.	Other						
	TOTAL	3,200,000	-	-	-	-	-

(5) PRIORITY:

a.	**health and safety**	safety concern, hazardous condition, agency compliance, non-functional, etc
b.	**level service maintenance**	maintains City desired level of service
c.	**economic development**	adds to the City's economic vibrancy
d.	**service improvement**	new or improved service to meet demand

(6) EFFECTS ON ANNUAL OPERATING BUDGET:

	FY 24	FY 25	FY 26	FY 27	FY 28	FY29	YEARS 29-33
Personnel							
Operating							

(7) PROPOSED FUNDING SOURCE(S):

(10) PROJECT OR EQUIPMENT LOCATION:

1)	**Bond**	**Walnut Street**	
2)	**Grants**	**(11) ASSET TYPE:**	
3)			

(7a) POTENTIAL GRANT FUNDING SOURCE IF APPLICABLE: (List source and matching requirements)

MVP Grant for $2.4 million of the $3.2 million total

(8) PROJECT LEAD NAME & CONTACT INFO: (ADDITIONAL PROJECT INFO AS NEEDED)

Robert A. Lewis

(9) FINANCE DEPARTMENT NOTES:

Massachusetts Municipal Vulnerability Program (MVP) Action Grant Program

WALNUT STREET NEIGHBORHOOD FLOOD MITIGATION



MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) PROGRAM

"The Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. Communities who complete the MVP program become certified as an MVP community and are eligible for MVP Action Grant funding and other opportunities."

https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program

MVP
Municipal Vulnerability Preparedness

ABOUT WALNUT ST NEIGHBORHOOD FLOODING

- Historically flooded area
  - Damage to private & public property
  - Road closures
- Impassable path between Walnut St (Bowditch Field) and Stonybrook Rd (Fuller Middle School)
- Identified as a high priority area in City's Hazard Mitigation Plan approved by FEMA and City's Community Building Resiliency plan approved by EEA
- Environmental Justice community
- Partial culvert failure after March 2022 storm





Flooding behind homes on Walnut St

GRANTS SUPPORTING THIS PROJECT

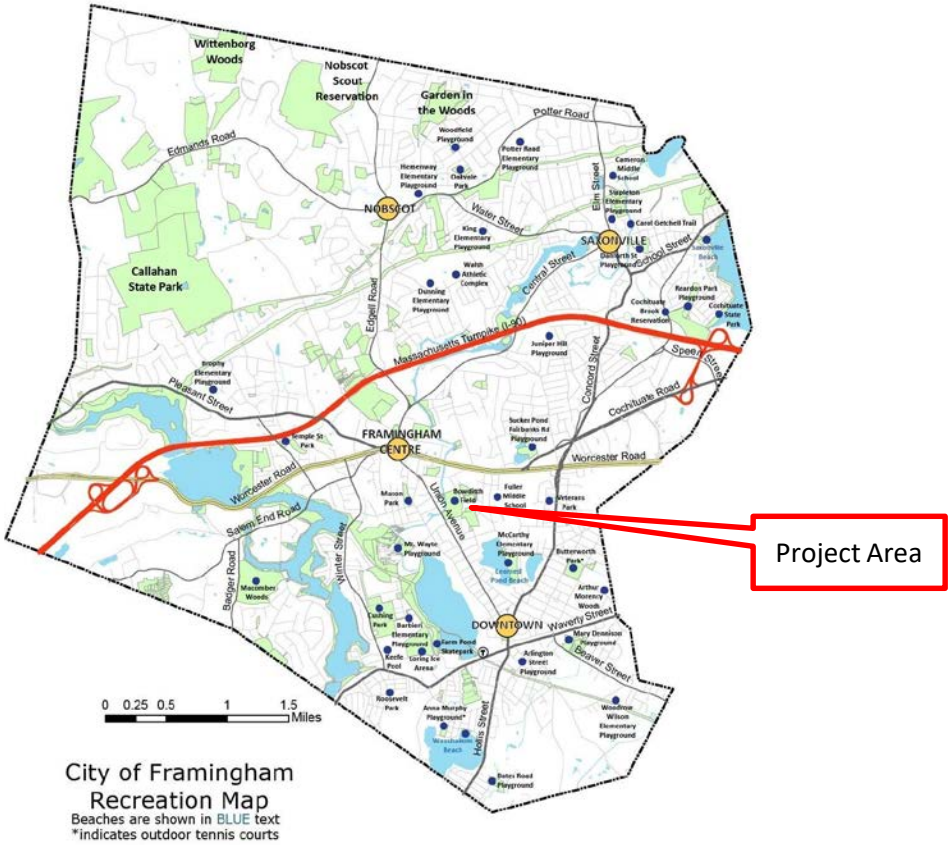
The City was awarded:

- $75,000 FEMA Flood Mitigation Assistance (FMA) grant for Walnut Street Neighborhood Flood Mitigation Feasibility Study
- $206,850 MVP FY20/21 grant for Walnut Street Neighborhood Flood Mitigation Feasibility Study
  - FEMA grant was able to be used as City's match
- $269,030 MVP FY22 grant for Walnut Street Neighborhood Flood Mitigation Design
- $127,150 MVP FY22/23 grant for "Building Relationships and Resilience with MetroWest Environmental Justice Neighborhoods" in partnership with Natick and Ashland.

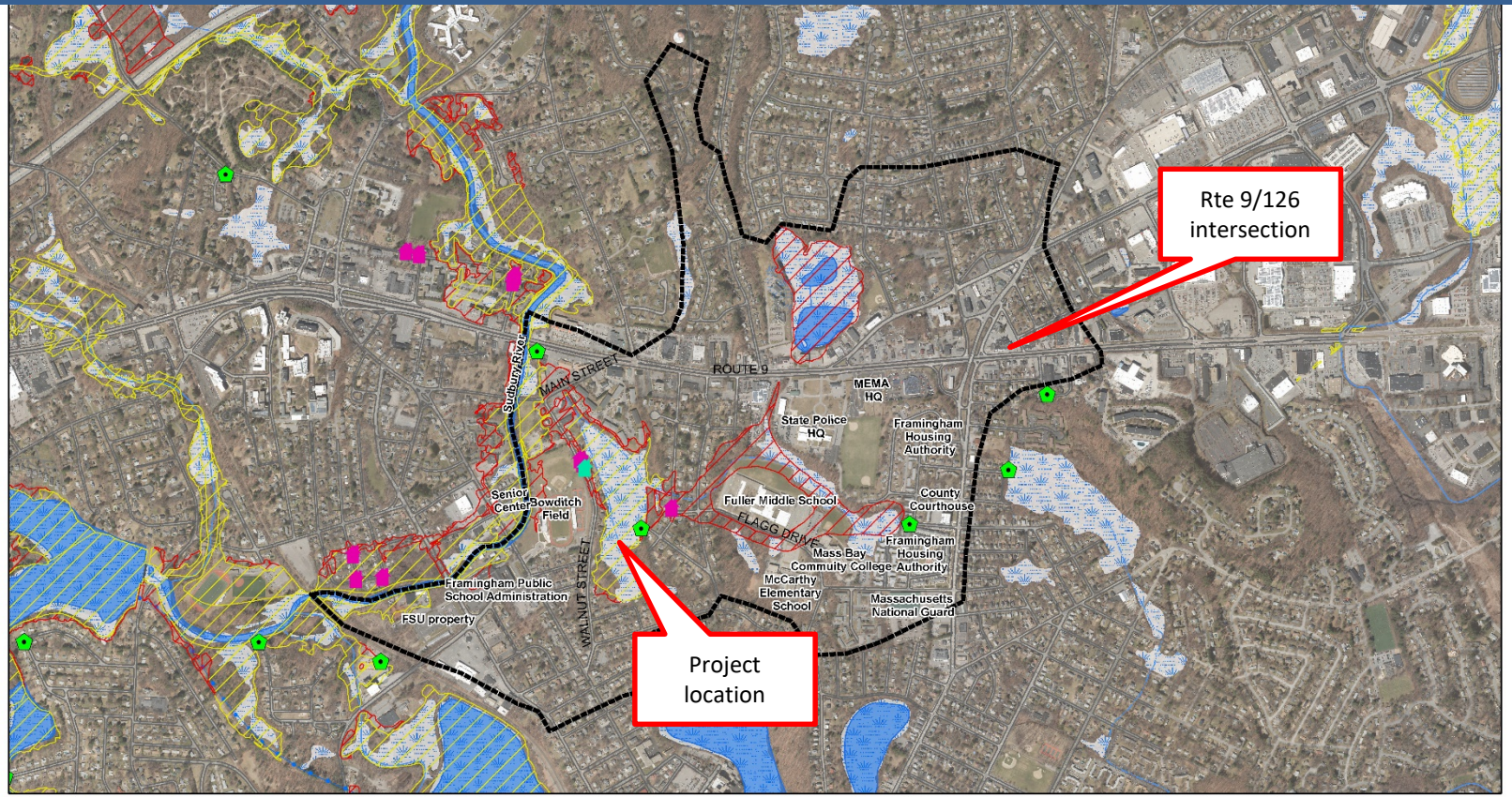


"School path" during flooded conditions

ABOUT WALNUT ST NEIGHBORHOOD FLOODING

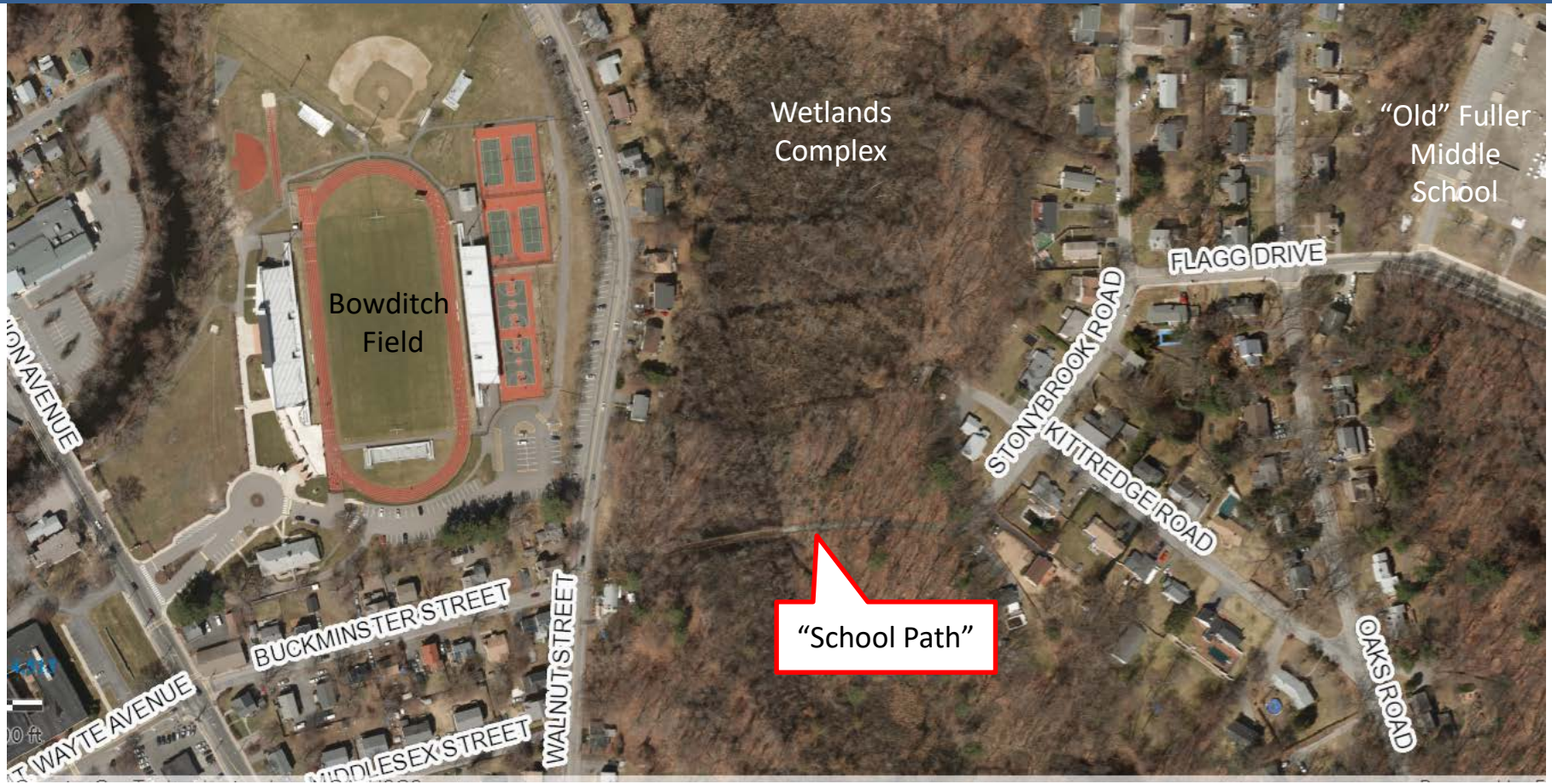


WALNUT ST NEIGHBORHOOD DRAINAGE SUBBASIN



Walnut Street Flood Mitigation Study
Project Map
City of Framingham
November 2019

WALNUT STREET “SCHOOL PATH”



“SCHOOL PATH” CURRENT CONDITIONS

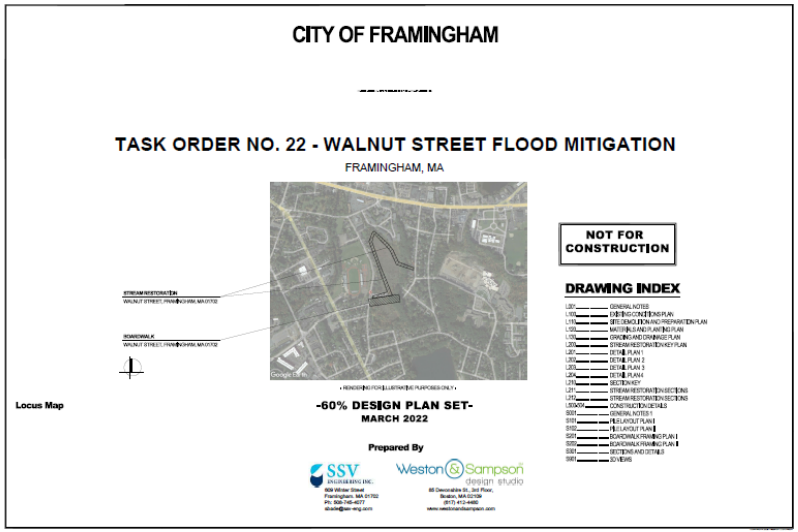
Trail entrance at Walnut Street across from Bowditch Field



Trail exit at Stonybrook Rd

PRELIMINARY DESIGN

- New boardwalk between Walnut St & Stonybrook Rd for “school path”
- Stream & wetlands restoration to improve flood storage
- Main St culvert replacement


CITY OF FRAMINGHAM

TASK ORDER NO. 22 - WALNUT STREET FLOOD MITIGATION

FRAMINGHAM, MA

NOT FOR CONSTRUCTION

DRAWING INDEX

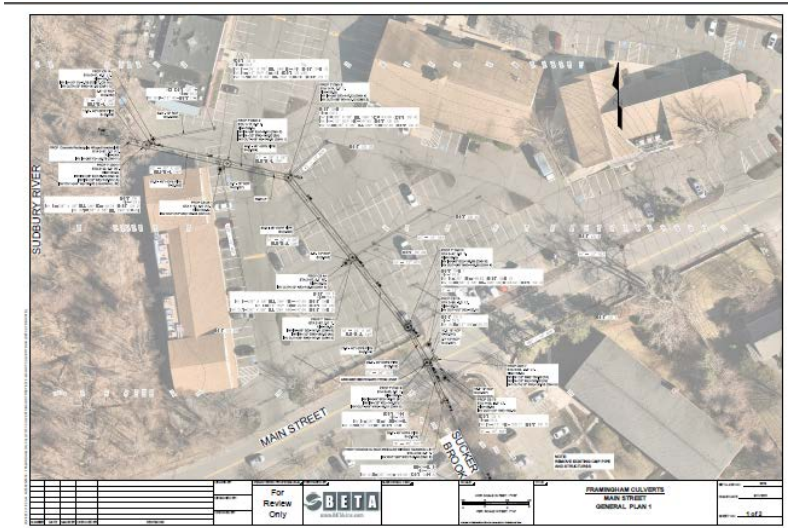
Locus Map

-60% DESIGN PLAN SET-
MARCH 2022

Prepared By

SSV ENGINEERING INC.

Weston & Sampson design studio



Preliminary design plans

WHAT COULD THE NEW BOARDWALK LOOK LIKE?









PUBLIC ENGAGEMENT

- FHS Environmental Awareness Club program – sponsor Climate Change leadership field trip/program (4/28; 5/11-5/12)
- Hoops & Homework after-school program (every Friday thru June 2022)
- Program at Callahan Center 4/28
- Public meetings
  - Sustainability Committee
  - Conservation Commission
  - Disability Commission
  - Parks Commission
- Create video about climate change impacts to Framingham and ways to be more resilient



FHS students on Field Trip to MassAudubon's Drumlin Farm

NEXT STEPS

- Public outreach & input
- Finalize designs
- Obtain permits
- Obtain access agreements and temporary construction easements
- Obtain funding
  - City submitted an MVP grant application for FY23 funding on May 5, 2022 for $155,000 to support permitting, easements, & bid support.
  - Boardwalk estimate ~$1.5M
  - Restoration estimate ~$1.2M
  - Culvert estimate ~$1.1M
- Construction
  - Do not anticipate construction before July 2024 (FY24)

WHAT WOULD YOU LIKE TO SEE?

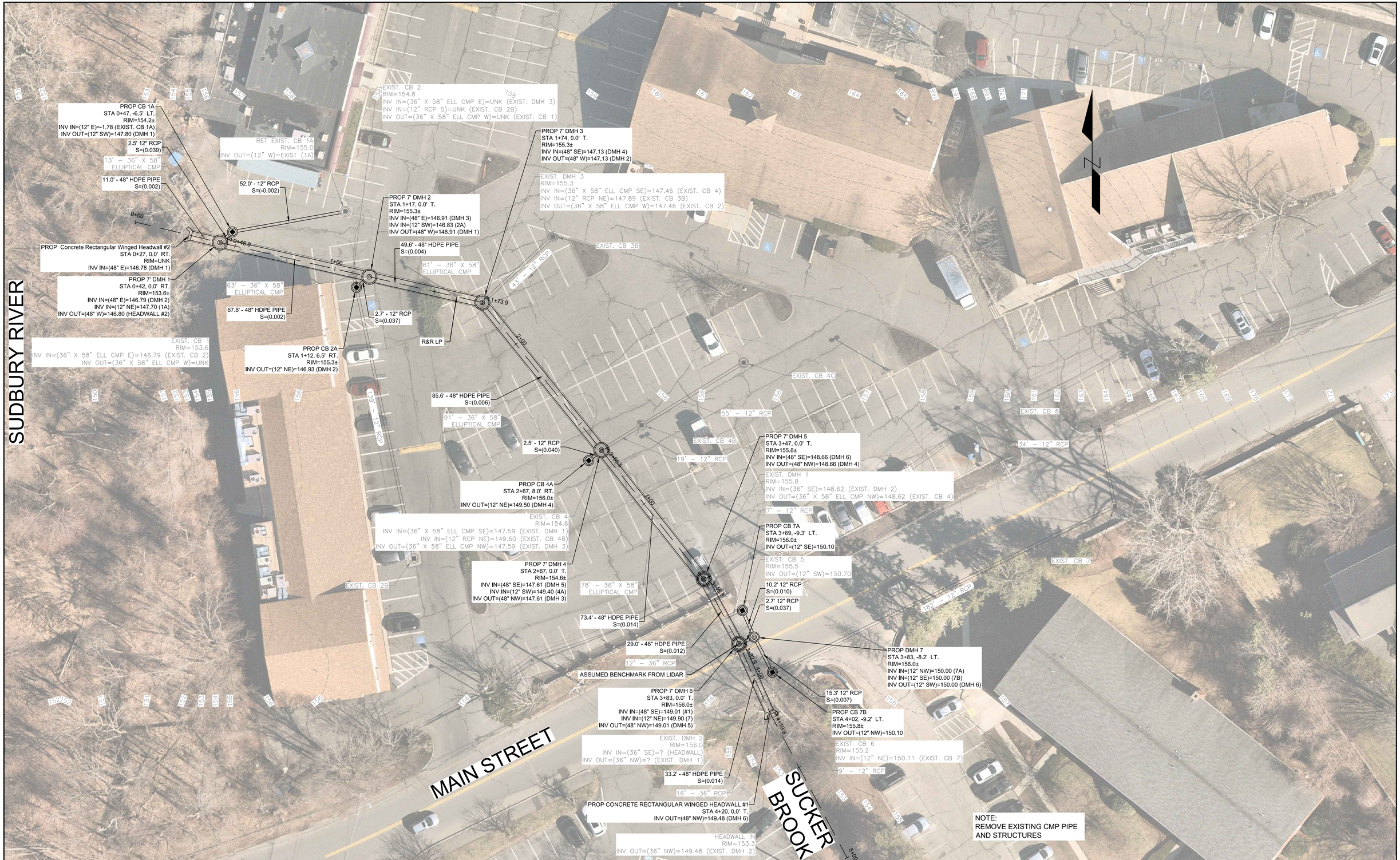
HOW DO YOU THINK THE CITY CAN BETTER BE PREPARED FOR CLIMATE CHANGE?

thank you



City of Framingham
Department of Public Works
508-532-6010
kr@framinghamma.gov

https://www.framinghamma.gov/3308/Walnut-Street-Neighborhood-Flood-Mitigat
https://www.framinghamma.gov/2047/Climate-Change-and-Hazard-Planning



NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS

DRAWN BY:

DESIGNED BY:

CHECKED BY:

REGISTERED PROFESSIONAL

For Review Only

PREPARED BY

BETA
www.BETA-Inc.com

SUBCONSULTANT

SCALE

HOR. SCALE IN FEET: 1"=20'
20 0 20 40
4 0 4 8
VER. SCALE IN FEET: 1"=4'

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

TITLE

FRAMINGHAM CULVERTS
MAIN STREET
GENERAL PLAN 1

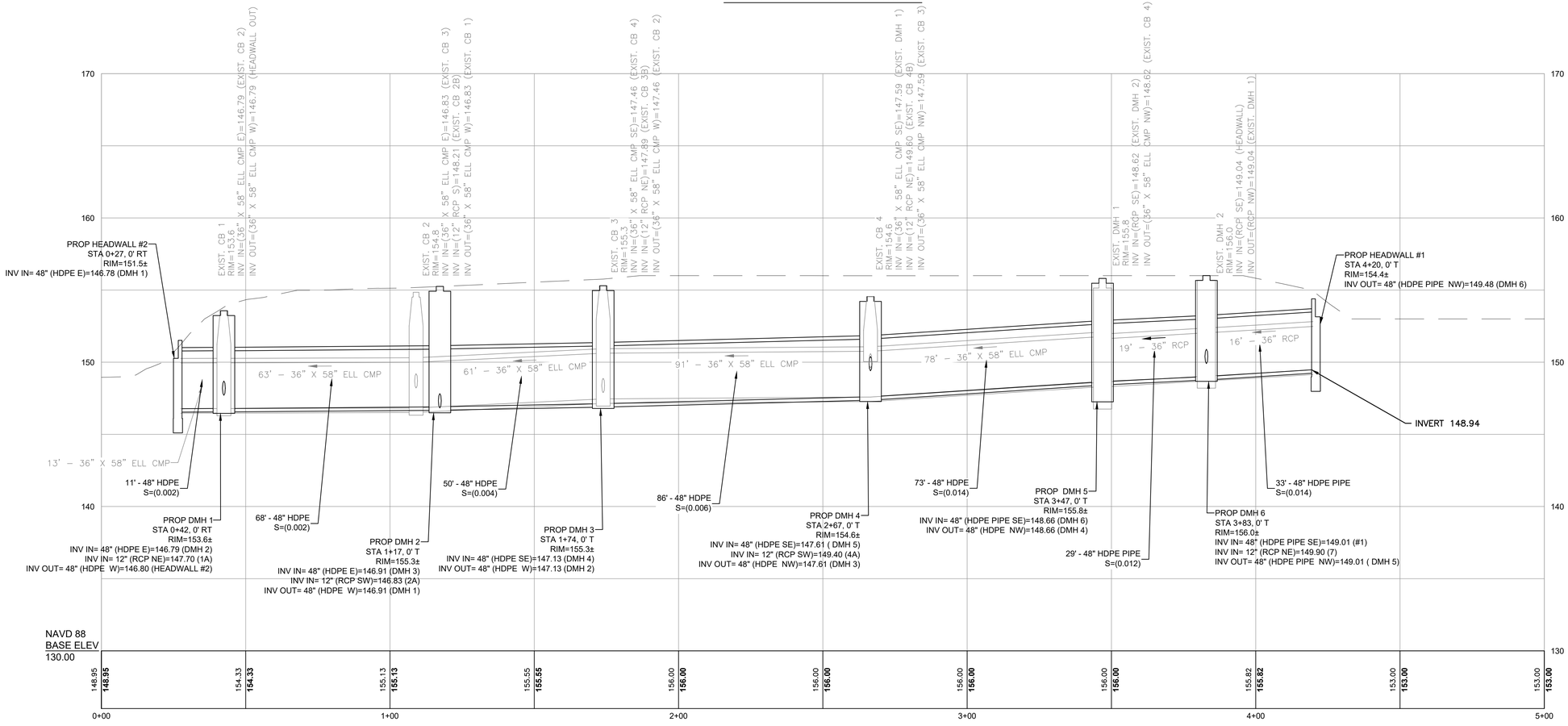
BETA JOB NO. 6379

ISSUE DATE 3/11/2022

SHEET NO. 1 of 2

3/24/2022 11:03 AM N:\6300S\6379 - FRAMINGHAM ON-CALL\TO 31-CULVERTS\MAIN STREET\6379 - MAIN ST CULVERT.DWG (BETA STB BW.STB)

CULVERT
STA 0+00 TO STA 5+00.00



NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS

DRAWN BY:

DESIGNED BY:

CHECKED BY:

REGISTERED PROFESSIONAL

For Review Only

PREPARED BY

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SUBCONSULTANT

SCALE

HOR. SCALE IN FEET: 1"=20'
20 0 20 40
VER. SCALE IN FEET: 1"=4'
4 0 4 8

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

TITLE

FRAMINGHAM CULVERTS
MAIN STREET
GENERAL PLAN 2

BETA JOB NO. 6379

ISSUE DATE 3/11/2022

SHEET NO. **2 of 2**

3/24/2022 10:37 AM N:\6300\S\6379 - FRAMINGHAM ON-CALL\TO 31-CULVERTS\MAIN STREET\6379 - MAIN ST CULVERT.DWG (BETA STB BW STB)

Draft 100% Design - Opinion of Probable Construction Cost
Boardwalk and Stream Restoration
Walnut Street Area Flood Mitigation - City of Framingham MA
June 30, 2022

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
1	Mobilization and Demobilization _____ Dollars and Cents	LS	1	$ 50,000.00	$ 50,000.00
2	Traffic Management _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
3	Demolition _____ Dollars and Cents	LS	1	$ 10,000.00	$ 10,000.00
4	Clearing and Grubbing _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
5	Temporary Water Management/Brook Diversion _____ Dollars and Cents	LS	1	$ 30,000.00	$ 30,000.00
6	Helical Piles _____ Dollars and Cents	LS	1	$ 160,000.00	$ 160,000.00
7	Steel Support System _____ Dollars and Cents	Ton	23	$ 12,500.00	$ 287,500.00
8	Walking Surface Deck _____ Dollars and Cents	SF	2500	$ 30.00	$ 75,000.00
9	Handrails, Posts, Balusters, Screens _____ Dollars and Cents	LF	600	$ 250.00	$ 150,000.00
10	Removal and Disposal of Fill Under Boardwalk _____ Dollars and Cents	Ton	320	$ 60.00	$ 19,200.00
11	Precast Headwall and Wingwall _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
12	Stormwater BMP _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
13	Reinforced Concrete Approach Ramps _____ Dollars and Cents	CY	20	$ 1,100.00	$ 22,000.00

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
14	Permanent Signage _____ Dollars and Cents	ea.	1	$ 10,000.00	$ 10,000.00
15	Educational Kiosks at Outlooks _____ Dollars and Cents	ea.	2	$ 10,000.00	$ 20,000.00
16	Permanent Bollards with Solar Lights _____ Dollars and Cents	ea.	4	$ 2,500.00	$ 10,000.00
17	Round Post Lock Removable Bollards _____ Dollars and Cents	ea.	2	$ 2,000.00	$ 4,000.00
18	Bituminous Concrete Binder Course _____ Dollars and Cents	Ton	60	$ 300.00	$ 18,000.00
19	Bituminous Concrete Wearing Course _____ Dollars and Cents	Ton	50	$ 400.00	$ 20,000.00
20	Stream Restoration Type A _____ Dollars and Cents	LF	525	$ 325.00	$ 170,625.00
21	Stream Restoration Type B _____ Dollars and Cents	LF	330	$ 225.00	$ 74,250.00
22	Stream Restoration Type C _____ Dollars and Cents	LF	480	$ 250.00	$ 120,000.00
23	Stream J Hooks _____ Dollars and Cents	ea.	10	$ 1,000.00	$ 10,000.00
24	Stream Cross Veins _____ Dollars and Cents	ea.	4	$ 2,500.00	$ 10,000.00
25	Construction Matting _____ Dollars and Cents	LS	1	$ 75,000.00	$ 75,000.00
26	Removal and Disposal of Soil/Sediment _____ Dollars and Cents	Ton	1700	$ 75.00	$ 127,500.00
27	Plantings, Stabilization, Loan and Seed _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
28	Remove and Dispose Channel Debris Dams _____ Dollars and Cents	ea.	8	$ 10,000.00	$ 80,000.00

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
29	Erosion and Sedimentation Control _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
30	Site Restoration on Private Properties _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
31	Police Detail Allowance _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
32	Miscellaneous Work and Cleanup _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
				Sub-Total Project Cost	$ 1,763,075
				10% Contingency	$ 176,308
				Total Project Cost	**$ 1,939,383**

NEWPORT CONSTRUCTION CORPORATION

145 TEMPLE STREET
NASHUA, NH 03060

603.882.1700 ph
603.882.2784 fax
info@NewportCorporation.com

To:	CITY OF FRAMINGHAM	**Contact:**	Diane E. Hayes, P.E.
Address:	100 Western Avenue	**Phone:**	508-532-6009
	Framingham, MA 01702	**Fax:**	508-620-4801
Project Name:	Framingham, MA - Emergency Culvert Repair	**Bid Number:**	
Project Location:	74 Main Street, Framingham, MA	**Bid Date:**	4/7/2022

Item #	Item Description	Estimated Quantity	Unit	Unit Price	Total Price
Phase 1 - HW#2 STA 0+27 To DMH-3 STA 1+74					
120.1	UNCLASSIFIED EXCAVATION	200.00	CY	$7.00	$1,400.00
146.	DRAINAGE STRUCTURE REMOVED	4.00	EACH	$2,000.00	$8,000.00
151.	GRAVEL BORROW	125.00	CY	$3.00	$375.00
170.	FINE GRADING AND COMPACTING	410.00	SY	$20.00	$8,200.00
180.903	Management, Hauling And Disposal Of Impacted Soil Less Than RCS-1	200.00	TON	$45.00	$9,000.00
201.5	CATCH BASIN - MUNICIPAL STANDARD	2.00	EACH	$9,000.00	$18,000.00
202.01	MANHOLE - MUNICIPAL STANDARD	5.83	EACH	$9,000.00	$52,470.00
220.	DRAINAGE STRUCTURE ADJUSTED	2.00	EACH	$600.00	$1,200.00
222.30	FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD	6.00	EACH	$350.00	$2,100.00
234.48	48 INCH DRAINAGE PIPE - HDPE	160.00	LF	$550.00	$88,000.00
252.12	12 INCH CORRUGATED PLASTIC (POLYETHYLENE) PIPE	150.00	FOOT	$200.00	$30,000.00
472.	HOT MIX ASPHALT FOR MISCELLANEOUS WORK	120.00	TON	$300.00	$36,000.00
482.3	SAWING ASPHALT PAVEMENT	500.00	FOOT	$0.01	$5.00
697.	SEDIMENTATION FENCE	140.00	LF	$4.00	$560.00
697.9	STRAW WATTLES	140.00	LF	$5.00	$700.00
751.	LOAM BORROW & SEED	75.00	CY	$6.00	$450.00
852.	SAFETY SIGNING FOR CONSTRUCTION TRAFFIC	290.00	SF	$5.00	$1,450.00
854.91	TEMPORARY PAVING MARKINGS - 4 IN. (PAINTED)	400.00	LF	$0.50	$200.00
901.	4000 PSI, 1.5 IN., 565 CEMENT CONCRETE	55.00	CY	$200.00	$11,000.00
910.	STEEL REINFORCEMENT FOR STRUCTURES	1,000.00	LB	$7.00	$7,000.00
986.	Modified Rockfill	70.00	TON	$70.00	$4,900.00
999.5	Emergency Repair Work	1.00	LS	$50,000.00	$50,000.00
	Total Price for above Phase 1 - HW#2 STA 0+27 To DMH-3 STA 1+74 Items:				**$331,010.00**
Phase 2 - DMH-3 STA 1+74 To DMH-5 STA 3+47					
120.1	UNCLASSIFIED EXCAVATION	205.00	CY	$7.00	$1,435.00
146.	DRAINAGE STRUCTURE REMOVED	2.00	EACH	$2,000.00	$4,000.00
151.	GRAVEL BORROW	180.00	CY	$3.00	$540.00
170.	FINE GRADING AND COMPACTING	310.00	SY	$20.00	$6,200.00
180.903	Management, Hauling And Disposal Of Impacted Soil Less Than RCS-1	250.00	TON	$45.00	$11,250.00
201.5	CATCH BASIN - MUNICIPAL STANDARD	1.00	EACH	$9,000.00	$9,000.00
202.01	MANHOLE - MUNICIPAL STANDARD	3.89	EACH	$9,000.00	$35,010.00
222.30	FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD	3.00	EACH	$350.00	$1,050.00
234.48	48 INCH DRAINAGE PIPE - HDPE	170.00	LF	$550.00	$93,500.00
238.12	12 Inch Ductile Iron Pipe	40.00	FOOT	$250.00	$10,000.00
472.	HOT MIX ASPHALT FOR MISCELLANEOUS WORK	180.00	TON	$300.00	$54,000.00
482.3	SAWING ASPHALT PAVEMENT	580.00	FOOT	$0.01	$5.80
852.	SAFETY SIGNING FOR CONSTRUCTION TRAFFIC	250.00	SF	$5.00	$1,250.00

NEWPORT CONSTRUCTION CORPORATION

145 TEMPLE STREET
NASHUA, NH 03060

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To:	CITY OF FRAMINGHAM	**Contact:**	Diane E. Hayes, P.E.
Address:	100 Western Avenue	**Phone:**	508-532-6009
	Framingham, MA 01702	**Fax:**	508-620-4801
Project Name:	Framingham, MA - Emergency Culvert Repair	**Bid Number:**	
Project Location:	74 Main Street, Framingham, MA	**Bid Date:**	4/7/2022

Item #	Item Description	Estimated Quantity	Unit	Unit Price	Total Price
854.91	TEMPORARY PAVING MARKINGS - 4 IN. (PAINTED)	400.00	LF	$0.50	$200.00
999.5	Emergency Repair Work	1.00	LS	$42,000.00	$42,000.00
	Total Price for above Phase 2 - DMH-3 STA 1+74 To DMH-5 STA 3+47 Items:				**$269,440.80**
Phase 3 - DMH-5 STA 3+47 To HW#1					
120.1	UNCLASSIFIED EXCAVATION	180.00	CY	$7.00	$1,260.00
146.	DRAINAGE STRUCTURE REMOVED	3.00	EACH	$2,000.00	$6,000.00
151.	GRAVEL BORROW	120.00	CY	$3.00	$360.00
170.	FINE GRADING AND COMPACTING	250.00	SY	$20.00	$5,000.00
180.903	Management, Hauling And Disposal Of Impacted Soil Less Than RCS-1	125.00	TON	$45.00	$5,625.00
201.5	CATCH BASIN - MUNICIPAL STANDARD	2.00	EACH	$9,000.00	$18,000.00
202.01	MANHOLE - MUNICIPAL STANDARD	2.90	EACH	$9,000.00	$26,100.00
222.30	FRAME AND GRATE (OR COVER) MUNICIPAL STANDARD	4.00	EACH	$350.00	$1,400.00
234.48	48 INCH DRAINAGE PIPE - HDPE	70.00	LF	$550.00	$38,500.00
252.12	12 INCH CORRUGATED PLASTIC (POLYETHYLENE) PIPE	60.00	FOOT	$200.00	$12,000.00
470.	HOT MIX ASPHALT BERM	4.00	TON	$165.00	$660.00
472.	HOT MIX ASPHALT FOR MISCELLANEOUS WORK	115.00	TON	$300.00	$34,500.00
482.3	SAWING ASPHALT PAVEMENT	400.00	FOOT	$0.01	$4.00
580.	CURB REMOVED AND RESET	40.00	FOOT	$30.00	$1,200.00
670.	FENCE REMOVED AND RESET	60.00	FOOT	$30.00	$1,800.00
685.	STONE MASONRY WALL IN CEMENT MORTAR	65.00	SF	$700.00	$45,500.00
697.	SEDIMENTATION FENCE	135.00	LF	$4.00	$540.00
697.9	STRAW WATTLES	135.00	LF	$5.00	$675.00
751.	LOAM BORROW & SEED	90.00	CY	$6.00	$540.00
852.	SAFETY SIGNING FOR CONSTRUCTION TRAFFIC	240.00	SF	$5.00	$1,200.00
854.91	TEMPORARY PAVING MARKINGS - 4 IN. (PAINTED)	200.00	LF	$0.50	$100.00
869.06	6 INCH REFLECTORIZED YELLOW LINE (EPOXY)	100.00	LF	$1.00	$100.00
901.	4000 PSI, 1.5 IN., 565 CEMENT CONCRETE	60.00	CY	$200.00	$12,000.00
910.	STEEL REINFORCEMENT FOR STRUCTURES	1,000.00	LB	$7.00	$7,000.00
986.	Modified Rockfill	50.00	TON	$70.00	$3,500.00
999.5	Emergency Repair Work	1.00	LS	$50,000.00	$50,000.00
	Total Price for above Phase 3 - DMH-5 STA 3+47 To HW#1 Items:				**$273,564.00**

Total Bid Price: $874,014.80

Notes:

- Newport Construction Corporation above pricing is based upon Newport's interpretation of a preliminary conceptual set of project documents. Newport reserves the right to re-price the work once the design has been finalized.

NEWPORT CONSTRUCTION CORPORATION

145 TEMPLE STREET
NASHUA, NH 03060

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Address:	100 Western Avenue	**Phone:**	508-532-6009
	Framingham, MA 01702	**Fax:**	508-620-4801
Project Name:	Framingham, MA - Emergency Culvert Repair	**Bid Number:**	
Project Location:	74 Main Street, Framingham, MA	**Bid Date:**	4/7/2022

ACCEPTED:

The above prices, specifications and conditions are satisfactory and are hereby accepted.

Buyer: _____

Signature: _____

Date of Acceptance: _____

CONFIRMED:

NEWPORT CONSTRUCTION CORPORATION

Authorized Signature: _____

Estimator: Tom Maimone
603-882-1700 Ext. 239
t.maimone@newportconstruct.com

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

MEMORANDUM

TO:	Kerry Reed, P.E., LEED AP, Senior Engineer, City of Framingham
FROM:	Jaurice A. Schwartz, P.E., Jennifer MacGregor, P.E., Kevin Connolly, P.E., Weston & Sampson and Sam Bade, President, SSV Engineering, Inc.
DATE:	June 30, 2022
SUBJECT:	Walnut Street Area Flood Mitigation –Final Design Memorandum

---

Background and Scope of Services

In accordance with our General Services Agreement dated November 28, 2018, and Task Order No. 22, dated October 12, 2021, Weston & Sampson Engineers, Inc. is pleased to submit this Draft 100% Design Basis Memorandum regarding the Walnut Street Neighborhood Flood Mitigation Design and Permitting Project.

The City received funding though the Municipal Vulnerability Preparedness (MVP) Action Grant Program and FEMA's Flood Mitigation Assistance (FMA) Grant Program to perform the Walnut Street Flood Mitigation Study (Study) that was completed in June 2021. The main objective of the Study was to develop design alternatives to mitigate not only current flooding experienced by the residents of Walnut Street, but also consider projections from future climate impacts (Year 2070). The Study also included near 30% designs for the three (3) flood mitigation alternatives recommended for implementation including anticipated environmental permitting and planning level construction cost estimates.

The scope of services for this project includes final design and preparation of required environmental permit submittals for two of the three flood mitigation alternatives recommended by the Study, which include:

- Pedestrian Boardwalk/Bridge - Replace existing culvert with a channel across the walkway between Walnut St. and Stonybrook Rd. to create/provide additional flood storage, and install an elevated boardwalk.
- Stream Restoration - Channel clearing and stabilization to enhance conveyance capacity in Sucker Brook and an unnamed stream.

During the development of the 60%, 90% and 100% designs, meetings were held with various City departments to seek input on the intended use of the proposed boardwalk, its material of construction, opportunities for public education on wetlands resources, along with other specific design criterion. Separate meetings were also held with the City's Conservation Commission to review the stream restoration project.

Project Understanding

There is an existing walkway on an earthen embankment (known as the "School Path") which crosses the wetland between Walnut Street (near the intersection with Buckminster Street) and the end of Stonybrook Road. The walkway, with chain link fence along both sides, provides access to area schools and parks. The top of the embankment is at approximately El. 154 and reportedly is submerged several times a year making it impassable. The embankment and chain link fence also impedes surface water flow through the wetland resulting in sediment build-up, restriction of wild-life and aquatic species passage, and exacerbates flooding.

We understand that the goal of the project is to remove the embankment and construct an elevated pedestrian boardwalk to restore water and habitat connectivity and flood storage within the wetland. The boardwalk deck is planned to be approximately 315-feet long with the ends tying into the existing grade on either side of the wetlands at approximately El. 156 and the center at approximately El. 158. To reduce the impact on the flood storage capacity of the wetland, the City Conservation Commission has requested boardwalk foundations be designed with the minimum practical area.

The project includes stream restoration and removal of blockages and sediment/debris accumulation within portions of Sucker Brook and the unnamed stream behind Walnut Street to enhance the hydrology and to support the created/restored floodplain.

Elevations in this report reference the North American Vertical Datum of 1988 (NAVD 88) datum and are in feet.

Geotechnical Assessment

As part of the geotechnical assessment, Weston & Sampson explored subsurface conditions along the boardwalk alignment by advancing three (3) borings and reviewed logs of borings advanced by others in the vicinity of the boardwalk as part of a City of Framingham sewer project. This information was utilized to assess the soil and groundwater conditions along the proposed boardwalk. The data indicates that the subsurface conditions along the boardwalk generally consist of granular fill, peat and organic silt, sand and silt, and glacial till to the depths explored.

The primary geotechnical consideration for support of the proposed boardwalk is the presence of undocumented (i.e., non-engineered) fill, peat, and organic silt extending to depths of up to about 28.5 feet. These materials are not suitable for support of structure foundations due to the risk of differential settlement from variations in thickness, consistency, compaction, decomposition, and rates of compression of these materials. Additionally, the Massachusetts Building Code does not allow support of foundations on non-engineered fill or organics. Therefore, we recommend supporting the proposed

boardwalk on deep foundations developing their geotechnical capacity in the native sand and glacial till strata.

The depth to the native sand and glacial till bearing strata varies along the length of the boardwalk from approximate El. 152 (2.5 feet below existing grade) at the west end, to approximate El. 125 (29 feet below existing grade) near the middle, and approximate El. 156 (at the ground surface) at the east end. We recommend supporting the boardwalk on either helical piles or driven piles. Additional details are provided in the Geotechnical Engineering Report included in Attachment D.

Wetland Delineation / Mapping / Survey

Weston & Sampson conducted a field-delineation of wetland resource areas to characterize and identify areas within the jurisdiction of the Massachusetts Wetland Protection Act and U.S. Army Corps of Engineers. Resource areas were field verified by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) and the US Army Corps of Engineers methodology. The results of the wetland delineation are provided in the Wetland Delineation Report included in Attachment E.

Two potential vernal pools were initially identified utilizing the Natural Heritage & Endangered Species Program (NHESP) "Potential Vernal Pools" data layer found on the Massachusetts Geographic Informational System (MassGIS) data repository and on MassMapper (MassGIS's Online Mapping Tool). One of the two GIS mapped potential vernal pools was verified in the field as meeting vernal pool criteria by a Weston & Sampson employee who is trained in the vernal pool identification process. The results are included in the Vernal Pool Assessment Report, which is included in attachment F.

Structural Design Recommendations

The proposed pedestrian boardwalk shall be designed in accordance with the International Building Code (IBC 2015) and the Massachusetts State Building Code, 780 CMR. The proposed structure shall be supported on helical piles with a maximum pile to pile spacing of 14 feet. The superstructure shall consist of hot dipped galvanized steel framed beams and girders with a timber deck running perpendicular to the main load carrying members. A cast-in-place concrete slab on grade with a handicap compliant slope, will serve as a transition ramp at each end of the boardwalk. The concrete slab will meet flush with grade at El. 156 and ramp up to El. 158. The ramp shall terminate at a pile supported cast-in-place abutment wall that will support the first bay of steel framing.

The project shall be designed in accordance with the following reference standards:

- International Building Code (IBC 2015)
- Massachusetts State Building Code, 780 CMR – 9th Edition
- Building Code Requirement for Structural Concrete (ACI 318-16)
- Manual of Steel Construction – 15th Edition (American Institute of Steel Construction)

- Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- National Design Specification for Wood Construction (NDS 2018)

The following is the loading criteria for the design of the pedestrian bridge:

- Risk Category II
- Exposure B
- Dead Loads
    - Actual weight of materials
    - Assumed additional 8 pounds per square foot (psf) for additional features, including but not limited to, suspended utilities, built up structures on the deck, and future modifications.
- Live Loads
    - 90 psf pedestrian load
    - H5 truck (8 kips on the rear axle, 2 kips front axle) for snow removal
    - 50 pounds per linear foot (plf) for guardrails, or 200 lb concentrated load (whichever is greater)
- Snow Loads
    - Ground snow load, Pg = 40 psf
    - Minimum flat roof snow load, Pf = 35 psf
    - Exposure factor, Ce = 1.2
    - Importance factor, Is = 1.0
    - Exposure Factor = 1.0
- Wind Loads
    - Wind speed, V = 127 mph
    - Kd = 0.85
    - Kzt = 1.0
    - Kz = 0.57
    - Wind Pressure, qz = 20.0 psf
    - Cf = 2.6 max, 1.15 min
    - Wind force = 23.5 psf
- Seismic Loads
    - Soil Site Class E (See Attachment D, Geotechnical Engineering Report)
    - Ss = 0.194
    - S1 = 0.067

Structural materials intended to be included on the project consist of cast-in-place concrete, hot-dipped galvanized structural steel, and pressure treated wood.

- Concrete shall be reinforced with design, mixing of concrete, fabrication and erection of reinforcement, and installation of concrete shall be in general conformance with the American Institute of Concrete (ACI) 318-16.
    - Steel reinforcement shall be deformed, uncoated bars in accordance with ASTM A615, Grade 60.
    - Concrete 28-day compressive strength (f'c) shall be a minimum of 4000 psi for foundations and walls.
    - Concrete shall be air entrained.
- Structural steel shall be hot rolled with a hot-dipped galvanized finished.

  - Wide flange shapes shall be in accordance with ASTM A992, Fy = 50 ksi.
  - Hollow structural sections (HSS) members shall be in accordance with ASTM A500, Grade C (Fy = 50 ksi).
  - Angles, plates, and channels shall be in accordance with ASTM A36, Fy = 36 ksi.
  - Anchor rods shall be in accordance with ASTM F1554, Grade 55 (Fy = 55 ksi).
  - Bolts shall be in accordance with ASTM A325.
  - Welds shall be performed by certified welders and shall conform to the "Structural Welding Code – Steel" as indicated by the American Welding Society. Electrodes shall be E70XX.
  - Galvanizing shall be in accordance with ASTM A123 and ASTM A153.
- Wood shall be in general conformance with the National Design Specifications (NDS) 2015.
  - Wood decking shall be naturally durable hardwood IPE (Tabebuia serratifolia; Brazilian Walnut) or Southern-Pine, Grade No. 1 or better.
  - Minimum Fb = 1500 psi.

Foundation/Geotechnical Considerations

Borings performed at the existing site encountered organic material at depths extending up to 28 feet below existing grade. Massachusetts State Building code does not allow shallow foundations on non-engineered fill or organics. Therefore, Weston & Sampson recommends deep foundations be installed through the layers of undocumented fill and organics and into the native sand and glacial till strata below. The proposed deep foundations, assumed to be helical piles, shall be spaced up to a maximum of 14 feet apart. Each group of helical piles, referred to as a "bent" shall consist of 3 helical piles, equally spaced. Piles shall be installed at both a vertical and battered orientation to resist all vertical and lateral forces as provided by the Engineer. Final pile layout and design shall be performed by a Professional Engineer licensed in the Commonwealth of Massachusetts. Concrete abutments are assumed to be supported on helical piles, with a minimum of 4 at each location. Piles shall be installed to minimum depths as indicated within the Geotechnical Engineering Report provided in Attachment D. Contractor shall perform pile load testing to verify the axial capacity of the helical piles in the field, as also indicated in the Geotechnical Engineering Report included in Attachment D.

Superstructure

The boardwalk shall be supported by structural steel beams and girders. At each bent location, a hot-dipped galvanized wide flange girder shall be bolted to the top plate of the helical piles, spanning perpendicular to the bridge. The limiting design factor of the superstructure shall be the strength of the timber deck. We are assuming 3x6 pressure treated decking will be used in this project, Southern-Pine No. 1 or greater. Standard 2x6 decking would not be feasible as steel joists will have to be spaced 12 in or less, center to center. IPE decking is a stronger, but more expensive design option that the City may also want to consider for this project. A minimum of five hot-dipped galvanized beams, equally spaced, will span between each bent, bolted directly to the steel girders. The beams shall have continuous wood blocking fastened to the top flange with countersunk bolts. Stainless steel deck screws shall fasten the 3x6 deck boards directly to the blocking. There will be a hot dipped galvanized channel

at each edge of the deck, also spanning girder to girder. The channel will be raised 4" above the top of deck to act as a continuous toe-kick plate as well as providing an attachment site for the future guardrail. The guardrail posts can be bolted or welded to the edge channel. Refer to landscape architecture details for guardrail design included as part of the 100% Design Drawings provided in Attachment A.

Stream Restoration

A stream assessment field program was conducted in May 2021 to document conditions along Sucker Brook between the Stonybrook Rd Culvert and the Main Street Culvert, and along an unnamed stream east of Walnut Street between Buckminster Street and Main Street. A memorandum dated May 24, 2021 was prepared and included with the Flood Mitigation Alternatives Summary Report dated February 19, 2021 and revised June 30, 2021 summarizing the stream assessment findings and recommendations.

A topographical survey was completed in November/December 2021 to assist with designs for the proposed stream restoration.

The proposed designs for the stream restoration include the following:

Sucker Brook – Between Stonybrook Rd Culvert and the Main Street Culvert

- Removal and restoration of blockages and sediment/debris accumulation to enhance the hydrology and to support the created/restored floodplain
- Approx. 600 LF of stream channel and bank establishment/restoration and stabilization

Unnamed Stream - Between Buckminster Street and Main Street

- Removal and restoration of blockages and sediment/debris accumulation to enhance the hydrology and to support the created/restored floodplain
- Approx. 720 LF of stream channel and bank establishment/restoration and stabilization

Specific goals of the stream restoration project are to:

- Reduce flood elevations through increased conveyance capacity via excavation
- Improve water quality - Encourage frequent water flow in the floodplain so as to retain sediment and improve water quality
- Maintain a geomorphically stable proposed channel - Design the low flow channel to maintain existing transport capacity for silt and sand sized sediment through the project reach and minimize the potential for aggradation that degrades habitat and reduces channel flood conveyance. Pool/riffle structure and downstream slack water channel sections, which are desirable from a habitat perspective, may accumulate sediment and potentially partially conflict with this goal and hence are not proposed.
- Maintain groundwater levels at generally similar elevations to existing conditions
- Prevent nuisance conditions - Avoid stagnant water where mosquitos might breed by sloping the floodplain to drain.
- Simplify project permitting.
    - Avoid impacts to forested areas

- Minimize disturbance of wetlands where possible
- Mitigate disturbance to site plantings where possible. United States Army Corps of Engineers (USACE) may approve impacts to wetlands and the existing mitigation site without off-site mitigation as part of a channel restoration project. Net benefit will need to be established in permitting documents.

Channel Design

The sections of the stream where channel and bank establishment/restoration and stabilization are proposed is based upon closely matching the geometry of the existing channel upstream and downstream of these stream sections. The proposed channel sections have been designed to have a uniform longitudinal slope and to mimic the sinuosity that the lost channel exhibited historically. It appears that the longitudinal slopes will be shallow to nearly flat upon completion of construction. It is anticipated that natural sediment transport as a result of flows in the restored stream channel will occur and establish more pronounced longitudinal slopes.

The proposed stream channel is set at an approximate bankfull section of 8.35 feet top width with 1.75H:1V side slopes, 1.5 feet depth and bottom width ranging between 8.0 and 10.0 feet. At the bankfull flow rate, the restored channel is predicted to have a velocity of 2 fps.

Natural Stream Bed Material and Bank Stabilization

As mentioned above, the longitudinal stream channel slopes will be shallow to flat and the resulting velocities will be low. Existing natural stream bed material will be left in place at the newly established channel bottom upon sediment removal to the design depth. The stream channel will be lined with coir rolls on both sides along the toe of channel slopes and stabilized with live stakes.

Stream Restoration Type A – Unnamed Tributary to Sucker Brook:

The proposed stream restoration work within the unnamed tributary to Sucker Brook will include the re-establishment of a direct hydrologic connection to the channel extending south from the proposed boardwalk and the removal of accumulated sediment/debris and stream restoration along approximately 525 LF of channel extending north from the proposed boardwalk to properties along Walnut Street. The spot removal of accumulated sediment/debris is planned along the remaining 530 LF channelized segment to the Main Street culvert. The channel just south of the Main Street culvert was last maintained by the Mosquito Control Project in 2016.

The focus of the stream restoration is to return the widened channel to a more typical stream channel width and plane form by constructing bioengineered flow deflectors on alternating sides of the channel. The flow deflectors are intended to reintroduce a level of sinuosity within the footprint of the existing channel which in turn will increase habitat complexity and flow rate. The increased velocities within the

narrower channel will promote natural sediment transport processes and allow the channel to become more resilient and self-sustaining. To aid in the initial establishment of a more typical channel cross section, accumulated fine sediments will be removed from the formed channel thalweg.

The unconsolidated existing soils within the wetlands bordering this 525 LF segment preclude the use of even low-ground pressure equipment working from construction mats. Therefore, the restoration design was based on the capabilities of a small amphibious tracked excavator. The initial phase of the work will involve the removal, by hand, of woody debris and vegetation within and overhanging the channel to allow access for the small amphibious machine to access the limits of the stream restoration from either the causeway or a temporary construction easement along Walnut Street. Then working back toward either the boardwalk or Walnut Street, bioengineered flow deflectors would be constructed with approximately 18-20-foot spacing along opposing channel banks. The flow deflectors consist of a 16-inch diameter high density, pre-drilled coir log anchored at each end to the channel bank with 8-10-foot-long wooden stakes. The space between the natural fiber log and channel bank will be packed with salvaged woody material from the clearing operation. Using the predrilled holes, the coir log will be planted with a combination of live stakes and emergent wetland plant plugs. The combination of the bush packing, and planting of the coir log will allow the deflector over time to trap sediment and become a vegetated and stable feature of the stream plane form. As a final measure, sediments from the channel thalweg will be excavated and placed inside each flow deflector for beneficial reuse to accelerate vegetation establishment. This procedure will remove approximately 18 inches of accumulated sediment from the restored channel. The sediment analytical results appear to indicate there would be no restrictions on the beneficial reuse of excavated sediment for in-situ stream restoration measures.

Stream Restoration Type B:

The proposed stream restoration work within the initial 330 LF reach of Sucker Brook, downstream of the Stonybrook Road culvert headwall, includes the installation of scour protection along approximately 30 LF of both stream banks adjacent to the headwall. The restoration work will also involve limited sediment removal within this reach to re-establish a well-defined channel thalweg feature which has been largely lost from the deposition of sediment from upstream sources. Restoring a more typical channel cross section within the reach is anticipated to reduce backwatering conditions within the culvert which in turn will improve the functionality of stormwater outflows along Stonybrook Road which discharge directly into the culvert just upstream of the headwall.

Temporary construction access easements will be obtained by the city, as necessary. The proposed temporary construction access from the sewer pump station off Kittredge Road will substantially reduce construction disturbance to neighborhoods along the eastern side of the project area. This City-owned upland location will be utilized for the temporary dewatering of the excavated sediment. Upon completion of the work, wetland areas disturbed by placement of the construction mats will be restored to previous grades and seeded with a native wetland seed mix. Disturbed upland locations will be restored to original conditions.

Stream Restoration Type C:

Work within the 480 LF segment of the lost channel will consist of both sediment removal and bio-engineered toe-of-slope protection and creating a sinuous natural channel segment. The proposed channel gradient of 0.1% was based on the establishment of a uniform gradient between the culvert invert elevations at Stonybrook Road and Main Street.

Average excavation depths within this reach are approximately 18 inches. As disturbance will be generally limited to the toe of the Inland Bank resource area, no further bank stabilization measures, other than seeding and installing live stakes will occur. No in-stream grade control measures are included in the restoration design due to the proposed uniform project profile. Opportunities to introduce in-stream habitat enhancement measures with salvaged wood or stone will be implemented, where possible, during field construction oversight. Downstream of this sinuous natural channel segment, identified obstructions within the channel during the initial field assessments will be removed using hand tools.

To facilitate construction access, a long array of construction matting will be placed adjacent to the top of bank as shown on Sheets L 201 and L 205 included in Attachment A. The alignment of the construction mats will be adjusted in the field to avoid, wherever possible, the removal of existing trees. Temporary construction access easements will be obtained by the city, as necessary. The proposed temporary construction access from the sewer pump station off Kittredge Road will substantially reduce construction disturbance to neighborhoods along the eastern side of the project area. This City-owned upland location will be utilized for the temporary dewatering of the excavated sediment. Upon completion of the work, wetland areas disturbed by placement of the construction mats will be restored to previous grades and seeded with a native wetland seed mix. Disturbed upland locations will be restored to original conditions.

Flow Diversion and Dewatering

The construction contractor will divert existing flows across the stream section being restored utilizing approved means and methods in accordance with the performance specifications included in the construction bid documents. Work will commence upon installation of approved erosion and sedimentation controls including siltation curtains.

Dewatering is anticipated within the contractor's work zone in-stream, and will be performed in accordance with an approved dewatering plan that meets the requirements of the technical specifications.

Temporary Construction Access

Construction access for the proposed work may pose a challenge as a majority of the proposed work within the stream channels is located either within private properties or will require temporary construction easements on private residential and commercial properties.

The following locations have been identified as potential areas for temporary construction access by the contractor. These locations have been identified for review by the City for suitability and relative ease of requesting and obtaining temporary construction access agreements with the private property owners. These locations have been identified on the Design Drawings included as Attachment A.

#161/159 Walnut Street

The strip of existing lawn area along the northern side of the duplex residence provides direct access from Walnut Street for proposed stream restoration work to the south and debris removal to the north. Overhead wires may pose a slight challenge. Restoration of existing lawn area and temporary impacts to the wetland resource areas will be required.



#161/159 Walnut Street

#205 Walnut Street

The existing paved driveway along the north side of the building (Freida B's Skating Apparel) provides access to the stream from Walnut Street for debris removal to the north and south of this location. Restoration of paving, the existing lawn area and temporary impacts to the wetland resource areas will be required.



#205 Walnut Street

Private Land - Kitteridge Road

An area off of the access road near the entrance to the City's Kitteridge Road Sewage Pumping Station that was previously identified does not appear to be suitable for the proposed stream restoration along Sucker Brook. Tree clearing may be required within the wetlands buffer across multiple properties; however, this may be a viable option if an access agreement cannot be executed with Georgetown Apartments.



Kitteridge Road Sewage Pumping Station Access Road

#87 Stonybrook Road

A portion of the existing driveway and lawn area along the south side of the residence provides access for the proposed stream bank stabilization and stream restoration of Sucker Brook. A utility pole and existing vegetation pose a challenge. Restoration of paving, the existing lawn area, the stormwater system and temporary impacts to the wetland resource areas will be required.



#87 Stony Brook Road

Generalized Sequence of Construction

Following is an anticipated construction sequence assuming that the proposed boardwalk and stream restoration projects will be executed as one construction contract:

- Close work zone to pedestrian traffic
- Establish laydown areas/construction entrance
- Install erosion control measures
- Remove fences along existing school path
- Clear stream channel obstructions within tributary to Sucker Brook
- Install bioengineered flow deflectors and remove accumulated sediment from channel thalweg
- Place beneficially reused sediment to create habitat features or remove and place in containment cells for dewatering
- Remove other noted flow obstructions within tributary to Sucker Brook downstream of this work zone
- Haul dewatered sediment to an approved disposal site
- Clear vegetation within alignment of construction mats for access along Sucker Brook
- Remove private property fencing as necessary
- Construct temporary flow diversions as necessary
- Construct scour protection at Stonybrook Road culvert.
- Remove accumulated sediment from Sucker Brook thalweg for initial 330 LF downstream from Stonybrook culvert
- Construct temporary flow diversions as necessary.
- Remove accumulated sediment from Sucker Brook along next 480 LF of channel and install bioengineered toe of channel slope protection
- Install permanent flow diversion to re-establish flows to newly restored sinuous channel segment
- Remove localized flow obstructions within Sucker Brook downstream of this work zone
- Remove construction mats and restore temporary impacts to wetlands

- Restore impacts to private properties
- Construct stormwater BMP at outfall just west of the proposed boardwalk
- Install boardwalk helical piles
- Remove wetland fill along causeway
- Construct boardwalk superstructure
- Install interpretive signage
- Restore laydown areas
- Open boardwalk to pedestrian traffic
- Initiate stream restoration monitoring protocols

Required Environmental Permits

A technical memorandum was prepared for the Study to analyze the flood mitigation alternatives for required permits. Local, state and federal regulations, and supporting documents, were reviewed to determine which permits will likely be required. These resources included the following:

- City of Framingham Wetlands Protection Bylaw (Section 18)
- City of Framingham Wetlands Protection Regulations
- Massachusetts Wetlands Protection Act (310 CMR 10.00)
- Massachusetts Environmental Policy Act (MEPA) (301 CMR 11.00)
- Massachusetts Chapter 91 regulations (310 CMR 9.00)
- Massachusetts 401 Water Quality Certification Regulations (314 CMR 9.00)
- Massachusetts Endangered Species Act regulations (321 CMR 10.00)
- Department of the Army – General Permits for the Commonwealth of Massachusetts (effective date 4/16/18)

The following permits are anticipated for the project and draft permit applications have been prepared by Weston & Sampson on behalf of the City:

- Notice of Intent – Framingham Conservation Commission
- MEPA Environmental Notification Form
- Joint Chapter 91 Waterways License and 401 Water Quality Certification
- Section 106 Mass Historical Commission
- US Army Corps of Engineers Pre-Construction Notification

A sediment analysis plan (SAP) in support of the 401 Water Quality Certification Application was prepared and submitted to Mass DEP. The SAP was approved by MassDEP, and sampling was completed on May 6, 2022. A Sediment Analysis Report was prepared on June 23, 2022, based on results from the sediment sampling. Technical specifications for the project have been revised, for

proper dewatering and removal, temporary storing, testing with proper transport and disposal of sediment.

The anticipated permit applications were prepared and submitted to the City for review on June 15, 2022. Draft permits were updated per City comments. The following information is still outstanding to bring these permits to completion;

Notice of Intent

- Stormwater Report to be stamped by PE
- Final Plans to be stamped by PE
- Obtain signatures or easements from all property owners where work will occur
- Signature page signed by City
- The permitting package will likely require the following items in the ecological restoration Limited Project checklist (310 CMR 10.24 (8)) –
    - Operation and maintenance plan (infrastructure)
    - Invasive species management plan
- Updated Abutters List – Done before submittal only good for approx. 6 months

Environmental Notification Form

- Stormwater Report to be stamped by PE
- Final Plans to be stamped by PE
- Environmental Justice Community engagement 45-days prior to ENF Submittal
- Signature from City on ENF form
- Easements from all other property owners where work occurs

CH 91/401 Water Quality Certification

- Continued Ch 91 communications for applicability
- SW Report to be stamped by PE
- Ch 91 Signature Pages (Municipal Zoning/Municipal Planning/City Sig)

- Final Plan updates (adding jurisdictional areas specific to Ch 91 and 41 WQC)
- Plans to be stamped by PE

ACOE

- SW Report to be stamped
- Final Plans updates (adding jurisdictional areas specific to ACOE)
- Plans to be stamped by PE
- Final Plans to be stamped by PE

100% Design Drawings

The 100% design drawings are included in Attachment A.

Technical Specifications

Technical specifications for the project are included in Attachment B.

Opinion of Probable Construction Cost

The 100% opinion of probable construction cost for this project is approximately $ 2.42 million, including a 10% contingency as summarized below. A detailed itemized base construction cost estimate has been included as Attachment C.

100% Design – Opinion of Probable Construction Costs	
Item Description	Cost
Base Construction Cost	$ 1,940,000
Construction Oversight	$ 300,000
Bidding Services	$20,000
Filing and Obtaining Permits	$ 45,000
Construction Access Agreements	$50,000
Post Construction Monitoring	$ 40,000
Public Engagement	$20,000
Total	**$ 2,415,000**

Attachments:

Attachment A – 100% Design Drawings
Attachment B – Technical Specifications
Attachment C – Opinion of Probable Construction Cost
Attachment D - Geotechnical Engineering Report
Attachment E – Wetland Delineation Report
Attachment F – Vernal Pool Assessment Report

Attachment A – 100% Design Drawings

CITY OF FRAMINGHAM

TASK ORDER NO. 22 - WALNUT STREET FLOOD MITIGATION

FRAMINGHAM, MA

100% CONSTRUCTION DESIGN PLAN SET

JUNE 2022

STREAM RESTORATION C
WALNUT STREET, FRAMINGHAM, MA 01702

STREAM RESTORATION B
WALNUT STREET, FRAMINGHAM, MA 01702

STREAM RESTORATION A
WALNUT STREET, FRAMINGHAM, MA 01702

STORMWATER OUTFALL BMP
WALNUT STREET, FRAMINGHAM, MA 01702

BOARDWALK
WALNUT STREET, FRAMINGHAM, MA 01702



- RENDERING FOR ILLUSTRATIVE PURPOSES ONLY -

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S901..... 3D VIEWS

Issued Date:

JUNE 30, 2022

811 Know what's below. Call before you dig.

Issued For:

100% SUBMITTAL
NOT RELEASED FOR CONSTRUCTION

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GENERAL NOTES

1. REFER TO EXISTING CONDITIONS FOR SURVEY LEGEND. ALL BIDDERS ARE REQUIRED TO INSPECT THE PROJECT SITE IN ITS ENTIRETY PRIOR TO SUBMITTING THEIR BID, AND BECOME FAMILIAR WITH ALL CONDITIONS AS THEY MAY AFFECT THEIR BID. CONTRACTOR AND SUB-CONTRACTOR SHALL BE FAMILIAR WITH ALL DRAWINGS AND SPECIFICATIONS PRIOR TO COMMENCING CONSTRUCTION.

2. LOCATIONS OF ANY UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF SUCH UTILITIES, PROTECTING ALL EXISTING UTILITIES AND REPAIRING ANY DAMAGE DONE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE COORDINATION WITH UTILITY COMPANIES AND PUBLIC AGENCIES AND FOR OBTAINING ALL REQUIRED PERMITS AND PAYING ALL REQUIRED FEES. IN ACCORDANCE WITH M.G.L. CHAPTER 82, SECTION 40, INCLUDING AMENDMENTS, CONTRACTORS SHALL NOTIFY ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES IN WRITING PRIOR TO EXCAVATION. CONTRACTOR SHALL ALSO CALL "DIG SAFE" AT (888) 344-7233 NO LESS THAN 72 HOURS, (EXCLUSIVE OF WEEKENDS AND HOLIDAYS), PRIOR TO SUCH EXCAVATION. DOCUMENTATION OF REQUESTS SHALL BE PROVIDED TO PROJECT REPRESENTATIVE PRIOR TO EXCAVATION WORK.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING ALL DRAWINGS AND SPECIFICATIONS TO DETERMINE THE EXTENT OF EXCAVATION AND DEMOLITION REQUIRED TO RECEIVE SITE IMPROVEMENTS.

4. ANY DISCREPANCIES OR CONFLICTS BETWEEN THE DRAWINGS AND EXISTING CONDITIONS, EXISTING CONDITIONS TO REMAIN, TEMPORARY CONSTRUCTION, PERMANENT CONSTRUCTION AND WORK OF ADJACENT CONTRACTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER BEFORE PROCEEDING. ITEMS ENCOUNTERED IN AREAS OF EXCAVATION THAT ARE NOT INDICATED ON THE DRAWINGS, BUT ARE VISIBLE ON SURFACE, SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE REMOVED AT NO ADDITIONAL COST TO THE OWNER.

5. ANY ALTERATIONS TO THESE DRAWINGS MADE IN THE FIELD DURING CONSTRUCTION SHALL BE RECORDED BY THE GENERAL CONTRACTOR ON "AS-BUILT" DRAWINGS.

6. ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS OUTSIDE THE PROJECT TERMINI, SHALL BE RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST AND TO THE SATISFACTION OF THE OWNER.

7. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT HIS EMPLOYEES, AS WELL AS PUBLIC USERS FROM INJURY DURING THE ENTIRE CONSTRUCTION PERIOD USING ALL NECESSARY SAFEGUARDS, INCLUDING BUT NOT LIMITED TO, THE ERECTION OF TEMPORARY WALKS, STRUCTURES, PROTECTIVE BARRIERS, COVERING, OR FENCES AS NEEDED.

8. THE CONTRACTOR SHALL SUPPLY THE OWNER WITH THE NAME OF THE OSHA "COMPETENT PERSON" PRIOR TO CONSTRUCTION.

9. FILLING OF EXCAVATED AREAS SHALL NOT TAKE PLACE WITHOUT THE PRESENCE OR PERMISSION OF THE OWNER.

10. EXISTING TREES TO REMAIN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES. NO STOCKPILING OF MATERIAL, EQUIPMENT OR VEHICULAR TRAFFIC SHALL BE ALLOWED WITHIN THE DRIP LINE OF TREES TO REMAIN. NO GUYS SHALL BE ATTACHED TO ANY TREE TO REMAIN. WHEN NECESSARY OR AS DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL ERECT TEMPORARY BARRIERS FOR THE PROTECTION OF EXISTING TREES DURING CONSTRUCTION.

11. NO FILLING SHALL OCCUR AROUND EXISTING TREES TO REMAIN WITHOUT THE APPROVAL OF THE OWNER OR OWNER REPRESENTATIVE.

12. ANY QUANTITIES SHOWN ON PLANS ARE FOR COMPARATIVE BIDDING PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE PROJECT SITE TO VERIFY ALL QUANTITIES AND CONDITIONS PRIOR TO SUBMITTING BID.

13. ALL EXISTING DRAINAGE FACILITIES TO REMAIN SHALL BE MAINTAINED FREE OF DEBRIS, SOIL, SEDIMENT, AND FOREIGN MATERIAL AND OPERATIONAL THROUGHOUT THE LIFE OF THE CONTRACT. REMOVE ALL SOIL, SEDIMENT, DEBRIS AND FOREIGN MATERIAL FROM ALL DRAINAGE STRUCTURES, INCLUDING BUT NOT LIMITED TO, DRAINAGE INLETS, MANHOLES AND CATCH BASINS WITHIN THE LIMIT OF WORK AND DRAINAGE STRUCTURES OUTSIDE THE LIMIT OF WORK THAT ARE IMPACTED BY THE WORK FOR THE ENTIRE DURATION OF CONSTRUCTION.

14. CONTRACTOR'S STAGING AREA MUST BE WITHIN THE CONTRACT LIMIT LINE AND IN AREAS APPROVED BY OWNER. ANY OTHER AREAS THAT THE CONTRACTOR MAY WISH TO USE FOR STAGING MUST BE COORDINATED WITH THE OWNER AND APPROVED PRIOR TO USE.

15. THE CONTRACTOR SHALL BROOM AND CLEAN ALL STREETS, PARKING LOTS AND WALKS THAT ARE NOT RESTRICTED FROM PUBLIC USE DURING CONSTRUCTION AT ALL TIMES. THE CONTRACTOR SHALL USE ACCEPTABLE METHODS AND MATERIALS TO MAINTAIN ADEQUATE DUST CONTROL THROUGHOUT CONSTRUCTION.

16. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER. NOTIFY THE CONSERVATION COMMISSION 48 HOURS PRIOR AND TO THE COMMENCEMENT OF ANY ACTIVITIES WITHIN DEP JURISDICTION PER THE DEP ORDER OF CONDITIONS.

DEMOLITION & SITE PREPARATION NOTES

1. THE CONTRACTOR SHALL INCLUDE IN THE BID THE COST OF REMOVING ANY EXISTING SITE FEATURES AND APPURTENANCES NECESSARY TO ACCOMPLISH THE CONSTRUCTION OF THE PROPOSED SITE IMPROVEMENTS. THE CONTRACTOR SHALL ALSO INCLUDE IN THE BID THE COST NECESSARY TO RESTORE SUCH ITEMS IF THEY ARE SCHEDULED TO REMAIN AS PART OF THE FINAL SITE IMPROVEMENTS. REFER TO PLANS TO DETERMINE EXCAVATION, DEMOLITION AND TO DETERMINE THE LOCATION OF THE PROPOSED SITE IMPROVEMENTS.

2. THE OWNER RESERVES THE RIGHT TO REVIEW ALL MATERIALS DESIGNATED FOR REMOVAL AND TO RETAIN OWNERSHIP OF SUCH MATERIALS. IF THE OWNER RETAINS ANY MATERIAL THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE OWNER TO HAVE THOSE MATERIALS REMOVED OFF SITE AT NO ADDITIONAL COST.

3. UNLESS SPECIFICALLY NOTED TO BE SAVED / STOCKPILED (R&S) OR REUSED / RELOCATED (R&R), ALL SITE FEATURES CALLED FOR REMOVAL (R&D/ REM) SHALL BE REMOVED WITH THEIR FOOTINGS, ATTACHMENTS, BASE MATERIAL, ETC. TO FULL DEPTH AND TRANSPORTED FROM THE SITE TO BE DISPOSED OF IN A LAWFUL MANNER AT AN ACCEPTABLE DISPOSAL SITE AND AT NO COST TO THE OWNER.

4. ALL EXISTING SITE FEATURES TO REMAIN SHALL BE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. ANY FEATURES DAMAGED DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.

5. DURING EARTHWORK OPERATIONS, CONTRACTOR SHALL TAKE CARE TO NOT DISTURB EXISTING MATERIALS TO REMAIN, OUTSIDE THE LIMITS OF EXCAVATION AND BACKFILL AND SHALL TAKE WHATEVER MEASURES NECESSARY, AT THE CONTRACTOR'S EXPENSE, TO PREVENT ANY EXCAVATED MATERIAL FROM COLLAPSING. ALL BACKFILL MATERIALS SHALL BE PLACED AND COMPACTED AS SPECIFIED TO THE SUBGRADE REQUIRED FOR THE INSTALLATION OF THE REMAINDER OF THE CONTRACT WORK.

6. IT SHALL BE THE CONTRACTOR'S OPTION, WITH CONCURRENCE OF THE OWNER, TO REUSE EXISTING GRAVEL PAVEMENT BASE COURSE MATERIAL IF IT IS TESTED TO MEET THE REQUIREMENTS OF THE SPECIFICATIONS FOR GRAVEL BORROW.

7. 'CLEAR AND GRUB VEGETATION' INDICATED ON PLAN SHALL INCLUDE REMOVAL OF SHRUBS AND UNDERBRUSH, REMOVAL OF ROOTS, ROUGH GRADING, INSTALLATION OF LOAM (IF APPLICABLE), FINE GRADING, SEEDING AND TURF ESTABLISHMENT BY THE CONTRACTOR.

8. "STRIP & STORE OR SKIM & STOCKPILE" EXISTING TOPSOIL FOR LATER REUSE WHERE APPROPRIATE, AND AS NOTED ON PLAN, WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.

9. LOAM / TOPSOIL DESIGNATED FOR REUSE AS GENERAL FILL SHALL BE BLENDED WITH SUITABLE BORROW MATERIAL AS SPECIFIED.

10. TREES DESIGNATED FOR REMOVAL SHALL BE TAGGED BY CONTRACTOR AND APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

11. THE CONTRACTOR SHALL PROTECT EXISTING TREES TO REMAIN. CONTRACTOR SHALL INSTALL TREE PROTECTION BARRIER AFTER CLEARING UNDERBRUSH AND TAKE DUE CARE TO PREVENT INJURY TO TREES DURING CLEARING OPERATIONS.

12. THE STORAGE OF MATERIALS AND EQUIPMENT WILL BE PERMITTED AT LOCATIONS DESIGNATED BY OWNER OR OWNER'S REPRESENTATIVE. PROTECTION OF STORED MATERIALS AND EQUIPMENT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

13. DISPOSAL OF EXCESS SOIL OR WASTES ARE SUBJECT TO APPROVAL OF THE OWNER

EROSION AND SEDIMENT CONTROL NOTES

1. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE PUT INTO PLACE PRIOR TO BEGINNING ANY CONSTRUCTION OR DEMOLITION. REFER TO PLAN FOR APPROXIMATE LOCATION OF EROSION AND SEDIMENT CONTROL. REFER TO SPECS AND DETAILS FOR TYPE OF EROSION AND SEDIMENT CONTROL.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUAL MAINTENANCE OF ALL CONTROL DEVICES THROUGHOUT THE DURATION OF THE PROJECT.

3. CONTRACTOR SHALL MEET ALL OF THE STATE OF MASSACHUSETTS D.E.P. AND THE CITY OF FRAMINGHAM'S WETLAND ORDINANCE REGULATIONS FOR SEDIMENT AND EROSION CONTROL.

4. A PERSON SHALL BE DESIGNATED TO BE RESPONSIBLE TO MONITOR COMPLIANCE WITH THE ORDER OF CONDITIONS. NAME AND CONTACT INFORMATION SHALL BE PROVIDED TO THE OFFICE OF THE CONSERVATION COMMISSION PRIOR TO THE START OF ANY ACTIVITY.

   4.1. PERIODIC INSPECTIONS SHALL OCCUR TO ENSURE EFFECTIVENESS OF CONTROLS. SEE ORDER OF CONDITIONS.

   4.2. INSPECTIONS OF CONTROLS SHALL OCCUR AFTER ANY RAIN EVENT GREATER THAN 0.5" OR AFTER HEAVY SNOW MELT.

5. EXCAVATED MATERIAL STOCKPILED ON THE SITE SHALL BE SURROUNDED BY A RING OF UNBROKEN SEDIMENT AND EROSION CONTROL FENCE. THE LIMITS OF ALL GRADING AND DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE APPROVED AREA OF CONSTRUCTION. ALL AREAS OUTSIDE OF THE LIMIT OF CONTRACT SHALL REMAIN TOTALLY UNDISTURBED UNLESS OTHERWISE APPROVED BY OWNER'S REPRESENTATIVE.

6. ALL CATCH BASINS AND DRAIN GRATES WITHIN LIMIT OF CONTRACT AND AS SHOWN IN THE DRAWINGS SHALL BE PROTECTED WITH SEDIMENT SACK DURING THE ENTIRE DURATION OF CONSTRUCTION.

7. EROSION CONTROL BARRIERS TO BE INSTALLED AT THE TOE OF SLOPES. SEE GRADING & DRAINAGE PLANS, NOTES, DETAILS AND SPECIFICATIONS.

8. ANY AREA OUTSIDE THE PROJECT LIMIT THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.

9. THE CONTRACTOR SHALL PROVIDE DUST CONTROL FOR CONSTRUCTION OPERATIONS AS APPROVED BY OWNER.

10. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC/PRIVATE ROADS.

LAYOUT & MATERIALS NOTES

1. COORDINATE ALL LAYOUT ACTIVITIES WITH THE SCOPE OF WORK CALLED FOR BY DEMOLITION, GRADING AND UTILITIES OPERATIONS ENCOMPASSED BY THIS CONTRACT. SET, PROTECT AND REPLACE REFERENCE STAKES AS NECESSARY OR AS REQUIRED BY THE OWNER'S REPRESENTATIVE.

2. ALL WORK SHALL BE PERFORMED BY CONTRACTOR UNLESS SPECIFICALLY INDICATED THAT THE WORK WILL BE PERFORMED "BY CITY".

3. THE LAYOUT OF SITE AMENITIES AND FENCES MUST BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.

4. THE LAYOUT OF ALL NEW PATHWAYS / WALKWAYS AND THE GRADING OF ALL SLOPES AND CROSS SLOPES SHALL CONFORM TO THE COMMONWEALTH OF MASSACHUSETTS RULES AND REGULATIONS FOR HANDICAP ACCESS CMR 521, AND THE AMERICANS WITH DISABILITIES ACT (ADA), TITLE 3. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND THOSE REQUIRED.

5. ALL LAYOUT LINES, OFFSETS, OR REFERENCES TO LOCATING OBJECTS ARE EITHER PARALLEL OR PERPENDICULAR UNLESS OTHERWISE DESIGNATED WITH ANGLE OFFSETS NOTED.

6. ALL PROPOSED SITE FEATURES SHALL BE LAID OUT AND STAKED FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF INSTALLATION. ANY REQUIRED ADJUSTMENTS TO THE LAYOUT SHALL BE UNDERTAKEN AS DIRECTED, AT NO ADDITIONAL COST TO THE OWNER.

7. ALL PROPOSED PAVEMENTS SHALL MEET THE LINE AND GRADE OF EXISTING ADJACENT PAVEMENT SURFACES AND SHALL BE TREATED WITH AN RS-1 TACK COAT AT POINT OF CONNECTION. ALL PATHWAY WIDTHS SHALL BE AS NOTED ON THE LAYOUT AND MATERIALS PLAN.

8. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE OWNER.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD MEASUREMENT OF ALL PROPOSED FENCES AND GATES.

10. THE DEPTH OF LOAM BORROW FOR ALL PROPOSED LAWN AREAS SHALL BE 4" MINIMUM. ALL DISTURBED AREAS SHALL BE RESTORED WITH LOAM AND SEED UNLESS OTHERWISE NOTED

11. ALL REFERENCES TO LOAM AND SEED (L&S) REFER TO HYDROMULCH SEEDED LAWN.

12. EXISTING PATHWAY GRAVEL MATERIALS SHALL BE REUSED WHENEVER POSSIBLE MAKING FIELD APPROVAL MANDATORY PER SPEC.

13. REFER TO DETAIL DRAWINGS FOR SITE CONSTRUCTION DETAILS.

GRADING & DRAINAGE NOTES

1. ALL WORK RELATING TO INSTALLATION, RENOVATION OR MODIFICATION OF WATER, DRAINAGE AND/OR SEWER SERVICES SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS OF THE CITY OF FRAMINGHAM.

2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND GRADES ON THE GROUND AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE OWNER.

3. ALL GRADING IS TO BE SMOOTH AND CONTINUOUS WHERE PROPOSED SURFACE MEETS EXISTING SURFACE, BLEND THE TWO PAVEMENTS AND ELIMINATE ROUGH SPOTS AND ABRUPT GRADE CHANGES AND MEET LINE AND GRADE OF EXISTING CONDITIONS WITH NEW IMPROVEMENTS.

4. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE (1.5% MINIMUM) AWAY FROM ALL BUILDING FOUNDATIONS AND STRUCTURES.

5. CONTRACTOR SHALL ENSURE ALL AREAS ARE PROPERLY PITCHED TO DRAIN, WITH NO SURFACE WATER PONDING OR PUDDLING.

6. WALKWAYS SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT AND THE RUNNING SLOPE (PARALLEL TO THE DIRECTION OF TRAVEL) BETWEEN 1% MIN. AND 4.5% MAX. ALL NEW WALKWAYS / ACCESS PATHS MUST CONFORM TO CURRENT AMERICANS WITH DISABILITIES ACT (ADA) REGULATIONS: WALKWAYS SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN TWO (2%) PERCENT AND THE RUNNING SLOPE (PARALLEL TO THE DIRECTION OF TRAVEL) 5% MAX. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE OWNER PRIOR TO CONTINUING WORK. ANY PATHS/WALKS FOUND TO BE OUT OF COMPLIANCE SHALL BE REGRADED AND REPAVED AT NO COST TO THE OWNER.

7. ALL UTILITY GRATES, COVERS OR OTHER SURFACE ELEMENTS INTENDED TO BE EXPOSED AT GRADE SHALL BE FLUSH WITH THE ADJACENT FINISHED GRADE AND ADJUSTED TO PROVIDE A SMOOTH TRANSITION AT ALL EDGES.

8. THE CONTRACTOR SHALL SET SUBGRADE ELEVATIONS TO ALLOW FOR POSITIVE DRAINAGE AND PROVIDE EROSION CONTROL DEVICES, STRUCTURES, MATERIALS AND CONSTRUCTION METHODS TO DIRECT SILT MIGRATION AWAY FROM DRAINAGE AND OTHER UTILITY SYSTEMS, PUBLIC/PRIVATE STREETS AND WORK AREAS. CLEAN BASINS REGULARLY AND AT THE END OF THE PROJECT.

9. EXCAVATION REQUIRED WITHIN PROXIMITY OF KNOWN EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE OWNER.

10. WHERE NEW EARTHWORK MEETS EXISTING EARTHWORK, CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDS AT ALL TOP AND BOTTOM OF SLOPES.

11. WHERE A SPECIFIC LIMIT OF WORK LINE IS NOT OBVIOUS OR IMPLIED, BLEND GRADES TO EXISTING CONDITIONS WITHIN 5 FEET OF PROPOSED CONTOURS.

12. RESTORE ALL DISTURBED AREAS AND LIMITS OF ALL REMOVALS TO LOAM AND SEED (L&S) UNLESS OTHERWISE NOTED.

13. SEE EARTHWORK SECTION OF SPECIFICATIONS FOR SPECIFIC EXCAVATION AND FILLING PROCEDURES.

GENERAL ABBREVIATIONS

BIT. CONC.	BITUMINOUS CONCRETE
CEM. CONC.	CEMENT CONCRETE
EQ	EQUIPMENT
EXIST. (OR EX.)	EXISTING
EOP	EDGE OF PAVEMENT
G.C.	GENERAL CONTRACTOR
L&S	LOAM AND SEED
LOW	LIMIT OF WORK
N.T.S.	NOT TO SCALE
PROT	PROTECT
PL	PROPERTY LINE
PVMT	PAVEMENT
PROP	PROPOSED
L&S	LOAM AND SEED
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK/STORE
R&D	REMOVE AND DISPOSE
TYP.	TYPICAL
CO	CLEANOUT
DI	DRAIN INLET
WF	WETLAND FLAGGED
CB	CATCH BASIN
INV	INVERT
DMH	DRAIN MANHOLE
RCP	REINFORCED CONCRETE PIPE
APPROX.	APPROXIMATE
ELEV.	ELEVATION

Project:

WALNUT STREET
FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

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GENERAL NOTES

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SURVEY LEGEND

LOW	LIMIT OF WORK
	PROPERTY LINE
	EX. CONTOURS
	FEMA NFHL LINE
	FLAGGED WETLAND EDGE
	EX. CHAIN LINK
▲	WETLAND FLAG
▽	DEBRIS
+00	EX. SPOT GRADE

EX.	EXISTING
TYP.	TYPICAL
WF	WETLAND FLAGGED
CB	CATCH BASIN
INV.	INVERT
DMH	DRAIN MANHOLE
RCP	REINFORCED CONCRETE PIPE
APPROX.	APPROXIMATE
ELEV.	ELEVATION
OHW	OVERHEAD ELECTRIC

SMH 1004570
RIM = 159.61
10" Clay Inv (
10" Clay Inv (

CONCRETE WHEEL STOPS

PAVED

12" Water 4" ST LP GAS

Record 16" CI Force Main

141A & B WALNUT ST SILL=161.3

PAVED

N/F EMRE B TEZDUYAR

50' Wetland No Disturb Zone

WLF#BVW A11

WLF#BVW A10

WLF#BVW A9

WLF#BVW A8

WETLAND

FLAGGED WETLAND EDGE

WLF#BVW A7

BB153.5
CL152.2
BANK153.8

EX. ELECTRICAL UTILITY POST

EX. STONE WALL

EX. CHAIN LINK

EX. GRAVEL/BIT. CONC. WALK

TOWN OF FRAMINGHAM
105 WALNUT ST

Debris

Debris

Debris

Overgrowth

FLAGGED WETLAND EDGE

BENCHMARK
CUT SPK POLE
ELEV.=159.56

WLF#BVW C8

WETLAND

WLF#BVW C9

WLF#BVW C7

CHAIN LINK FENCE (TYP.)

MONITOR WELL

WLF#BVW C6

WLF#BVW C5

WLF#BVW C4

WLF#BVW C2

WLF#BVW C3

WLF#BVW C1

WETLAND

FLAGGED WETLAND EDGE

FEMA NFHL LINE

SMH 1004569
RIM= 160.17
6" SDR Inv (a) = 156.32
10" Clay Inv (b) = 152.30
8" Clay Inv (a) = 152.62
10" Clay Inv (b) = 152.18

GRANITE CURBING
BITUMINOUS SIDEWALK

DMH 57
RIM= 159.72
10" RCP Inv (a) = 155.3
8" AC Inv (b) = 157.3
15" RCP Inv (c) = 154.6
Water @ 154.7
Sediment @ 153.2

Sewer Manhole

Storm Drain

CB 58
RIM= 159.46
8" AC Inv = 157.2
Sediment @ 157.2

100' Wetland Buffer Zone

780±

BITUMINOUS SIDEWALK

GRANITE CURBING

N/F RICHARD & MARGARET HARDY

CB 59
RIM= 159.42
10" RCP Inv (a) = 154.5
12" RCP Inv (b) = 154.3
15" RCP Inv (c) = 154.4
Water @ 153.9
Sediment @ 152.9

PAVED

DMH 61
RIM= 159.92
12" RCP Inv (a) = 154.8
12" RCP Inv (b) = 154.8
Top of 18" Force Main = 155.7

N/F THOMAS & EMILY S MANDERS

DMH 65
RIM= 159.89
12" RCP Inv (a) = 154.8
12" RCP Inv (b) = 154.8
12" RCP Inv (c) = 154.8
15" RCP Inv (d) = 155.2
Water @ 155.0
Sediment @ 153.8

4" GAS

6" W

CB 64
RIM= 159.92
12" RCP Inv (a) = 155.0
12" RCP Inv (b) = 155.0
Sediment @ 153.5

LEMIEUX JOHN P & ELLEN M
98 WALNUT ST

Walnut Street (Public ~ 40' Wide)

4" ST LP GAS

8" W

8" W

GUY WIRE

CROSSWALK

CB
RIM=158.93

18 " RCP
Inv = 153.5

DMH 60
RIM= 159.64
15" RCP Inv (a) = 154.1
15" RCP Inv (b) = 154.5
18" RCP Inv (c) = 154.2

WALKING PATH

UP

WETLAND

WETLAND

DCB 63
RIM= 159.47
15" RCP Inv (a) = 154.9
15" RCP Inv (b) = 154.6
Sediment @ 153.6

N/F ALCIONE R BATISTA

BENCHMARK
CHISELED "X" HYD
ELEV.=162.04

SMH 62
RIM= 159.90
8" Clay Inv (a) = 152.74
10" Clay Inv (b) = 152.74
10" Clay Inv (b) = 152.65

EX. CATCH BASIN
DRAINAGE OUTFALL
SEE STREAM RESTORATION SHEETS

DMH 67
RIM= 159.58
8" RCP Inv (a) = 157.0
10" RCP Inv (b) = 156.2
Water @ 155.8

CB 68
RIM= 159.34
Sediment @ 158.1

CB 66
RIM= 159.34
10" RCP Inv (a) = 155.6
12" RCP Inv (b) = 155.1
12" RCP Inv (c) = 154.9
Water @ 154.2
Sediment @ 153.5

LOWERY CHARLES & DELLA
93 WALNUT ST

0 20 40 60 Feet

SCALE 1"=20'-0"

Project:

WALNUT STREET
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CITY OF FRAMINGHAM, MA

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EXISTING CONDITIONS PLAN

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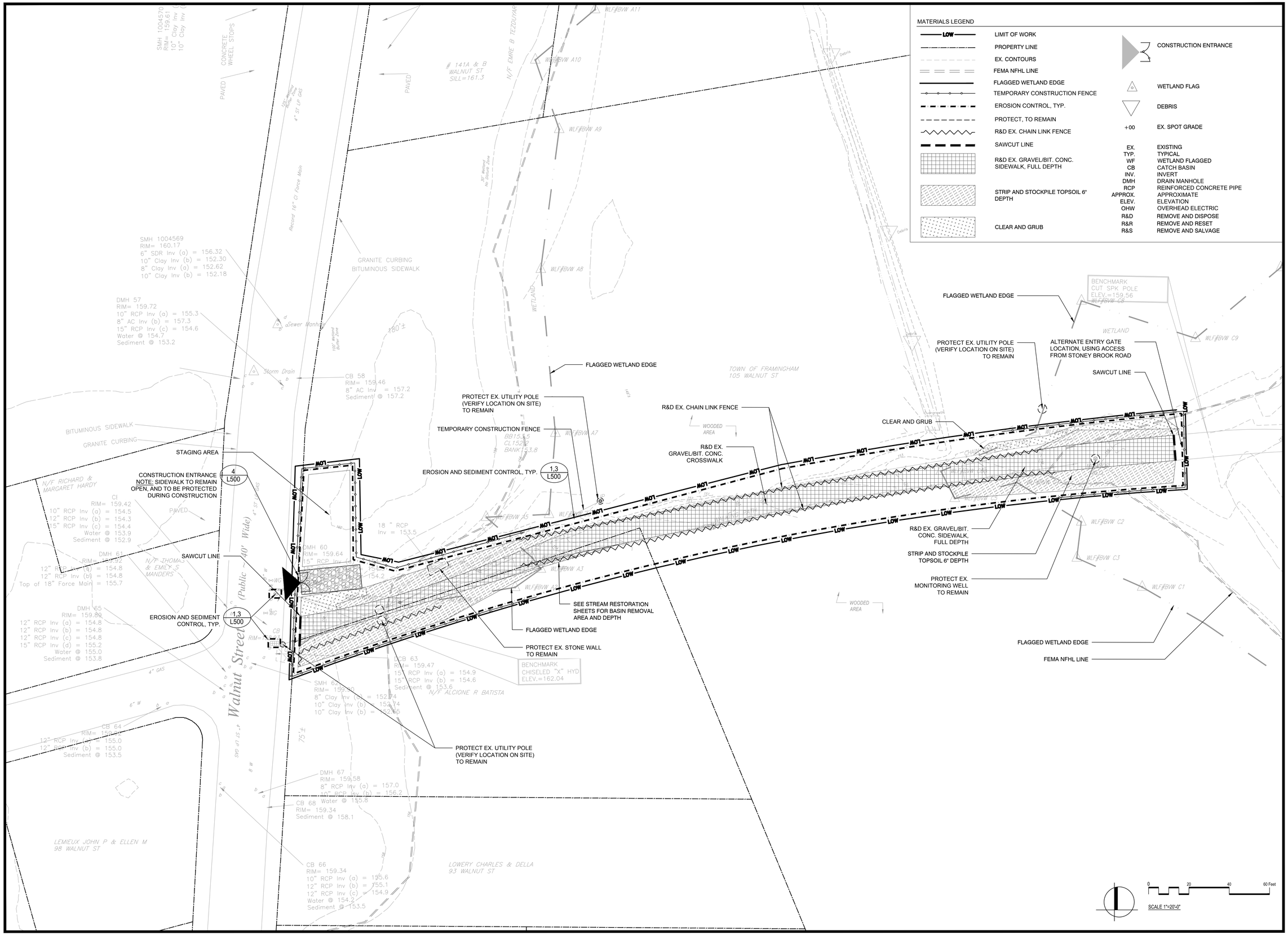

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SITE PREPARATION PLAN

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PLANT_SCHEDULE

SHRUBS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
	CO	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	24"-30" HT.	B&B
	CA	CLETHRA ALNIFOLIA	SUMMERSWEET	24"-30" HT.	B&B
	IW	ILEX VERTICILLATA	WINTERBERRY	24"-30" HT.	B&B
	NW	NEW ENGLAND WILDFLOWER SEED MIX, SEE CHART BELOW			

NEW ENGLAND WILDFLOWER SEED MIX (APPLY TO ALL DISTURBED AREAS)

Botanical Name	Common Name	Indicator
Schizachyrium scoparium	Little Bluestem	FACU
Sorghastrum nutans	Indian Grass	UPL
Chamaecrista fasciculata	Partridge Pea	FACU
Elymus virginicus	Virginia Wild Rye	FACW-
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Asclepias tuberosa	Butterfly Milkweed	NI
Vernonia noveboracensis	New York Ironweed	FACW+
Oenothera biennis	Evening Primrose	FACU-
Aster novae-angliae (Symphyotrichum novae-anglia	New England Aster	FACW-
Rudbeckia hirta	Black Eyed Susan	FACU-
Solidago juncea	Early Goldenrod	
Eupatorium fistulosum (Eutrochium fistulosum)	Hollow-Stem Joe Pye Weed	FACW
Aster lateriflorus (Symphyotrichum lateriflorum)	Starved/Calico Aster	FACW

NOTE:
1. WHEN MATURE TREES OF 10" CALIPER OR GREATER ARE TO BE REMOVED, CONTRACTOR SHALL PLANT 2 NEW TREES OF 2"-2.5" CAL PER EACH TREE REMOVED. SEE LIST BELOW FOR APPROVED TREES TO BE PLANTED AS NEEDED.

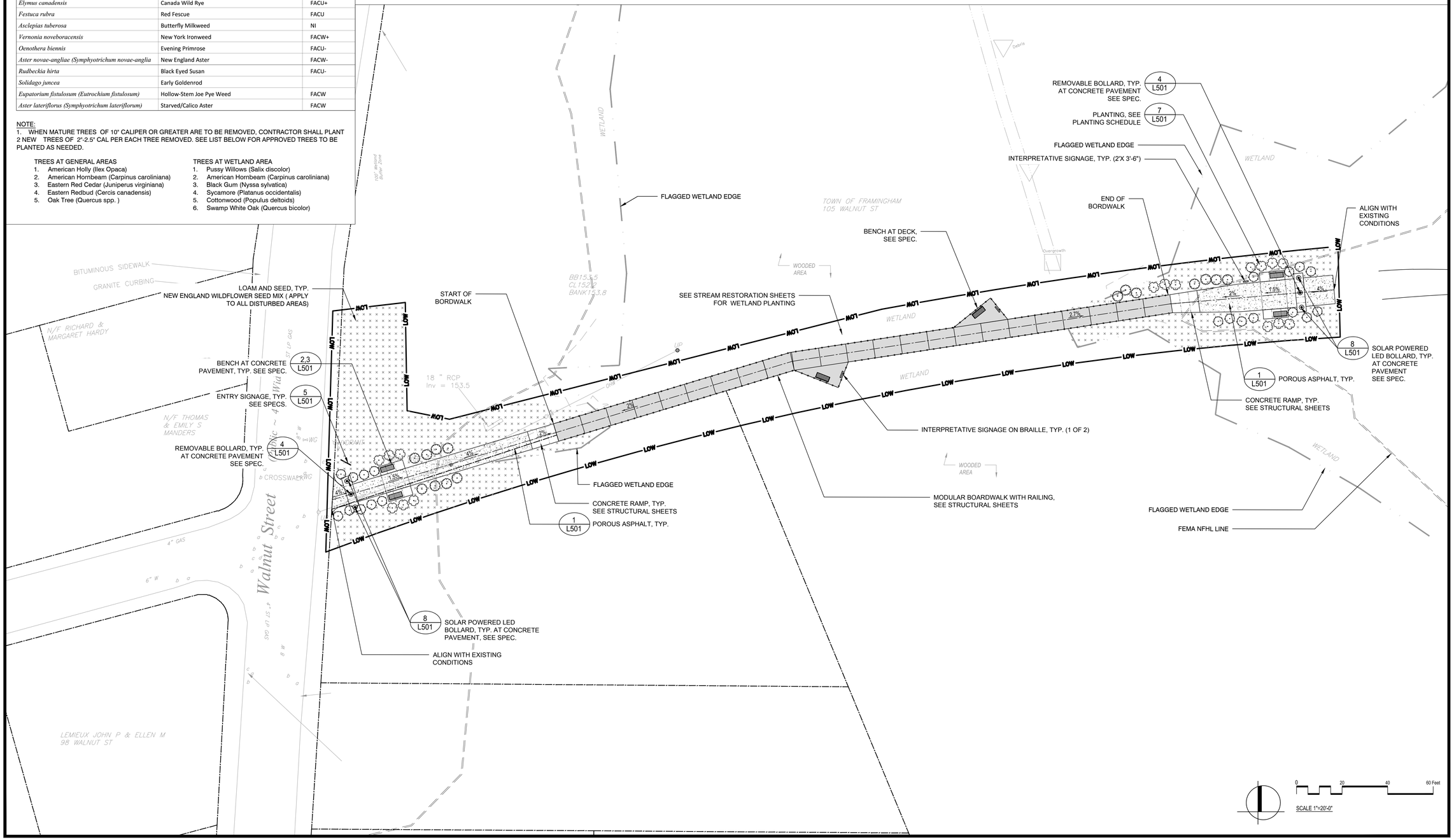
TREES AT GENERAL AREAS
1. American Holly (Ilex Opaca)
2. American Hornbeam (Carpinus caroliniana)
3. Eastern Red Cedar (Juniperus virginiana)
4. Eastern Redbud (Cercis canadensis)
5. Oak Tree (Quercus spp.)

TREES AT WETLAND AREA
1. Pussy Willows (Salix discolor)
2. American Hornbeam (Carpinus caroliniana)
3. Black Gum (Nyssa sylvatica)
4. Sycamore (Platanus occidentalis)
5. Cottonwood (Populus deltoids)
6. Swamp White Oak (Quercus bicolor)

MATERIALS LEGEND

- LOW — LIMIT OF WORK
- PROPERTY LINE
- EX. CONTOURS
- FEMA NFHL LINE
- FLAGGED WETLAND EDGE
- CENTERLINE
- WOOD BOARDWALK, TYP.
- ASPHALT PAVEMENT, TYP.
- CONCRETE PAVEMENT, TYP.
- BENCH, TYP.
- INTERPRETATIVE SIGNAGE, TYP.
- ENTRY SIGNAGE, TYP.
- REMOVABLE BOLLARD, TYP.
- SOLAR POWERED LED BOLLARD, TYP.

EX.	EXISTING
TYP.	TYPICAL
CONC.	CONCRETE
PA	PLANTING AREA
L&S	LOAM AND SEED
CIP	CAST IN PLACE
SPECS.	SPECIFICATIONS
WF	WETLAND
HT.	HEIGHT



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MATERIALS AND PLANTING PLAN

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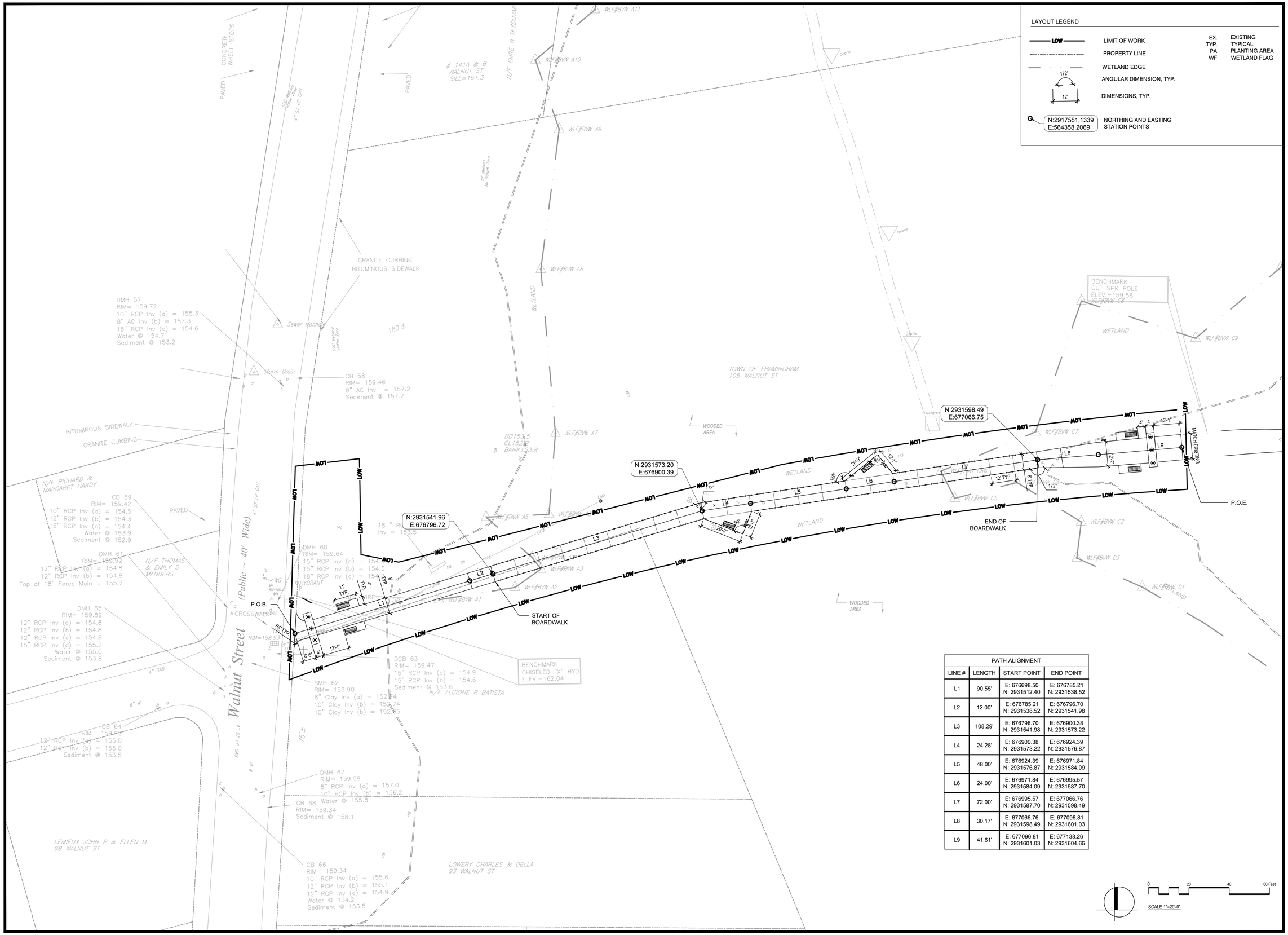

PATH ALIGNMENT			
LINE #	LENGTH	START POINT	END POINT
L1	90.55'	E: 676698.50 N: 2931512.40	E: 676785.21 N: 2931538.52
L2	12.00'	E: 676785.21 N: 2931538.52	E: 676796.70 N: 2931541.98
L3	108.29'	E: 676796.70 N: 2931541.98	E: 676900.38 N: 2931573.22
L4	24.28'	E: 676900.38 N: 2931573.22	E: 676924.39 N: 2931576.87
L5	48.00'	E: 676924.39 N: 2931576.87	E: 676971.84 N: 2931584.09
L6	24.00'	E: 676971.84 N: 2931584.09	E: 676995.57 N: 2931587.70
L7	72.00'	E: 676995.57 N: 2931587.70	E: 677066.76 N: 2931598.49
L8	30.17'	E: 677066.76 N: 2931598.49	E: 677096.81 N: 2931601.03
L9	41.61'	E: 677096.81 N: 2931601.03	E: 677138.26 N: 2931604.65

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LAYOUT PLAN

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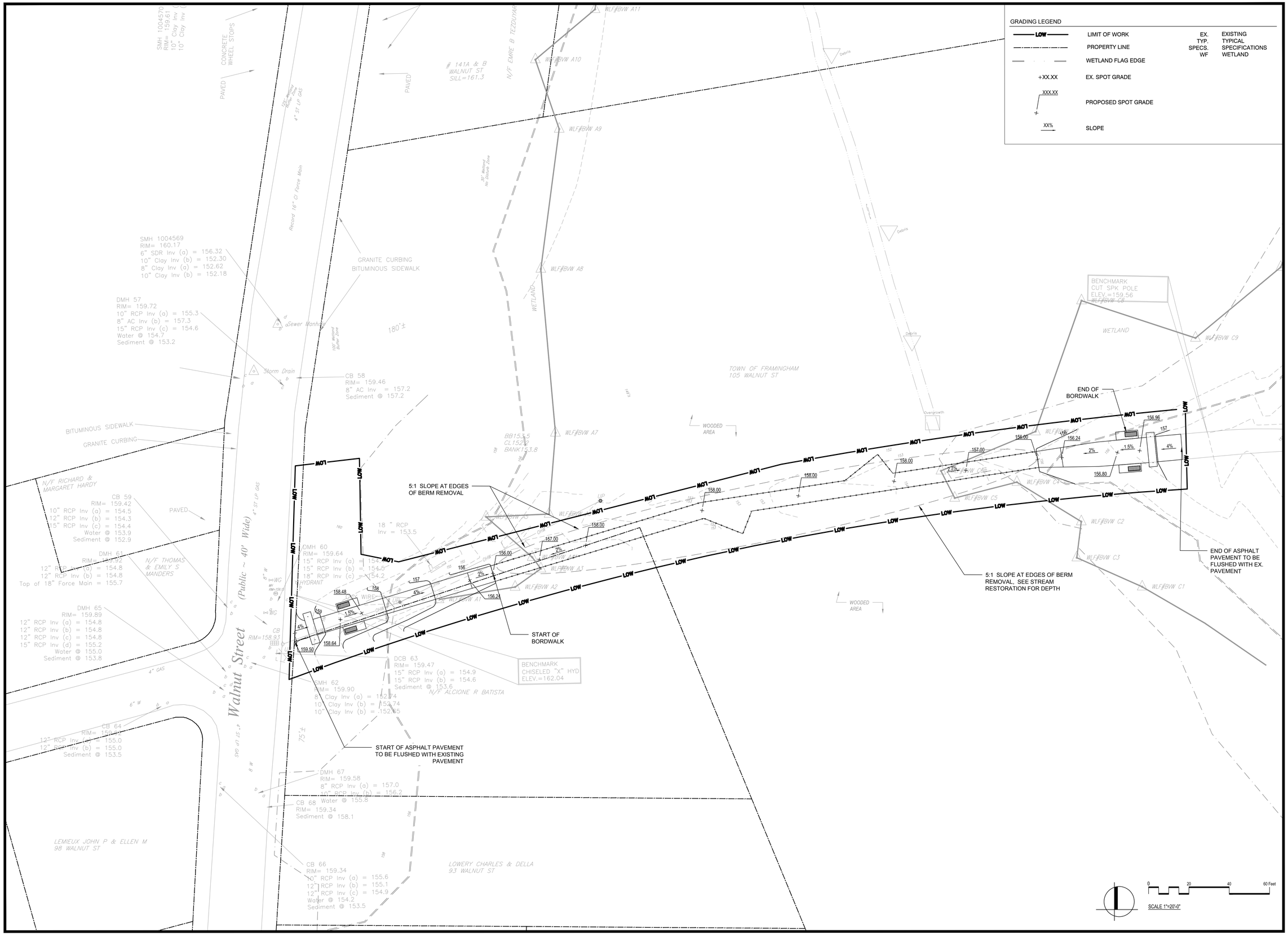

Project:

WALNUT STREET FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

Weston & Sampson

85 Devonshire Street,
3rd Floor, Boston, MA 02109
617.412.4480 800.SAMPSON
www.westonandsampson.com

Consultants:

SSV ENGINEERING INC.

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Ph: 508-745-4077
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GRADING PLAN

Sheet Number:

L140

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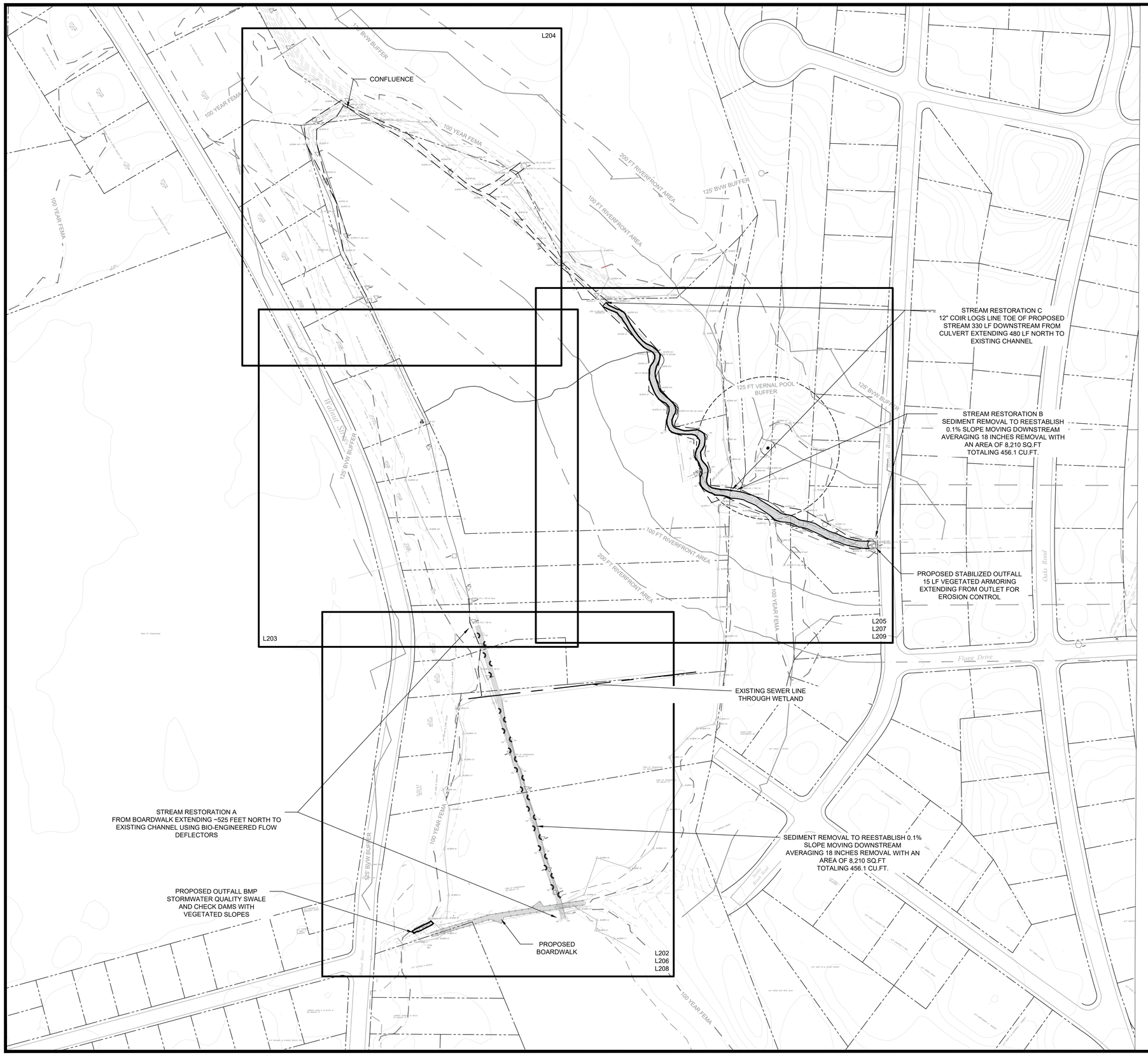

SURVEY LEGEND

- LIMIT OF WORK
- PROPERTY LINE
- EX GRADING
- DEBRIS
- +00 EX. SPOT GRADE
- EX. WETLAND FLAGGED TOE OF BANK (TOB C6)
- TOB Interpolated from Aerial Photography (TOB)
- PROPOSED STREAM RESTORATION
- PROPOSED BOARDWALK
- 100 YEAR FEMA FLOOD ELEVATION (EL. 156)
- 100 FT RIVERFRONT AREA
- 200 FT RIVERFRONT AREA
- BORDERING VEGETATIVE WETLAND (BVW)
- 125' BVW BUFFER

Project:

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STREAM RESTORATION

PLAN

Sheet Number:

L200

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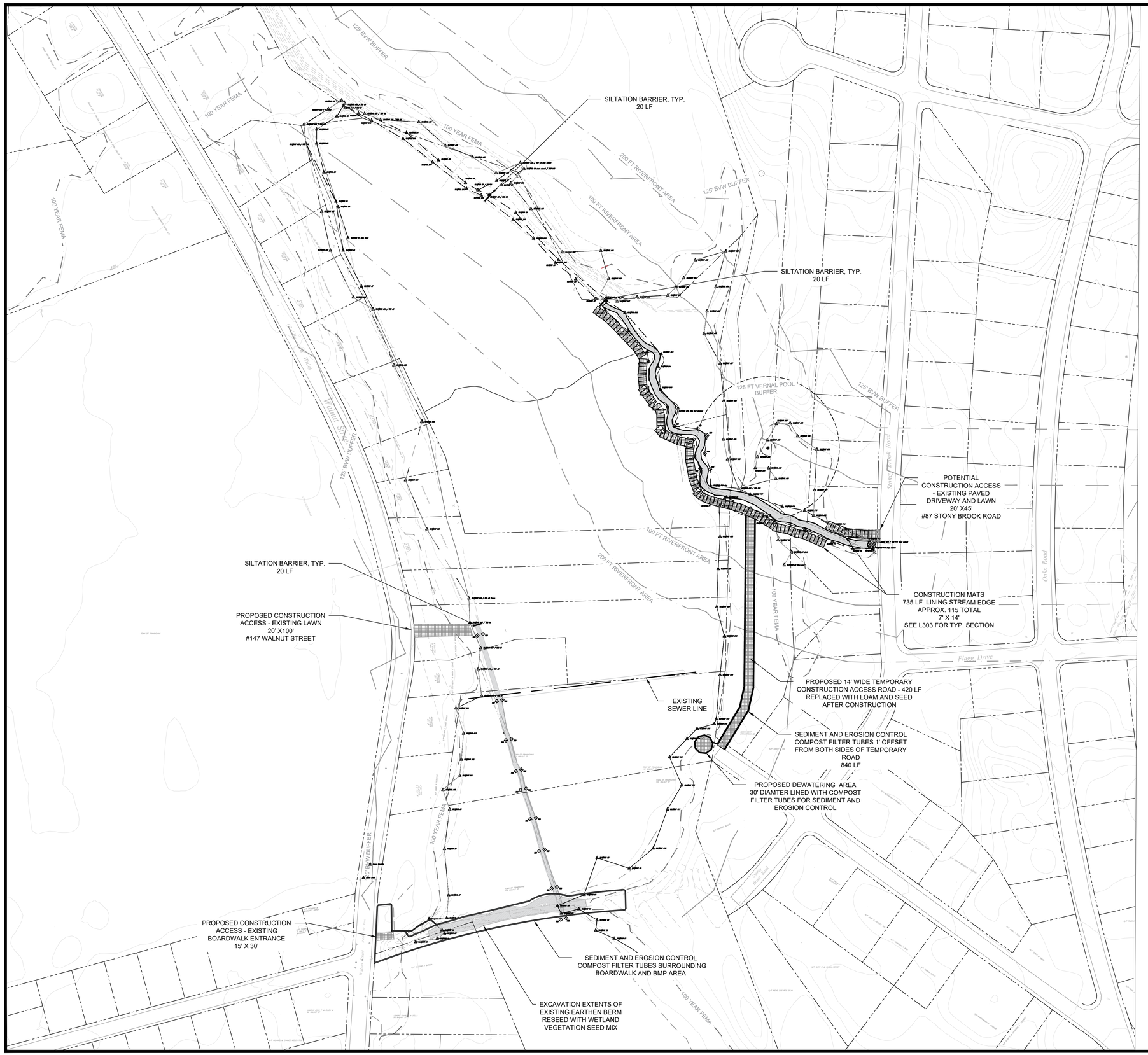

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0 80 160 240 320 feet

SCALE: 1" = 80'

Project:

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STREAM RESTORATION

SITE PREPARATION

Sheet Number:

L201

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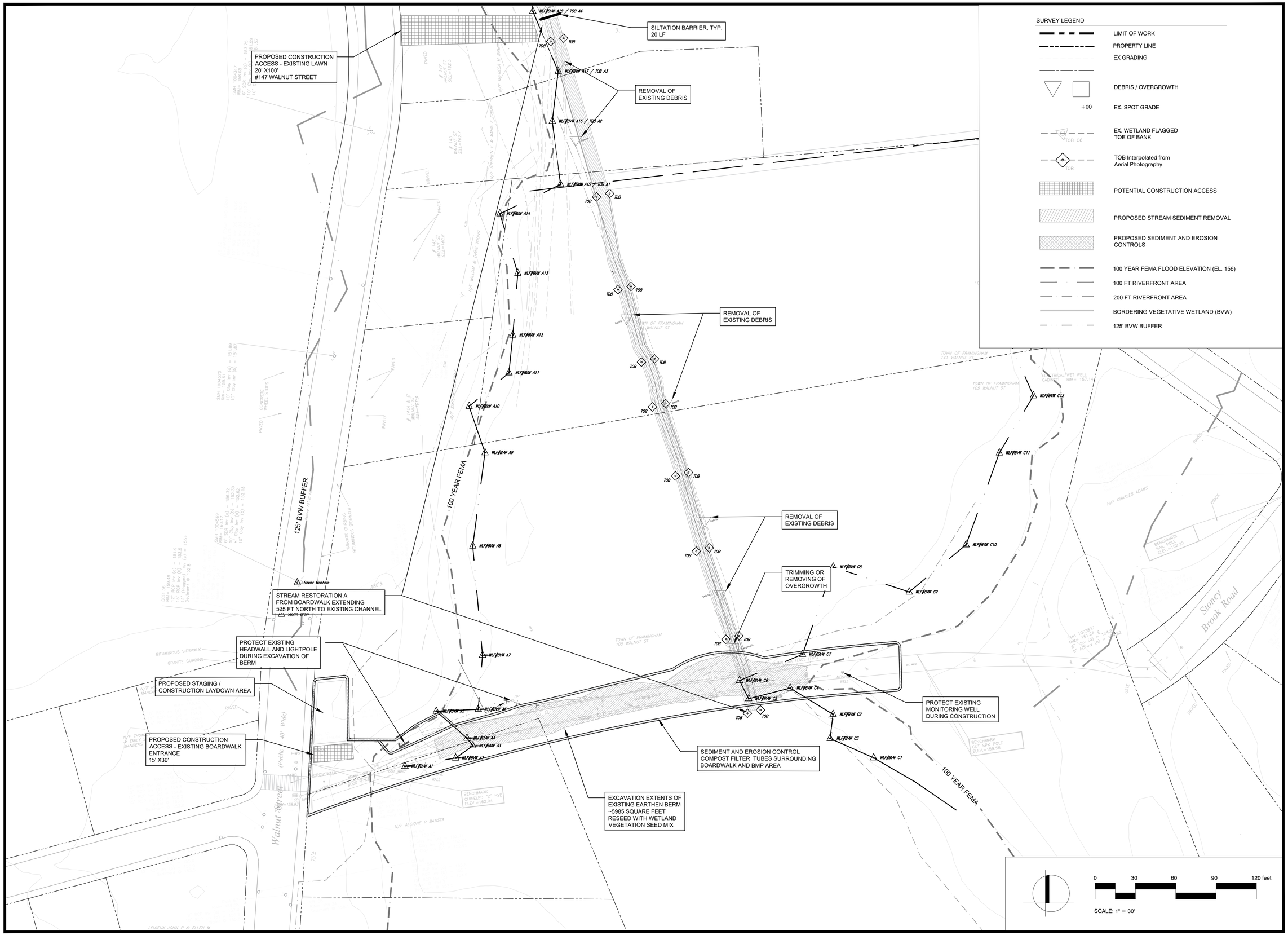

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STREAM RESTORATION

SITE PREPARATION
DETAIL PLAN 1

Sheet Number:

L202

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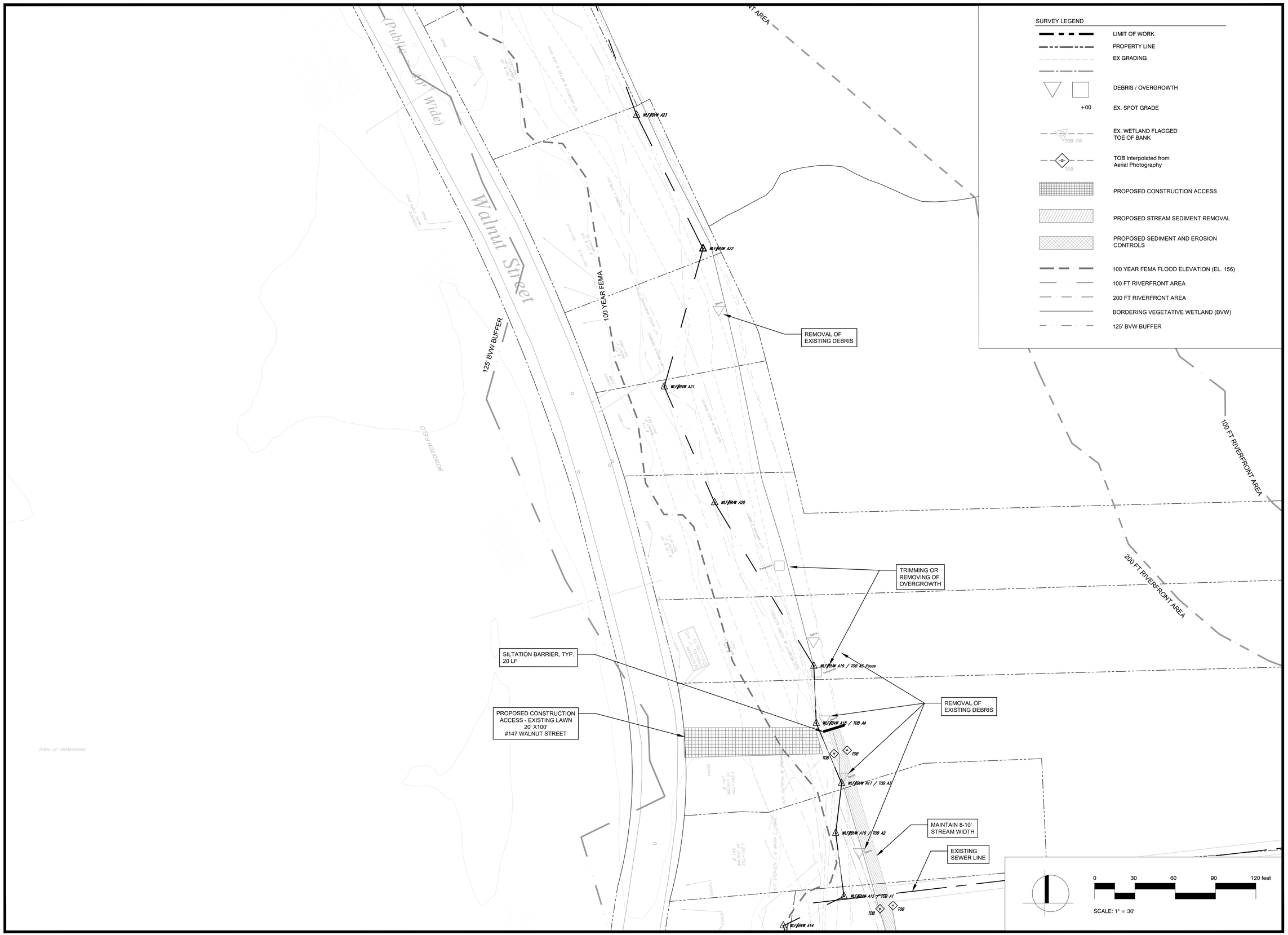

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STREAM RESTORATION

SITE PREPARATION
DETAIL PLAN 2

Sheet Number:

L203

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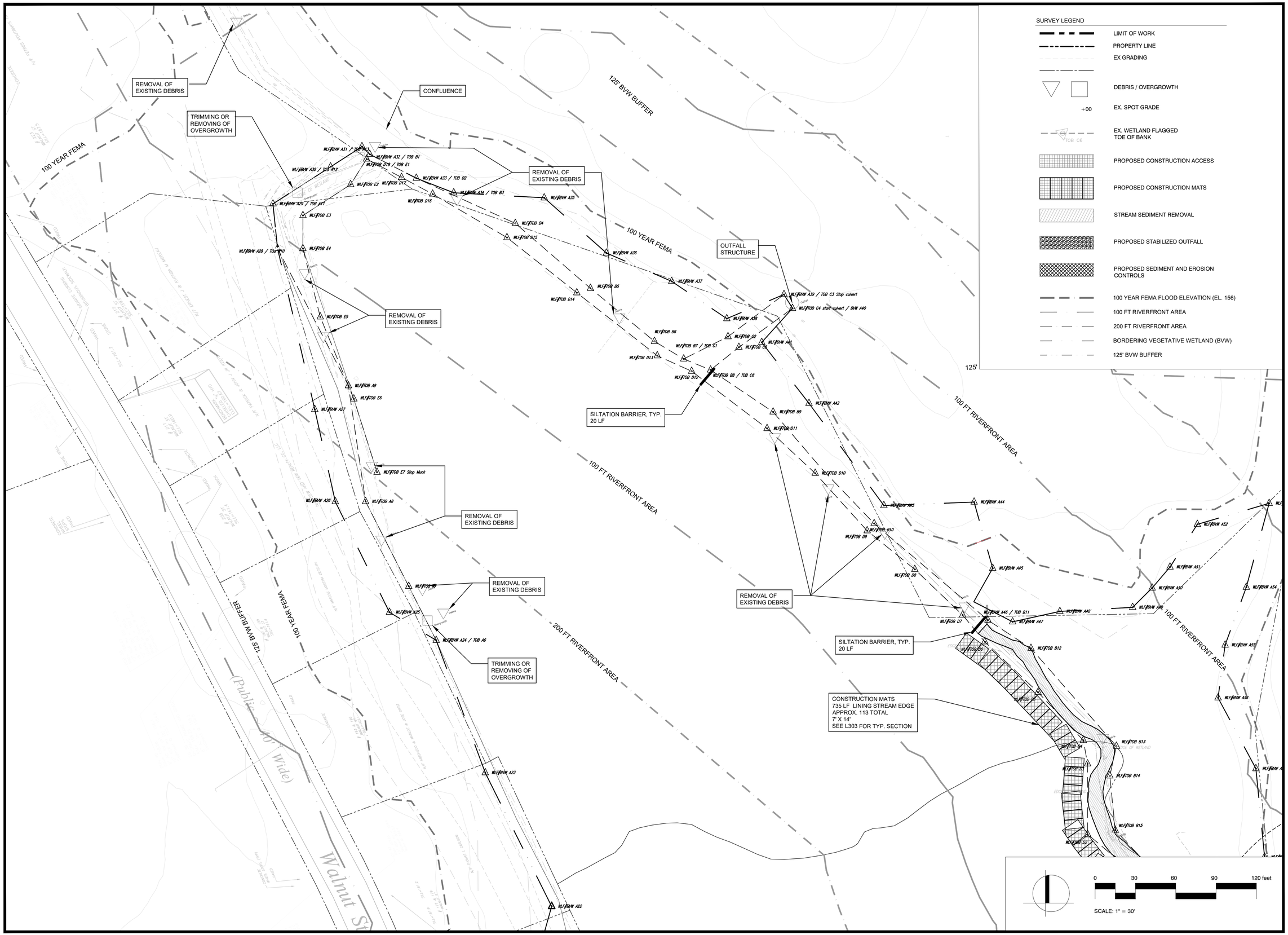

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STREAM RESTORATION

SITE PREPARATION
DETAIL PLAN 3

Sheet Number:

L204

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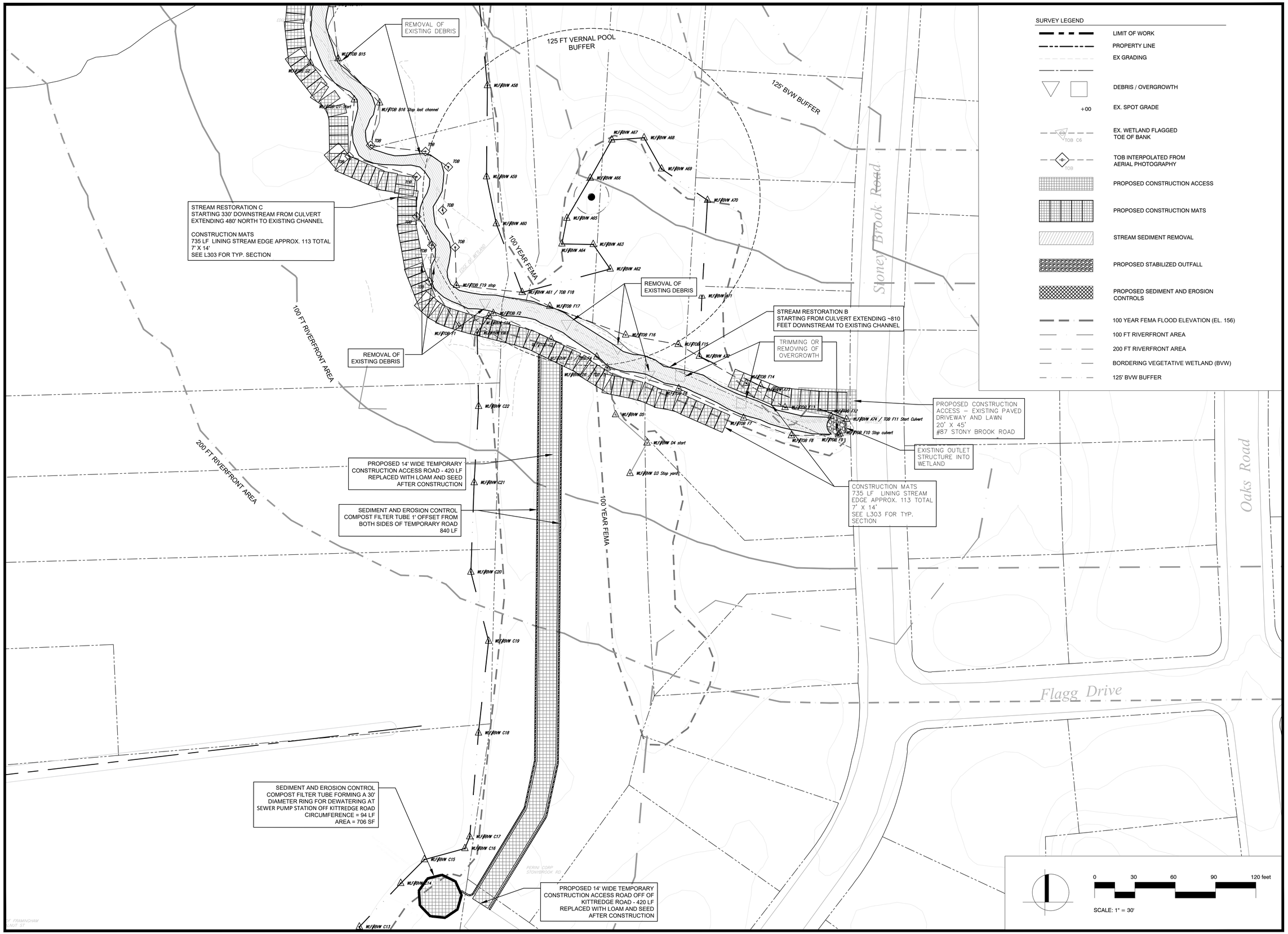

SURVEY LEGEND

- LIMIT OF WORK
- PROPERTY LINE
- EX GRADING
- DEBRIS / OVERGROWTH
- +00 EX. SPOT GRADE
- EX. WETLAND FLAGGED TOE OF BANK
- TOB INTERPOLATED FROM AERIAL PHOTOGRAPHY
- PROPOSED CONSTRUCTION ACCESS
- PROPOSED CONSTRUCTION MATS
- STREAM SEDIMENT REMOVAL
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STREAM RESTORATION

SITE PREPARATION
DETAIL PLAN 4

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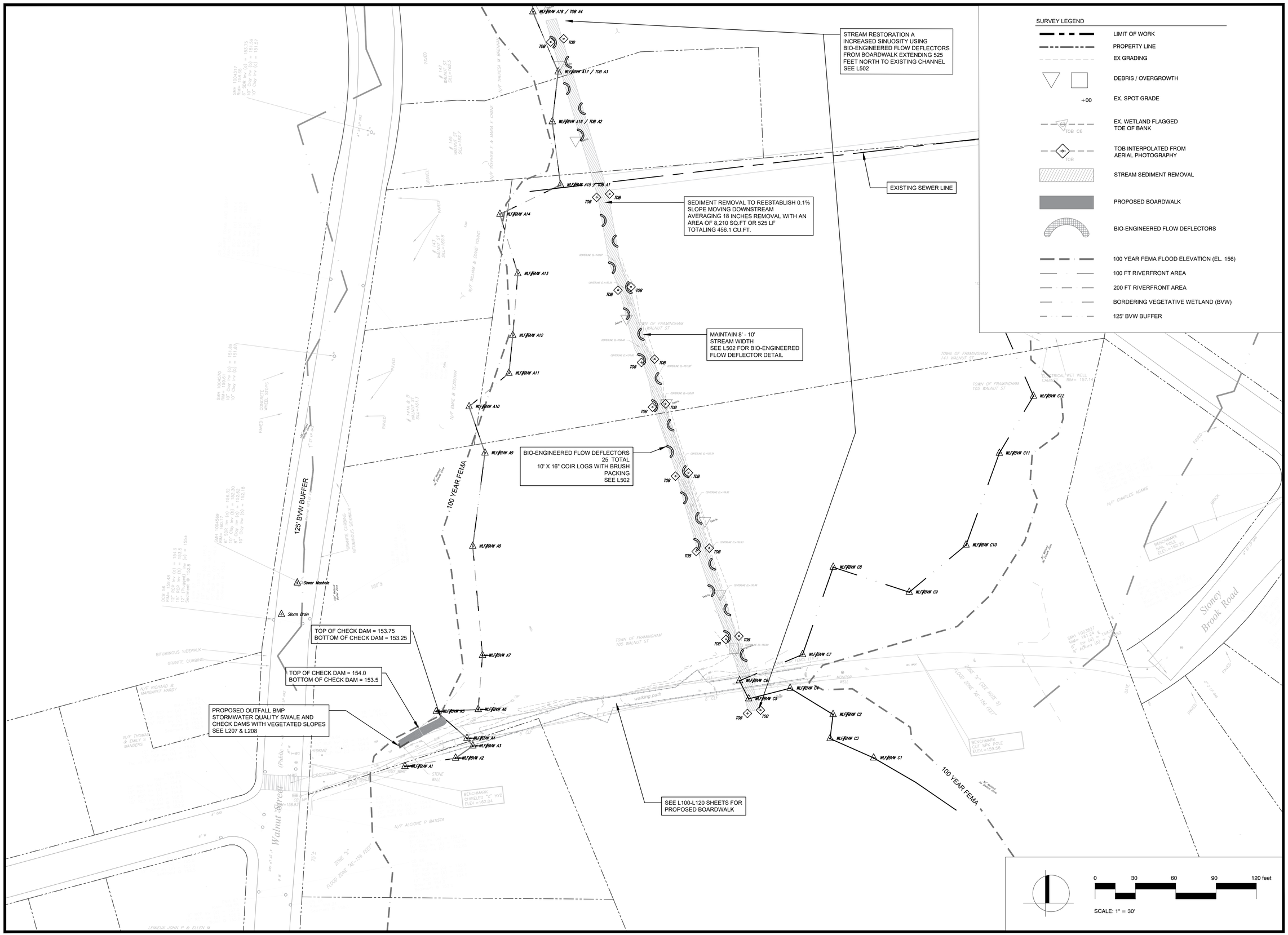

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STREAM RESTORATION

PROPOSED STREAM DETAIL PLAN 1

Sheet Number:

L206

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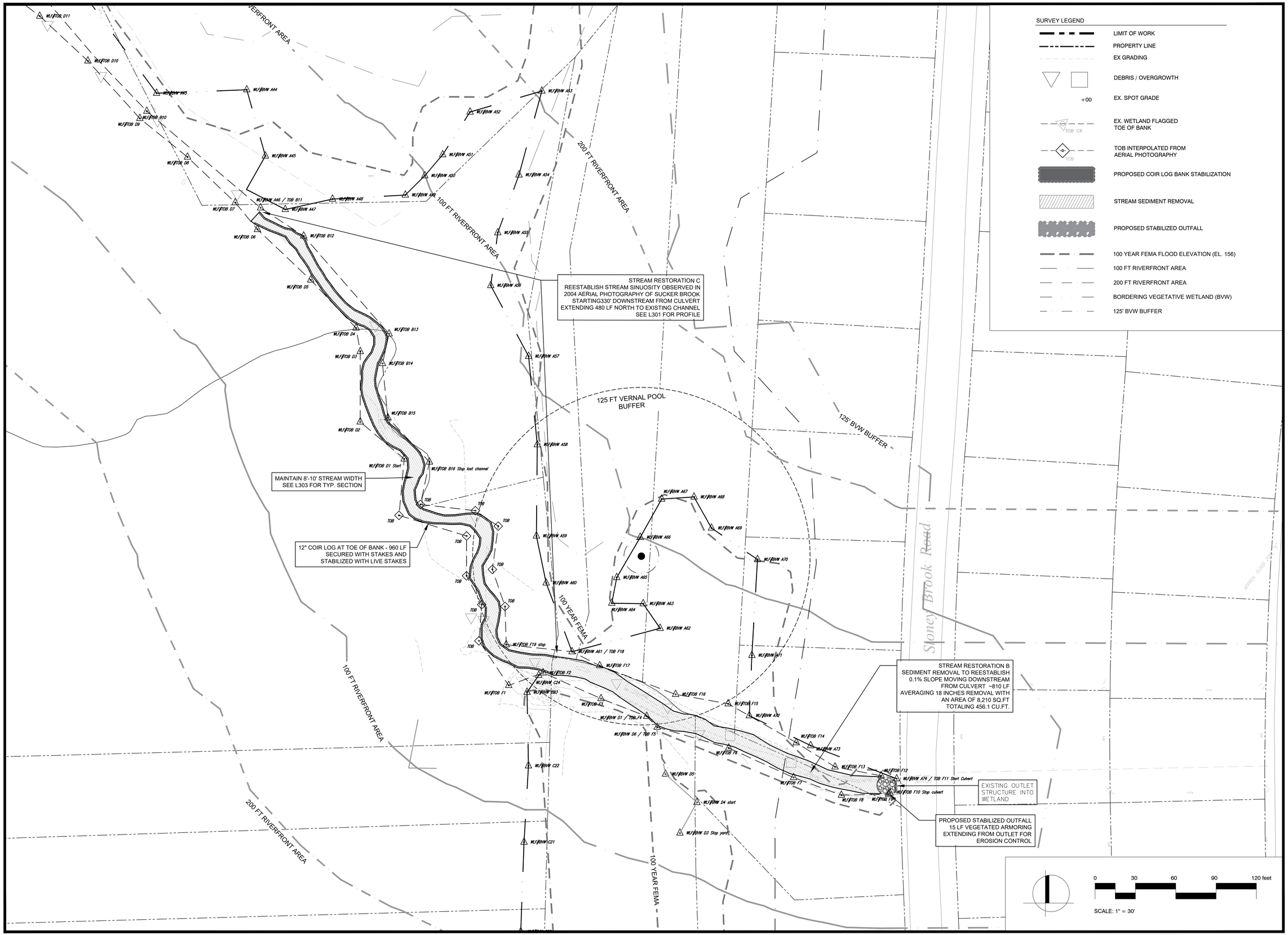

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STREAM RESTORATION

PROPOSED STREAM
DETAIL PLAN 2

Sheet Number:

L207

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SURVEY LEGEND

- LIMIT OF WORK
- PROPERTY LINE
- EX GRADING
- DEBRIS
- +00 EX. SPOT GRADE
- TOB C6 EX. WETLAND FLAGGED TOE OF BANK
- PROPOSED CONSTRUCTION ACCESS
- BMP LOW FLOW CHANNEL
- EXISTING HEADWALL
- BMP PLANTING BED
- 100 YEAR FEMA FLOOD ELEVATION (EL. 156)
- BORDERING VEGETATIVE WETLAND (BVW)

TOP OF CHECK DAM = 153.75
BOTTOM OF CHECK DAM = 153.25

TOP OF CHECK DAM = 154.0
BOTTOM OF CHECK DAM = 153.4

PROPOSED TEMPORARY CONSTRUCTION STAGING AREA FOR STORMWATER BMP AND BOARDWALK
TOTAL = 1020 SQ.FT.

PROPOSED OUTFALL BMP
STORMWATER QUALITY SWALE AND CHECK DAMS WITH VEGETATED SLOPES

DMH 60
RIM = 159.64
15" RCP Inv (a) = 154.4
15" RCP Inv (b) = 154.5
18" RCP Inv (c) = 154.2

PROPOSED CONSTRUCTION ACCESS

WLF#BVW A5

WLF#BVW A6

WLF#BVW A4

WLF#BVW A3

WLF#BVW A2

WLF#BVW A1

154'

154'

155'

156'

TEMPORARY EROSION AND SEDIMENT CONTROL
SEE L500

BIORETENTION CELL 2
TOTAL = 120 SQ.FT.
PLANTING SOIL = 72 SQ.FT.
FLOW CHANNEL = 48 SQFT

BIORETENTION CELL 1
TOTAL = 90 SQ.FT.
PLANTING SOIL = 48 SQ.FT.
FLOW CHANNEL = 42 SQFT

OUTFALL
TOP OF STONE HEADWALL = 155.3
18" RCP INV. = 153.5

SEE L100-L120 SHEETS FOR PROPOSED BOARDWALK

0 5 10 15 20 FEET

SCALE: 1" = 5'

Project:

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PROPOSED STORMWATER BMP

GRADING & MATERIALS

Sheet Number:

L208

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Planting Inventory						
Symbol	Type	Latin Name	Common Name	Total #	Size	Height/Caliper
Shrubs						
	Sa	Spirea alba	White Meadowsweet	16	3 Gal.	2'–0" O.C.
	Vt	Viburnum trilobum	Highbush Cranberry	9	5 Gal.	3'–0" O.C.
	Hv	Hamamelis virginiana	Witch Hazel	2	5 Gal.	3'–0" O.C.
	Sc	Sambucus canadensis	Elderberry	4	5 Gal.	3'–0" O.C.

Live Stake – Varies							
	Latin Name	Common Name	Total Length (ft)	Exposed Length (ft)	Buried Length (ft)	Basal Diamter (in)	Spacing (ft)
	Salix exigua ssp. interior	Sandbar Willow	Min. 3.0	Max. 1.0	Min 2/3 Total Length	0.75 to 1.5	4.0 O.C.
	Salix sericea	Silky Willow	Min. 3.0	Max. 1.0	Min 2/3 Total Length	0.75 to 1.5	4.0 O.C.
	Cornus amomum	Silky Dogwood	Min. 3.0	Max. 1.0	Min 2/3 Total Length	0.75 to 1.5	4.0 O.C.
	Sambucus canadensis	Elderberry	Min. 3.0	Max. 1.0	Min 2/3 Total Length	0.75 to 1.5	4.0 O.C.
	Viburnum dentata	Arrowwood	Min. 3.0	Max. 1.0	Min 2/3 Total Length	0.75 to 1.5	4.0 O.C.

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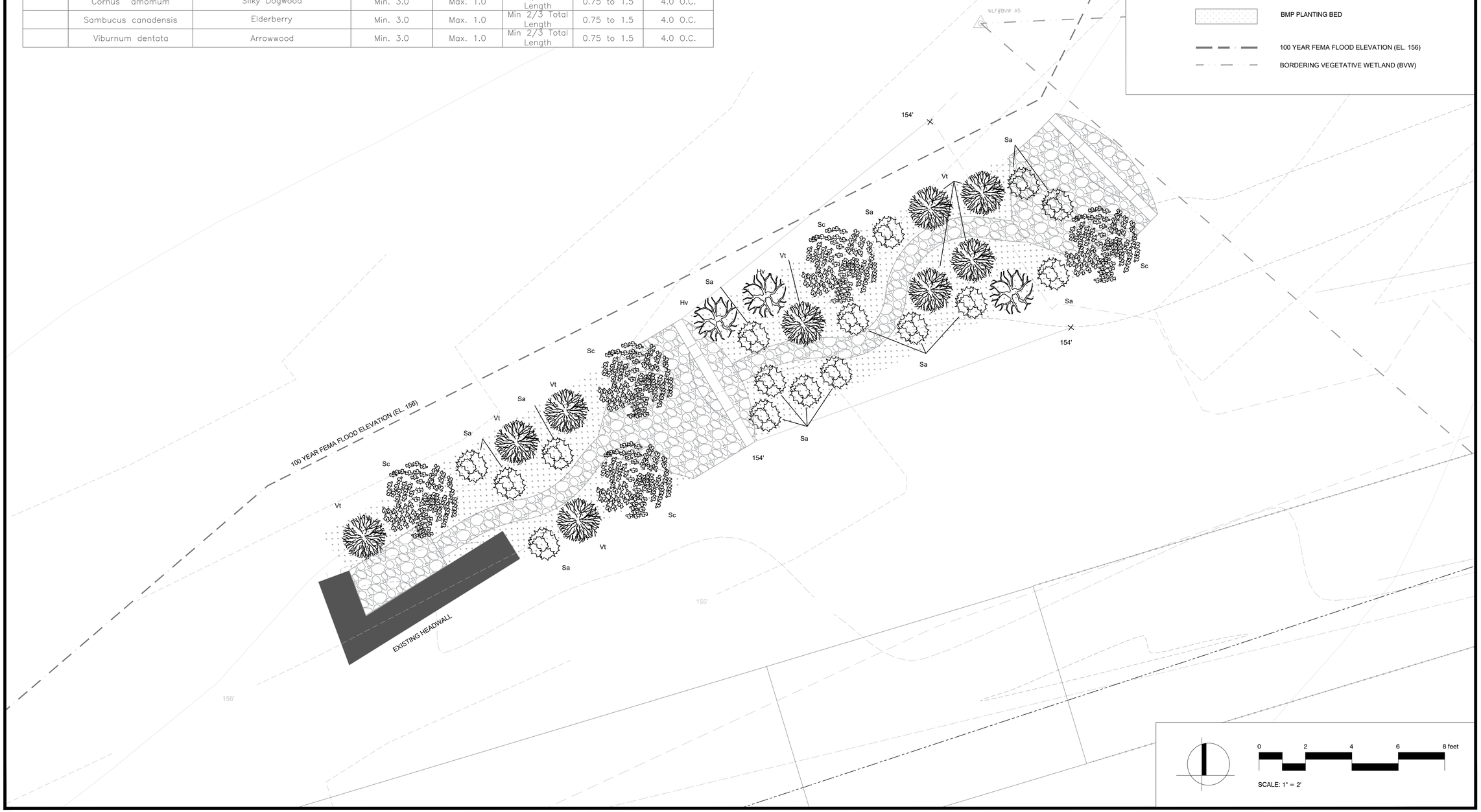

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PROPOSED STORMWATER BMP

PLANTING

Sheet Number:

L209

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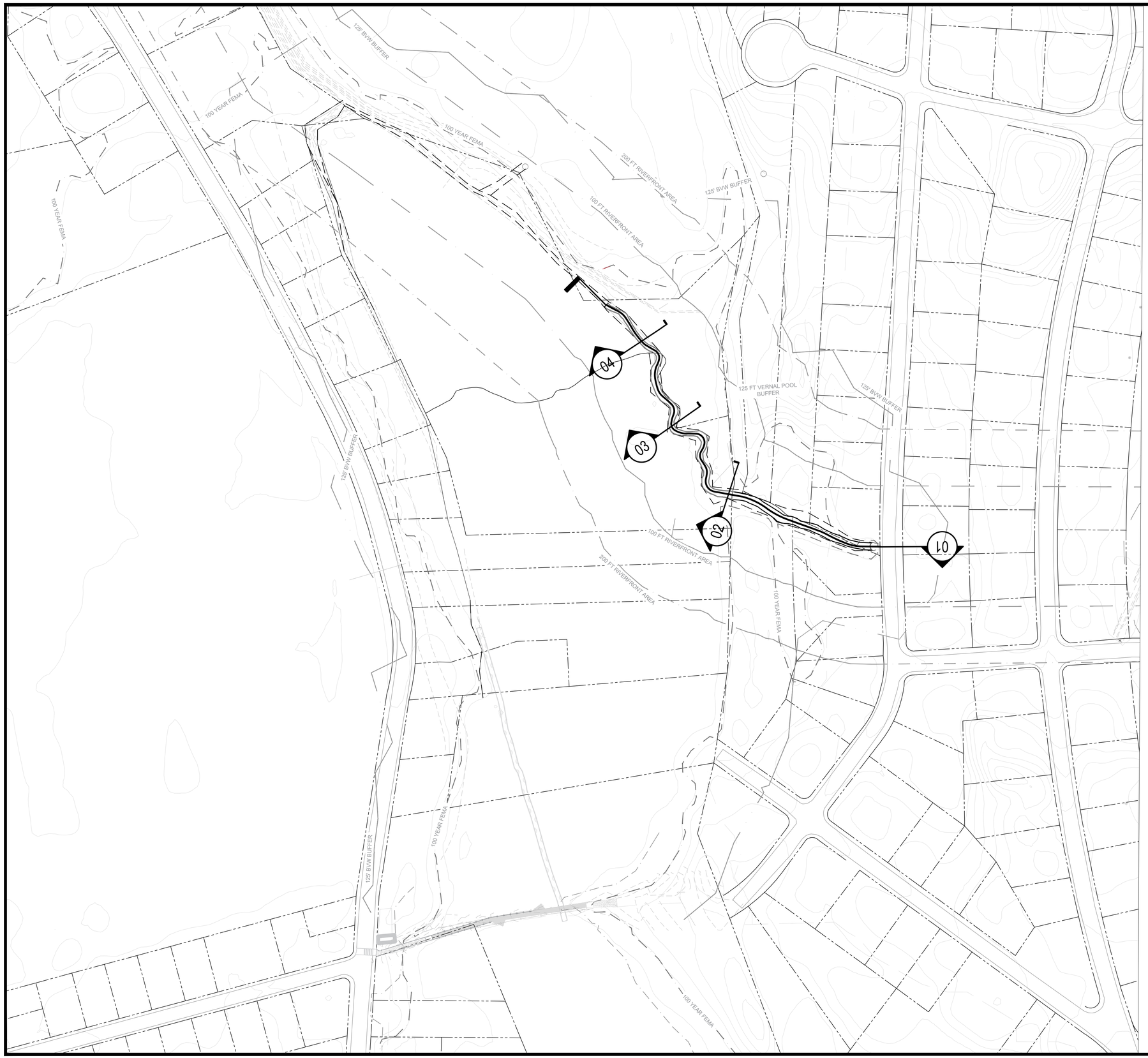

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0 80 160 240 320 feet

SCALE: 1" = 80'

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STREAM RESTORATION

SECTION KEY PLAN

Sheet Number:

L300

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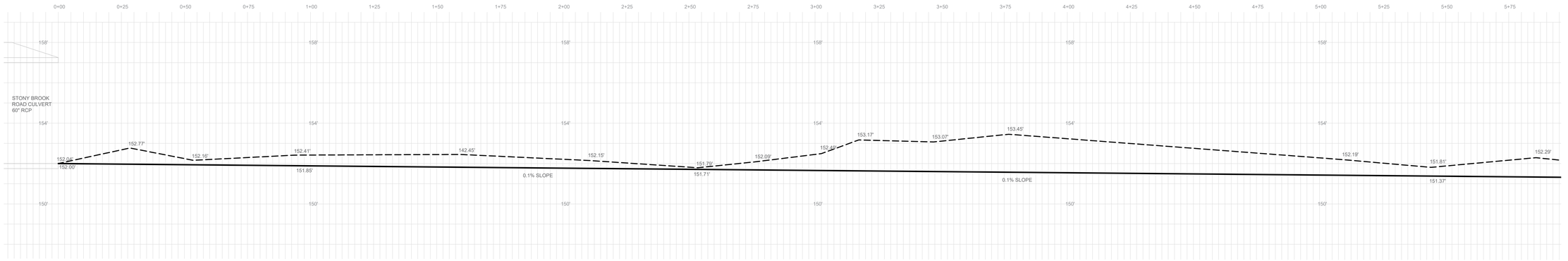


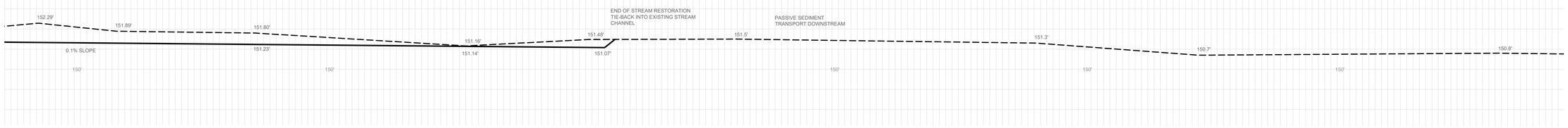
01 SUCKER BROOK PROFILE

SCALE: 1" = 5'-0"

SECTION LEGEND

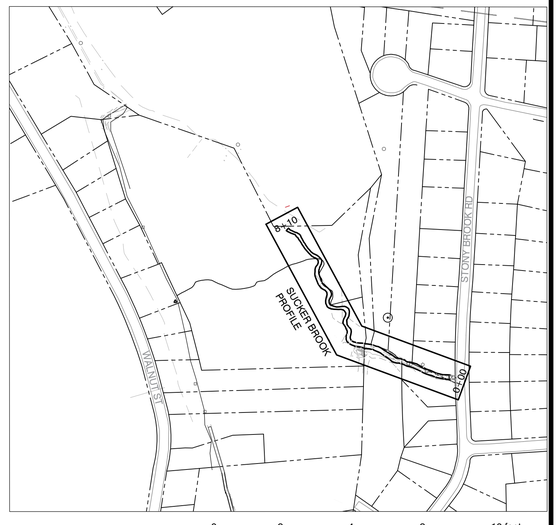
EXISTING PROFILE

PROPOSED PROFILE



01 SUCKER BROOK PROFILE (CONT.)

SCALE: 1" = 5'-0"



0 2 4 8 10 feet

SCALE: 1" = 2'

Project:

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STREAM RESTORATION

PROFILES

Sheet Number:

L301

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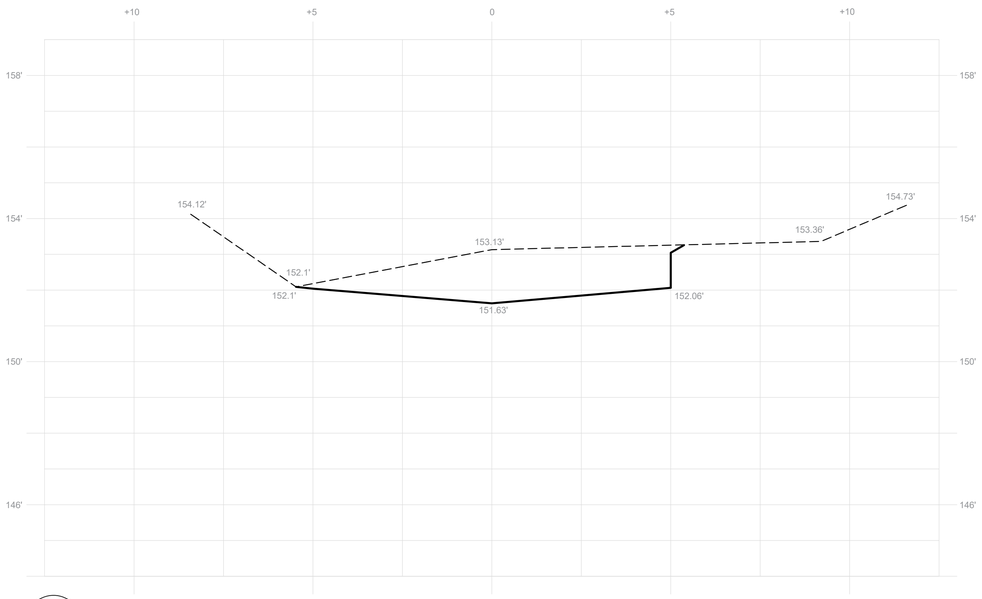
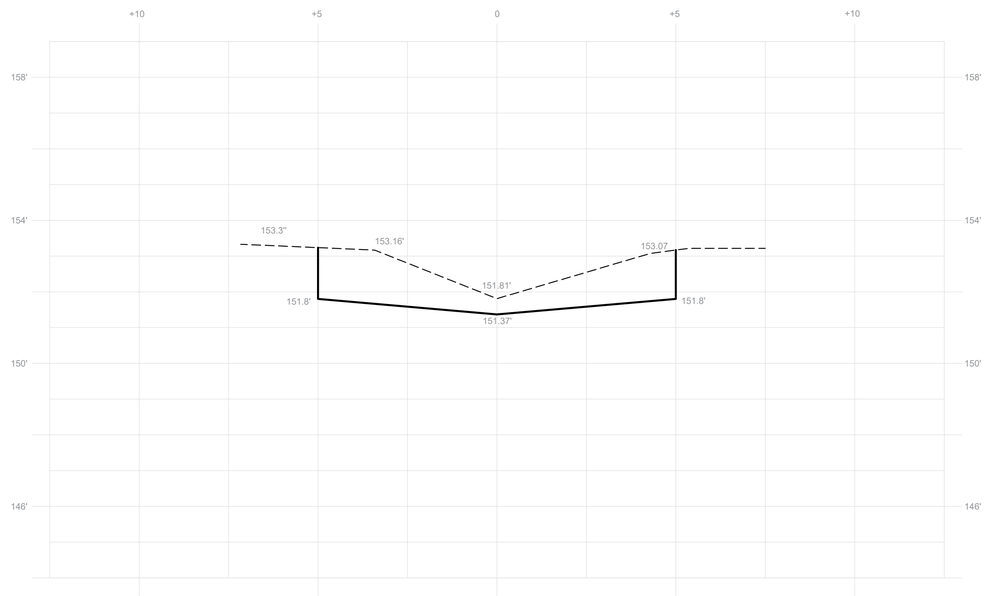


02 SECTION
SCALE: 1" = 2'-0"

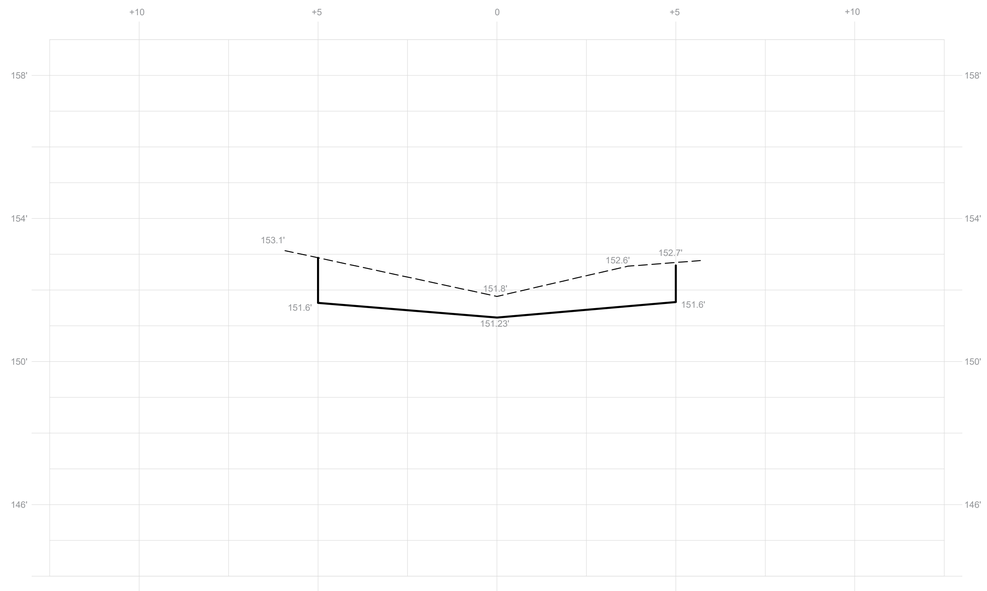
SECTION LEGEND

EXISTING PROFILE

PROPOSED PROFILE



03 SECTION
SCALE: 1" = 2-0"



04 SECTION
SCALE: 1" = 2'-0"

0 2 4 8 10 feet

SCALE: 1" = 2'

Project:

WALNUT STREET
FLOOD MITIGATION

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STREAM RESTORATION

CROSS SECTIONS

Sheet Number:

L302

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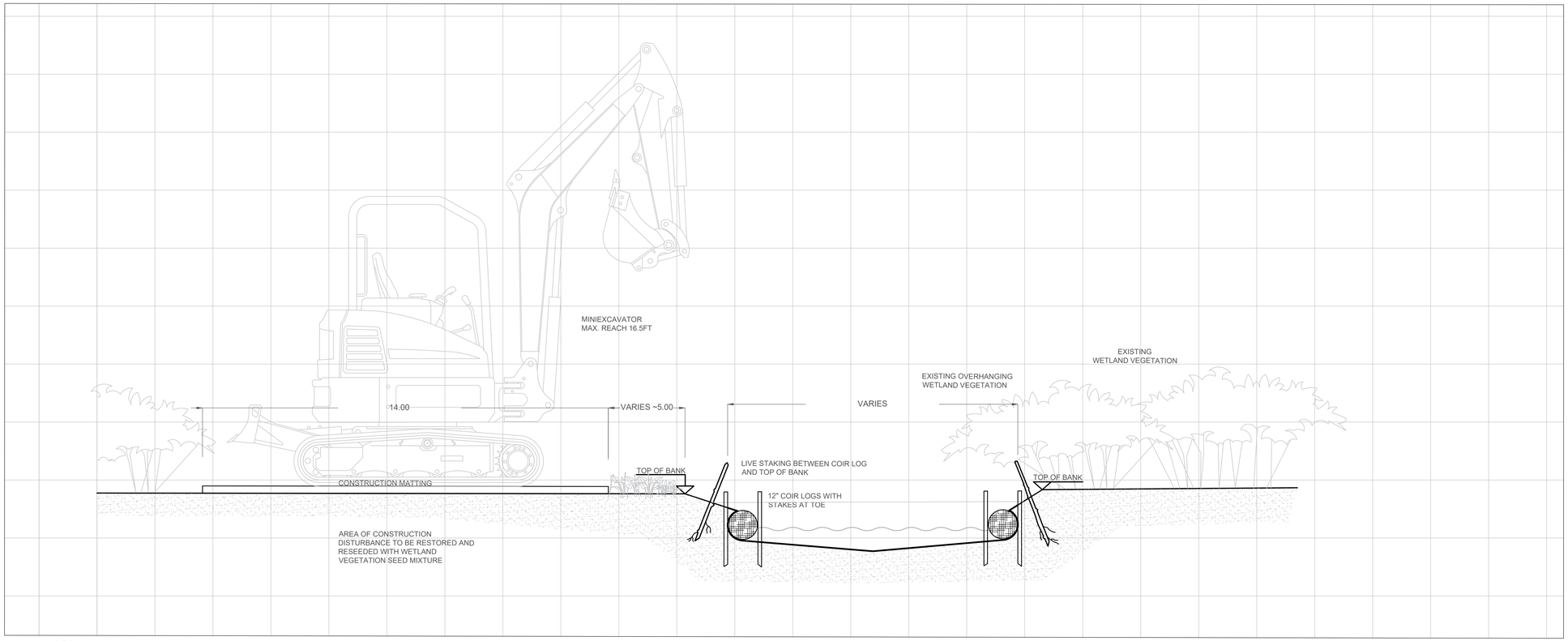
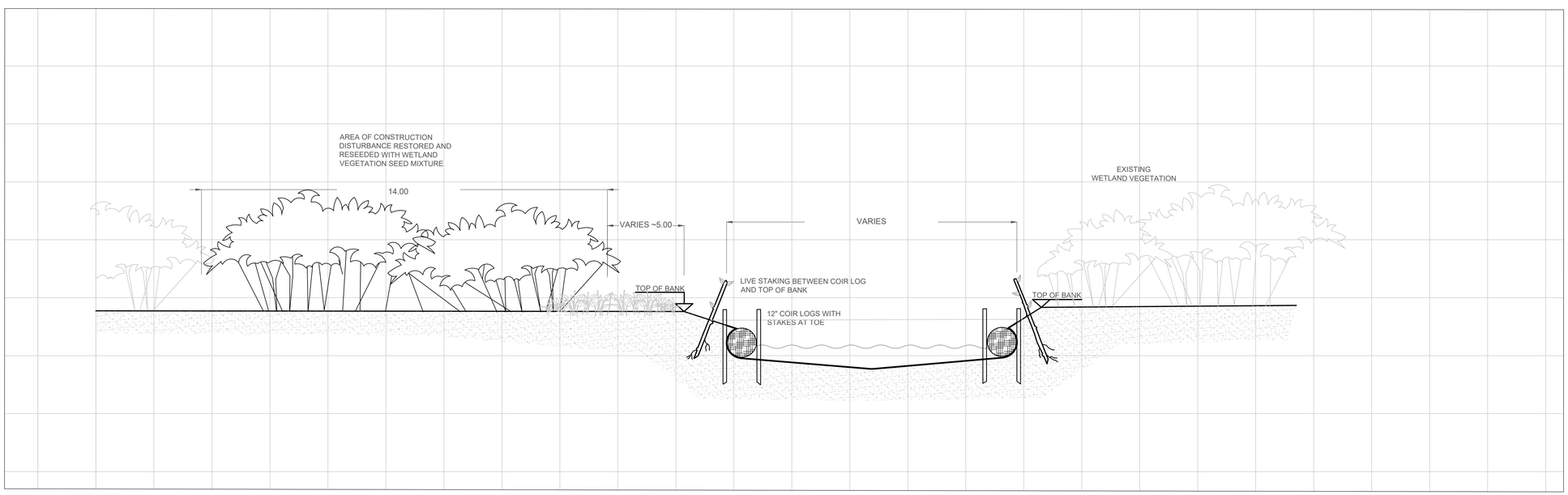


STREAM RESTORATION B & C: SUCKER BROOK COIR LOG WITH LIVE STAKING STREAM EDGE TYPE (UNDER CONSTRUCTION)

SCALE: 1" = 2'-0"



STREAM RESTORATION B & C: SUCKER BROOK COIR LOG WITH LIVE STAKING STREAM EDGE TYPE

SCALE: 1" = 2'-0"

SCALE: 1" = 2'

0 2 4 8 10 feet

Project:

WALNUT STREET
FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

Weston & Sampson

85 Devonshire Street,
3rd Floor, Boston, MA 02109
617.412.4480 800.SAMPSON
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Consultants:

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STREAM RESTORATION

TYPICAL STREAM
RESTORATION
SECTIONS

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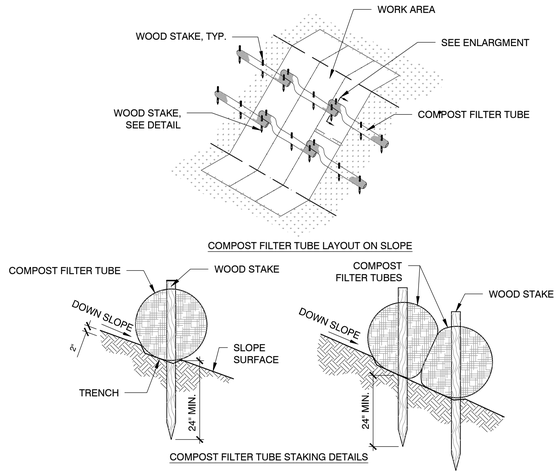
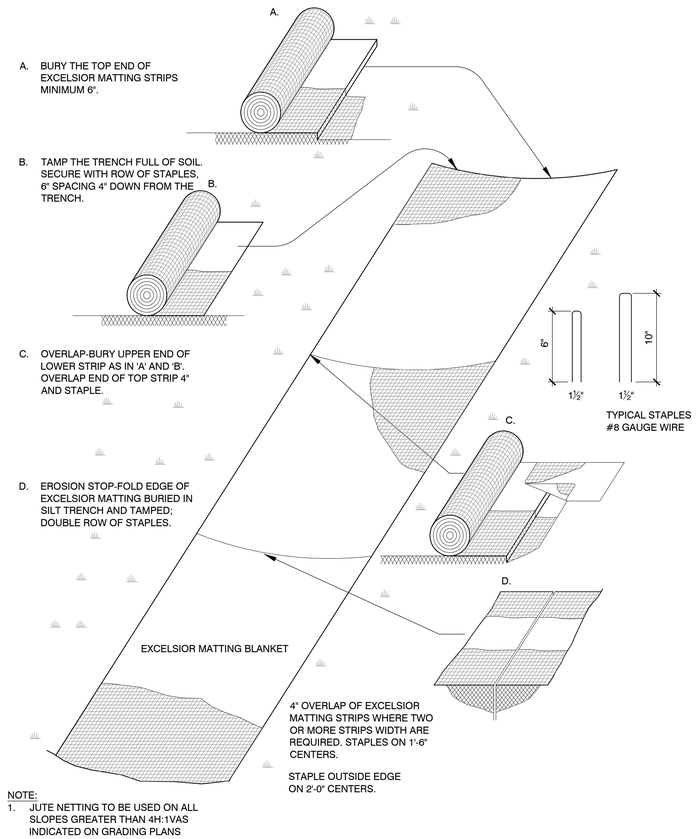


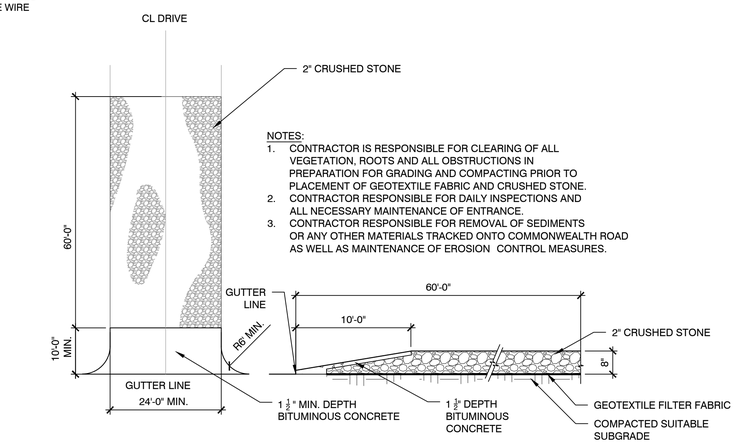
1 EROSION AND SEDIMENT CONTROL, TYP.

SCALE: N.T.S.



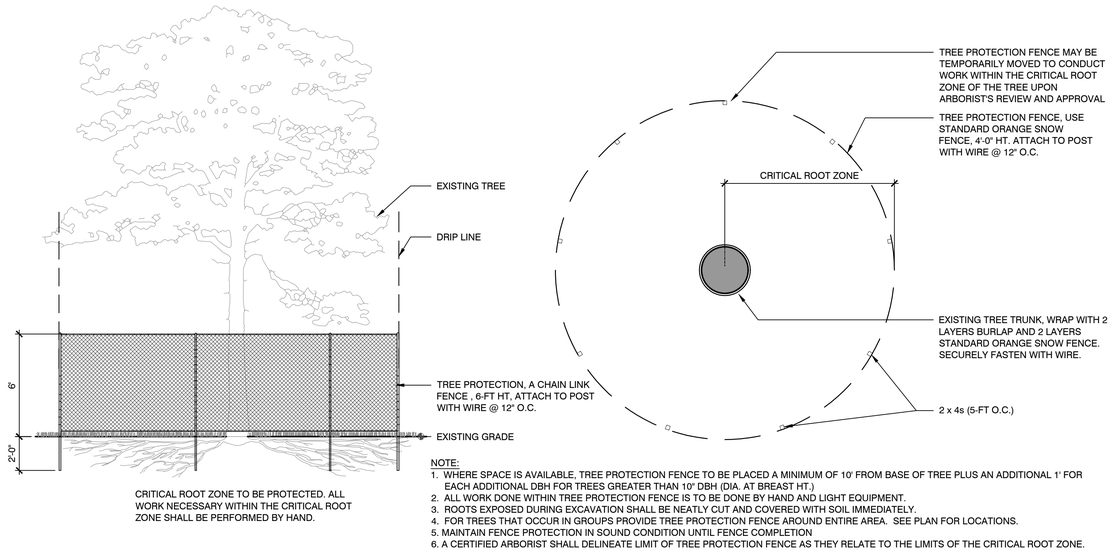
3 EROSION CONTROL BLANKET, TYP.

SCALE: N.T.S



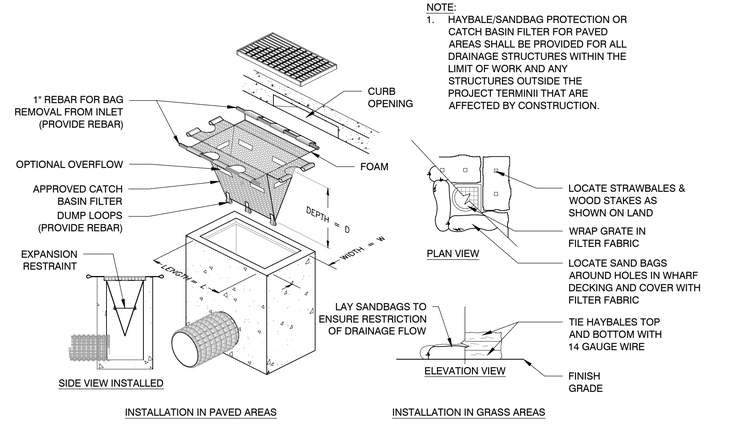
4 CONSTRUCTION ENTRANCE

SCALE: N.T.S.



2 TREE PROTECTION, TYP.

SCALE: N.T.S.



5 INLET SEDIMENT CONTROL

SCALE: N.T.S.

Project:

WALNUT STREET
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CONSTRUCTION DETAILS

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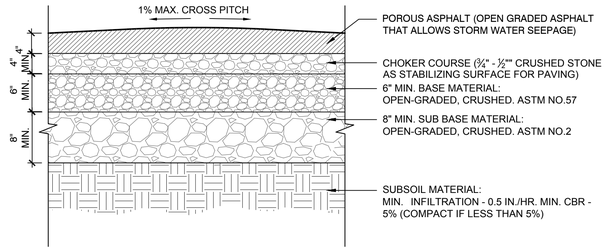
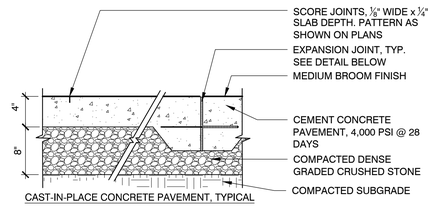
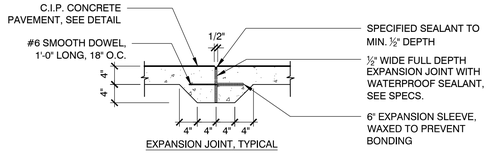


NOTES:
1. ALL AGGREGATE MATERIAL SHALL BE CRUSHED, ANGULAR STONE AND FREE OF FINES.
2. SURFACE SLOPE SHALL BE A MINIMUM OF 1% AND A MAXIMUM OF 5%.
3. THE MINIMUM AGGREGATE THICKNESS ARE AFTER COMPACTION.

1 POROUS ASPHALT, TYP.
SCALE: N.T.S.



CAST-IN-PLACE CONCRETE PAVEMENT, TYPICAL

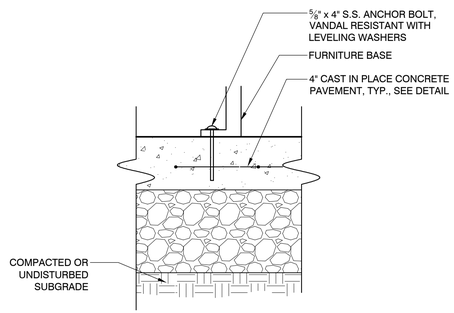


EXPANSION JOINT, TYPICAL

EXPANSION JOINT INSTALLATION NOTES:

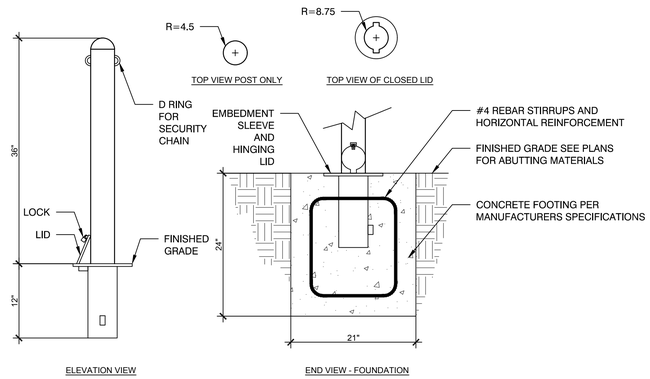
1. DOWEL IS TYPICAL AT ALL EXPANSION JOINTS (18" O.C.) WITHIN CONCRETE PAVING AND BETWEEN NEW CONCRETE PAVING AND EXISTING CONCRETE PAVING TO REMAIN.
2. DELETE EXPANSION SLEEVE AND DOWEL WHERE JOINT ABUTS WALL, CURBS, OR OTHER VERTICAL SURFACES, UNLESS OTHERWISE NOTED.
3. EXPANSION JOINTS MAX. 25'-0" O.C. UNLESS SHOWN OTHERWISE.
4. EXPANSIONS JOINTS SHALL BE PLACED WHERE NEW CEMENT CONCRETE PAVEMENT MEETS EXISTING PAVEMENT OR WALLS TO REMAIN.
5. ALL EXPANSION JOINTS SHALL BE SAW CUT.

2 CEMENT CONCRETE PAVEMENT, TYP.
SCALE: N.T.S.



NOTE:
1. ALL SITE FURNISHINGS SHALL BE SURFACE MOUNTED PER MANUFACTURER'S RECOMMENDATIONS.

3 SITE AMENITIES SURFACE MOUNT, TYP.
SCALE: N.T.S

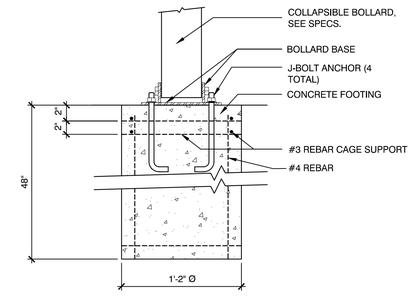


ELEVATION VIEW

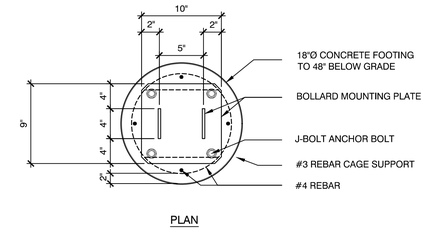
END VIEW - FOUNDATION

NOTES:
1. ACCEPTABLE MANUFACTURER " TRAFFIC-GUARD INC. (WWW.TRAFFICGUARD.NET)", MODEL ROUND POST REMOVABLE BOLLARD (RPL3,RPL4,RPL6) OR APPROVED EQUIVALENT.
2. MANUFACTURERS SPECIFICATIONS AND INSTALATION INSTRUCTIONS TO BE FOLLOWED AS REQUIRED.
3. GROUND SLEEVES SHOULD BE INSTALLED WITH THE TOP OF THE SLEEVE SET FLUSH WITH THE FINISHED SURFACE.

4 REMOVABLE BOLLARD, TYP.
SCALE: N.T.S.

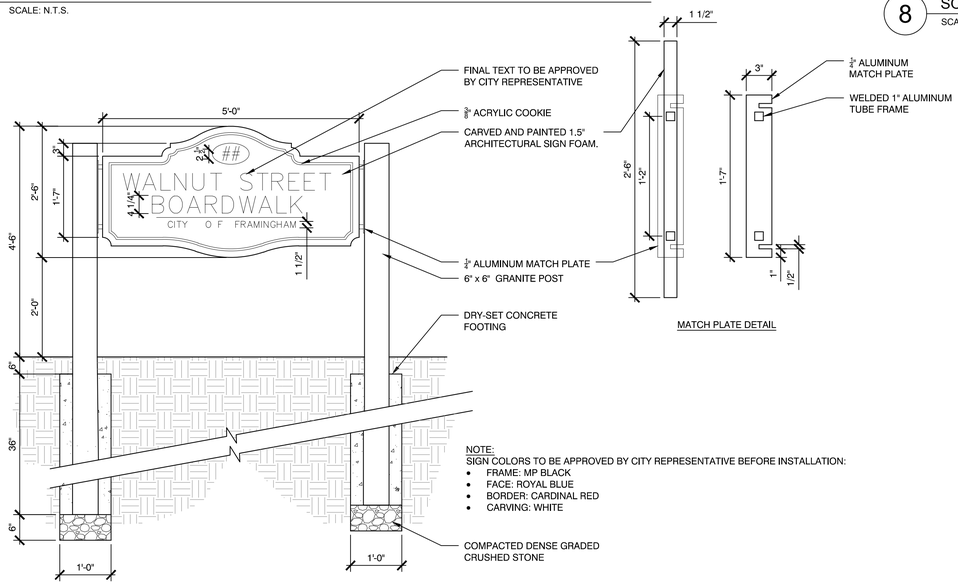


SECTION



PLAN

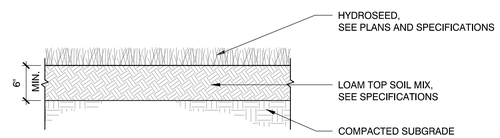
8 SOLAR POWERED LED BOLLARD, TYP.
SCALE: N.T.S.



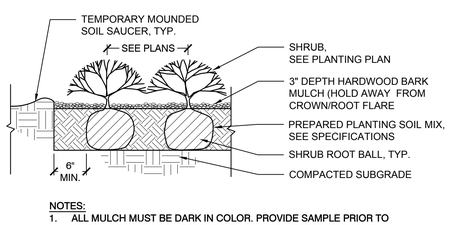
NOTE:
SIGN COLORS TO BE APPROVED BY CITY REPRESENTATIVE BEFORE INSTALLATION:
- FRAME: MP BLACK
- FACE: ROYAL BLUE
- BORDER: CARDINAL RED
- CARVING: WHITE

5 ENTRY SIGNAGE, TYP.
SCALE: N.T.S.

MATCH PLATE DETAIL



6 LOAM & SEED, TYP.
SCALE: N.T.S.



NOTES:
1. ALL MULCH MUST BE DARK IN COLOR. PROVIDE SAMPLE PRIOR TO INSTALLATION TO BE APPROVED BY OWNER'S REPRESENTATIVE.

7 SHRUB PLANTING, TYP.
SCALE: N.T.S.

Project:
WALNUT STREET FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

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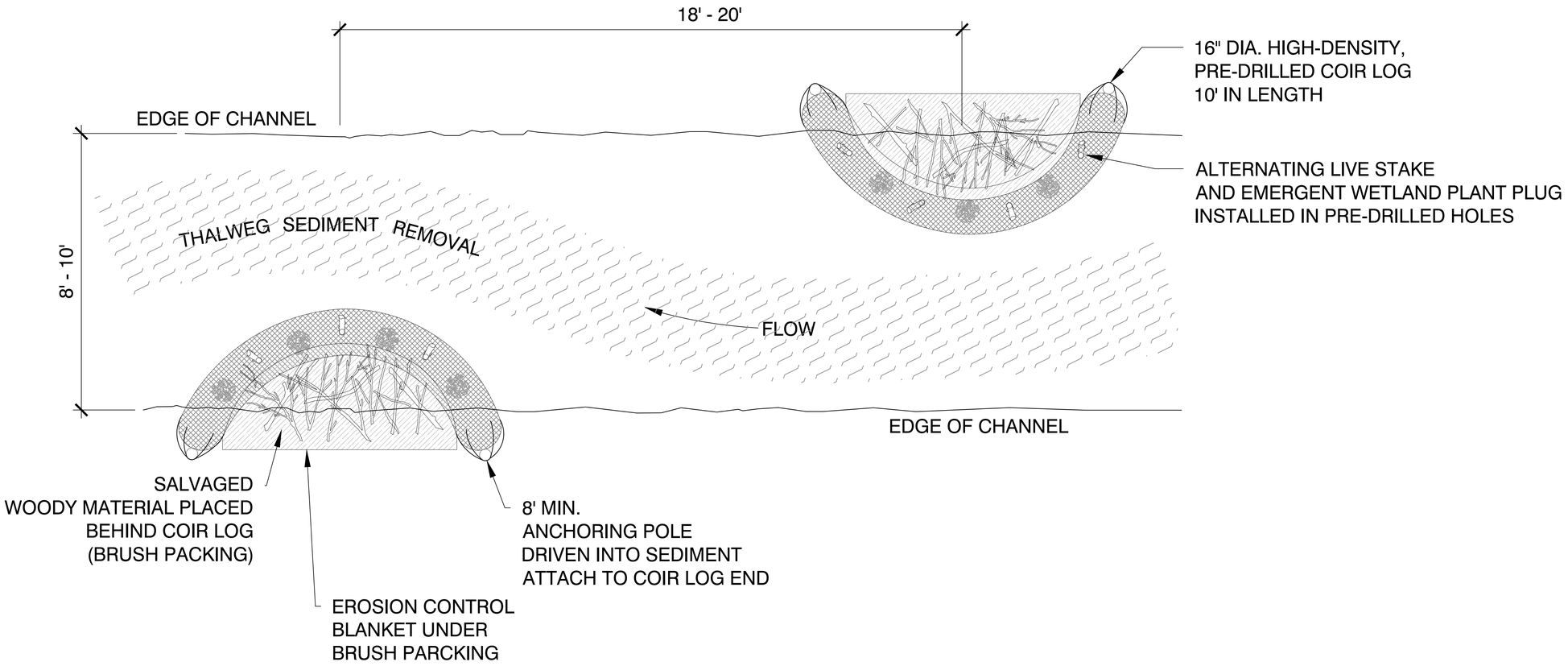

1 BIO-ENGINEERED FLOW DEFLECTORS
SCALE: N.T.S.

Project:
WALNUT STREET
FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

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STREAM RESTORATION
LANDSCAPE
DETAILS

Sheet Number:
L502

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1.0 - GENERAL

1.01 THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND SPECIFICATIONS. REFER TO LANDSCAPE AND ELECTRICAL DRAWINGS FOR LOCATION, DIMENSIONS, AND DETAILS OF OPENINGS, SLEEVES, EMBEDMENTS, INSERTS, PADS, CURBS, DEPRESSIONS, ANCHOR BOLTS, AND OTHER PROJECT REQUIREMENTS NOT SHOWN ON STRUCTURAL DRAWINGS.

1.02 THE CONTRACTOR IS RESPONSIBLE FOR CHECKING, COORDINATING AND VERIFYING ALL DIMENSIONS IN THE FIELD PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY DISCREPANCY TO THE ARCHITECT AND ENGINEER AS A REQUEST FOR INFORMATION (RFI) BEFORE PROCEEDING WITH WORK.

1.03 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING IN THE FIELD THE EXISTENCE AND LOCATION OF OVERHEAD, BURIED AND/OR EMBEDDED UTILITIES, AND DETERMINING LOCATIONS OF ALL EMBEDDED MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS AFFECTED BY THE WORK OF THIS CONTRACT.

1.04 ALL WORK IS TO CONFORM WITH THE FOLLOWING CODES AND STANDARDS:

(A) "780 CMR: MASSACHUSETTS AMENDMENTS MASSACHUSETTS STATE BUILDING CODE" - 9TH EDITION (MSBC)
(B) INTERNATIONAL BUILDING CODE, (IBC 2015)
(C) "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" - AMERICAN CONCRETE INSTITUTE (ACI 318)
(D) "MANUAL OF STEEL CONSTRUCTION" - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC 360)
(E) "STRUCTURAL WELDING CODE - STEEL" - AMERICAN WELDING SOCIETY (AWS D1.1)
(F) "SEISMIC PROVISION FOR STRUCTURAL STEEL BUILDINGS" -AMERICAN INSTITUTE OF STEEL CONSTRUCTION, (AISC)
(G) "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES" - AMERICAN SOCIETY OF CIVIL ENGINEERS, (ASCE 7-10)

FOR ADDITIONAL CODES AND STANDARDS REFER TO SPECIFICATIONS.

1.05 THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER OF UNFORESEEN CONDITIONS THAT MAY BE UNCOVERED DURING DEMOLITION AND CONSTRUCTION AS A REQUEST FOR INFORMATION (RFI) BEFORE PROCEEDING WITH WORK.

1.06 PERMANENT STRUCTURAL ELEMENTS TO BE DESIGNED IN ACCORDANCE WITH PERFORMANCE SPECIFICATIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

(A) DRIVEN HELICAL PILES

FOR PERFORMANCE DESIGN REQUIREMENTS OF ELEMENTS LISTED ABOVE, REFER TO ADDITIONAL NOTES ON THESE SHEETS AND IN THE TECHNICAL SPECIFICATIONS. ALL DESIGN SUBMITTAL DRAWINGS AND CALCULATIONS SHALL BE CERTIFIED, SIGNED AND SEALED BY A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE STATE OF MASSACHUSETTS.

1.07 DETAILS AND NOTES SHOWN ON STRUCTURAL DRAWINGS SHALL BE APPLICABLE TO ALL PARTS OF THE STRUCTURAL WORK EXCEPT WHERE SPECIFICALLY REQUIRED OTHERWISE BY CONTRACT DOCUMENTS. CONDITIONS NOT SPECIFICALLY SHOWN SHALL BE SIMILAR TO THOSE SHOWN FOR LIKE CONDITIONS AS DETERMINED BY THE ENGINEER.

1.08 IN ACCORDANCE WITH SPECIFICATION SECTION 01 45 23, TESTING AND INSPECTION OF STRUCTURAL WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE COSTS FOR TESTING AND INSPECTIONS WILL BE PAID BY THE CONTRACTOR. PROVIDE TEST RESULTS TO THE ENGINEER IN A TIMELY MANNER.

1.09 THE CONTRACTOR SHALL DESIGN AND PROVIDE ALL REQUIRED SHORING AND TEMPORARY BRACING TO RESIST FORCES ON THE STRUCTURE THROUGHOUT THE CONSTRUCTION PERIOD.

2.0 - FOUNDATIONS

2.01 THE SUBSURFACE CONDITIONS DESCRIBED IN THE DRAWINGS, SPECIFICATIONS, TEST BORINGS AND TEST PITS ARE INCLUDED ONLY TO ASSIST THE CONTRACTOR DURING BIDDING AND SUBSEQUENT CONSTRUCTION AND REPRESENT CONDITIONS ONLY AT THESE SPECIFIC LOCATIONS AT THE TIME THEY ARE MADE.

2.02 THE CONTRACTOR SHALL DESIGN AND PROVIDE ALL TEMPORARY EARTH SUPPORT, SHORING AND BRACING REQUIRED TO PERFORM THE WORK IN ACCORDANCE WITH OSHA, STATE AND LOCAL REQUIREMENTS.

2.03 THE CONTRACTOR SHALL DESIGN AND PROVIDE SHEETING, SHORING, BRACING, AND/OR UNDERPINNING IN ORDER TO PROTECT EXISTING UTILITIES FROM EXCESSIVE MOVEMENTS DURING THE CONSTRUCTION PERIOD, IN ACCORDANCE WITH OSHA, STATE & LOCAL REQUIREMENTS.

2.04 THE CONTRACTOR SHALL CARRY OUT CONTINUOUS CONTROL OF SURFACE AND SUBSURFACE WATER. DEWATER ANY AREAS REQUIRING EXCAVATION IN ADVANCE OF PERFORMING EXCAVATION. MAINTAIN GROUNDWATER LEVELS AT LEAST 2 FEET BELOW PLANNED SUBGRADES.

2.05 ALL SUBGRADES TO RECEIVE FILL MATERIALS, FOUNDATIONS, SLABS OR OTHER CONSTRUCTION SHALL BE FREE OF RUNNING OR STANDING WATER PRIOR TO PLACEMENT.

2.06 FOUNDATIONS SHALL BE INSTALLED IN THE GEOMETRY SHOWN IN THE PLANS, ANY ROCK ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED TO CLEAR THE REQUIRED FOUNDATION GEOMETRY.

2.07 SPREAD FOOTING BEARING SURFACES SHALL BE EXCAVATED BY EQUIPMENT WITH A SMOOTH, TOOTHLESS CUTTING EDGE.

2.08 THE GEOTECHNICAL REPORT PREPARED BY WESTON & SAMPSON DATED 03/07/2022 IS PROVIDED FOR INFORMATION PURPOSES ONLY.

3.0 - CAST IN PLACE CONCRETE

3.01 CONCRETE WORK SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318) AND "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301).

3.02 CONCRETE SHALL BE CONTROLLED CONCRETE, PROPORTIONED, MIXED AND PLACED IN THE PRESENCE OF A REPRESENTATIVE OF AN APPROVED TESTING AGENCY.

3.03 UNLESS NOTED OTHERWISE, CONCRETE SHALL BE NORMAL WEIGHT AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:

(A) FOUNDATIONS: 4000 PSI
(B) SLABS AND WALKWAYS: 5000 PSI

3.04 ALL PERMANENTLY EXPOSED VERTICAL AND HORIZONTAL CONCRETE SURFACES SHALL BE TREATED OR SEALED IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

3.05 FOR SLABS-ON-GRADE, LOCATE CONSTRUCTION OR CONTROL JOINTS ALONG COLUMN LINES OR AS SHOWN. PROVIDE JOINTS AT 20FT. MAX. SPACING. SUBMIT JOINT LOCATIONS AND DETAILS FOR APPROVAL.

3.06 SEALANT FOR CONTROL/CONTRACTION JOINTS AND SAW CUT JOINTS SHALL BE SIKADUR 51 MANUFACTURED BY SIKA OR AN APPROVED EQUAL.

3.07 CONCRETE EXPOSED TO WEATHER (FREEZE-THAW CONDITIONS) IN THE FINISHED PROJECT SHALL BE AIR ENTRAINED PER SPECIFICATIONS REQUIREMENTS.

3.08 A MINIMUM OF 72 HOURS SHALL ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.

3.09 CONCRETE SLABS SHALL BE PLACED SO THAT THE SLAB THICKNESS IS AT NO POINT LESS THAN THAT INDICATED ON THE DRAWINGS.

3.10 PROVIDE A 3/4" CHAMFER ON ALL VERTICAL AND HORIZONTAL CORNERS EXPOSED TO VIEW UNLESS NOTED OTHERWISE.

3.11 ALL CONCRETE SHALL BE WATER CURED UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER.

3.12 NON-SHRINK, NON-METALLIC, GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 7,500 PSI (ASTM C942) AND A MINIMUM BOND STRENGTH OF 2,000 PSI AT 28-DAYS (ASTM C882). GROUT MAY BE EXTENDED WITH COARSE AGGREGATE PER THE MANUFACTURER'S RECOMMENDATIONS.

4.0 - CAST IN PLACE CONCRETE REINFORCEMENT

4.01 REINFORCEMENT DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO "ACI DETAILING MANUAL" - SP-66, "CRSI MANUAL OF STANDARD PRACTICE".

4.02 STEEL REINFORCEMENT, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE FOLLOWING:

(A) BARS, TIES, AND STIRRUPS___ASTM A615 GRADE 60
(B) WELDED WIRE FABRIC,ASTM A185, FLAT SHEETS

4.03 REINFORCING STEEL SHALL BE UNCOATED AND DEFORMED.

4.04 MINIMUM CONCRETE PROTECTIVE COVERING FOR REINFORCEMENT, UNLESS REQUIRED FOR FIRE PROTECTION OR NOTED OTHERWISE, SHALL BE AS FOLLOWS:

(A) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:____3"
(B) CONCRETE EXPOSED TO EARTH OR WEATHER:
(1) NO. 6 THRU NO. 18 BARS____2"
(2) NO. 5 BAR, W31 OR D31 WIRE AND SMALLER____2"
(C) SURFACES NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
(1) SLABS, WALLS, JOISTS:
(a) NO. 14 AND NO 18 BARS____2"
(b) NO. 11 BARS AND SMALLER____2"

4.05 REINFORCING STEEL SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS, CORNERS, AND INTERSECTIONS UNLESS OTHERWISE NOTED. REINFORCING SHALL BE LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS, UNLESS OTHERWISE NOTED.

4.06 FOR REINFORCING STEEL SPLICE LAP LENGTHS REFER TO THE TABLE PROVIDED UNLESS OTHERWISE INDICATED.

4.07 MECHANICAL SPLICES SHALL BE PERMITTED SUBJECT TO APPROVAL BY THE ENGINEER. MECHANICAL SPLICES SHALL DEVELOP AT LEAST 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR. NO WELDED CONNECTIONS ARE PERMITTED.

4.08 WELDED WIRE FABRIC SHALL BE LAPPED (1) SQUARE PLUS (2) INCHES WHERE REQUIRED AND SHALL BE WIRED TOGETHER AT ALL LAPS. WWF SHALL BE SUPPORTED BY CHAIRS AND/OR CARRYING BARS PRIOR TO CONCRETE PLACEMENT.

4.09 REINFORCEMENT SHALL NOT BE TACK WELDED.

4.10 NOTIFY THE TESTING LAB AND ENGINEER A MINIMUM OF 48 HOURS PRIOR TO SCHEDULED CONCRETE PLACEMENT IN ORDER TO ACCOMMODATE INSPECTION OF REINFORCEMENT AND CONCRETE TESTING. NO CONCRETE SHALL BE PLACED WITHIN 48 HOURS OF SUCH NOTIFICATION.

4.11 WHERE REINFORCEMENT IS REQUIRED IN SECTION, REINFORCEMENT IS CONSIDERED TYPICAL WHEREVER THE SECTIONS APPLIES.

4.12 DOWELS SHALL MATCH BAR SIZE, NUMBER AND SPACING, UNLESS NOTED OTHERWISE.

6.0 - STRUCTURAL STEEL

6.01 STRUCTURAL STEEL DESIGN, FABRICATION AND ERECTION SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION", "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS AND BRIDGES" (ANSI/AISC 360-10), AND "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (ANSI/AISC 303-10).

6.02 STRUCTURAL STEEL SHALL BE NEW STEEL CONFORMING TO THE FOLLOWING:

(A) WIDE FLANGE SHAPES:_____ASTM A992
(B) OTHER STEEL SHAPES, PLATES AND BARS:_____ASTM A572 OR ASTM A36.
(C) STRUCTURAL TUBING:_____ASTM A500 GR B.

6.03 ALL WELDED CONNECTIONS SHALL BE MADE BY APPROVED CERTIFIED WELDERS AND SHALL CONFORM TO A.W.S. SPECIFICATIONS AMENDED TO DATE. ELECTRODES SHALL BE E70XX.

6.04 BOLTS SHALL CONFORM TO ASTM A325 AND BE INSTALLED SNUG-TIGHT UNLESS NOTED OTHERWISE

6.05 STRUCTURAL STEEL FRAMING SHALL BE WITHIN TOLERANCE BEFORE CONNECTIONS ARE FINALLY BOLTED OR WELDED.

6.06 FIELD CUTTING OF STRUCTURAL STEEL OR ANY FIELD MODIFICATIONS OF STRUCTURAL STEEL SHALL NOT BE MADE WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER FOR EACH SPECIFIC USE.

6.07 STRUCTURAL STEEL SHAPES AND PLATES EXPOSED TO WEATHER AND AT CANOPIES SHALL BE HOT-DIPPED GALVANIZED PER ASTM A123 U.N.O. FASTENERS SHALL BE HOT-DIPPED GALVANIZED PER ASTM A153 U.N.O. HOT-DIPPED GALVANIZING SHALL ALSO CONFORM TO ASTM A385. THE GALVANIZER SHALL SUBMIT A CERTIFICATE OF CONFORMANCE FOR RECORD.

6.08 PROVIDE FIELD TOUCH-UP AND REPAIR OF GALVANIZING AS REQUIRED PER ASTM A780 USING AN INORGANIC ZINC-RICH PRIMER.

6.09 WHEN DISSIMILAR METALS ARE IN CONTACT (E.G. STAINLESS STEEL IN CONTACT WITH GALVANIZED STEEL), COAT SURFACE WITH COAL TAR EPOXY OR PROVIDE OTHER APPROVED MEANS TO PROVIDE A BARRIER.

6.10 WELDS SHALL BE 1/4" FILLET WELDS MINIMUM UNLESS NOTED OTHERWISE ON THE DRAWINGS.

6.11 PROVIDE TEMPORARY ERECTION BRACING AND SUPPORTS TO HOLD STRUCTURAL STEEL FRAMING SECURELY IN POSITION. SUCH TEMPORARY BRACING AND SUPPORTS SHALL NOT BE REMOVED UNTIL PERMANENT BRACING HAS BEEN INSTALLED.

6.12 SUBMIT SHOP DRAWINGS AND PRODUCT DATA FOR APPROVAL PRIOR TO FABRICATION.

8.0 - POST INSTALLED CONCRETE ANCHORS AND REINFORCING DOWELS

8.01 ADHESIVE ANCHORS AND REINFORCING DOWELS SHALL BE HILTI HIT-HY-200 ADHESIVE ANCHORING SYSTEM.

8.02 EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT TZ EXPANSION ANCHORS.

8.03 INSTALL ANCHORS IN STRICT CONFORMANCE WITH THE MANUFACTURER'S REQUIREMENTS.

8.04 HOLES SHALL BE THOROUGHLY CLEANED AND DRY PRIOR TO INSTALLING ANCHORS.

8.05 DO NOT DAMAGE EXISTING REINFORCING. LOCATE REINFORCING WITH PROFOMETER OR OTHER MEANS PRIOR TO DRILLING CONCRETE.

8.06 ANCHORS INSTALLED OVERHEAD SHALL BE PROOF TESTED BY THE MANUFACTURER'S FIELD ENGINEER OR OTHER APPROVED AGENCY. PROOF TEST A MINIMUM OF 25% OF THE ANCHORS OR (2) TOTAL, WHICHEVER IS GREATER.

9.0 - DESIGN LOADS:

9.01 GENERAL DESIGN REQUIREMENTS_____(IBC 2015, SECTION 1604)
(A) RISK CATEGORY_____II (ASCE 7-10, TABLE 1-1)
(B) MUNICIPALITY_____FRAMINGHAM, MA (780 CMR, TABLE 1604.11)

9.02 DESIGN LOADS TO BE VERIFIED BY PRE-ENGINEERED METAL BUILDING DESIGNER.

9.03 LIVE LOADS
(A) PEDESTRIAN LL _____90 PSF
(B) VEHICLE LL _____HS TRUCK (AASHTO)

9.04 SNOW LOADS
(A) GROUND SNOW LOAD, Pg _____40 PSF
(B) IMPORTANCE FACTOR, Is _____1.0
(C) EXPOSURE FACTOR, Ce _____1.0
(D) THERMAL FACTOR, Ct _____1.2
(E) FLAT ROOF SNOW LOAD, Pf _____35 PSF

9.05 WIND LOADS
(A) WIND SPEED_____127 MPH
(B) EXPOSURE FACTOR_____B
(C) WIND DIRECTIONALITY FACTOR, Kd_____0.85
(D) TOPOGRAPHIC FACTOR, Kzt _____1.0
(E) PRESSURE EXPOSURE COEFFICIENT, Kz_____0.57

9.06 EARTHQUAKE LOADS _____(IBC 2015, SECTION 1613)
(A) SITE CLASS _____D (GEOTECH REPORT)
(B) SPECTRAL RESPONSE ACCELERATIONS
(1) Ss _____0.227 (780 CMR, TABLE 1604.11)
(2) S1 _____0.072 (780 CMR, TABLE 1604.11)
(C) SPECTRAL RESPONSE COEFFICIENTS
(1) Sds _____0.242 (ASCE 7-10, SEC. 11.4.3)
(2) Sd1 _____0.115 (ASCE 7-10, SEC. 11.4.3)
(D) SEISMIC DESIGN CATEGORY _____C (ASCE 7-10, SEC 11.6-1)
(E) SEISMIC IMPORTANCE FACTOR, Ie _____1.5 (ASCE 7-10, TABLE 11.5-1)
(F) SEISMIC FORCE RESISTING SYSTEM: _____(780 CMR, TABLE 12.2-1)
(1) STEEL SYSTEM NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE
(a) RESPONSE MODIFICATION COEFFICIENT, R _ 3
(b) SYSTEM OVERSTRENGTH PARAMETER,Ωo _ 3
(c) DEFLECTION AMPLIFICATION FACTOR, Cd _ 3

(G) ANALYSIS PROCEDURE_____EQUIVALENT LATERAL FORCE ANALYSIS (ASCE 7-10, SEC. 12.8)

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Project:

WALNUT STREET FLOOD MITIGATION

CITY OF FRAMINGHAM, MA

Weston & Sampson
100 Foxborough Boulevard Suite 250
Foxborough, MA 02035
(508) 698.3034 (800) SAMPSON
www.westonandsampson.com

Consultants:

SSV ENGINEERING INC.

REVISIONS:

NO.	DATE	DESCRIPTION

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Drawing Title:

STRUCTURAL GENERAL NOTES I

Sheet Number:

S001

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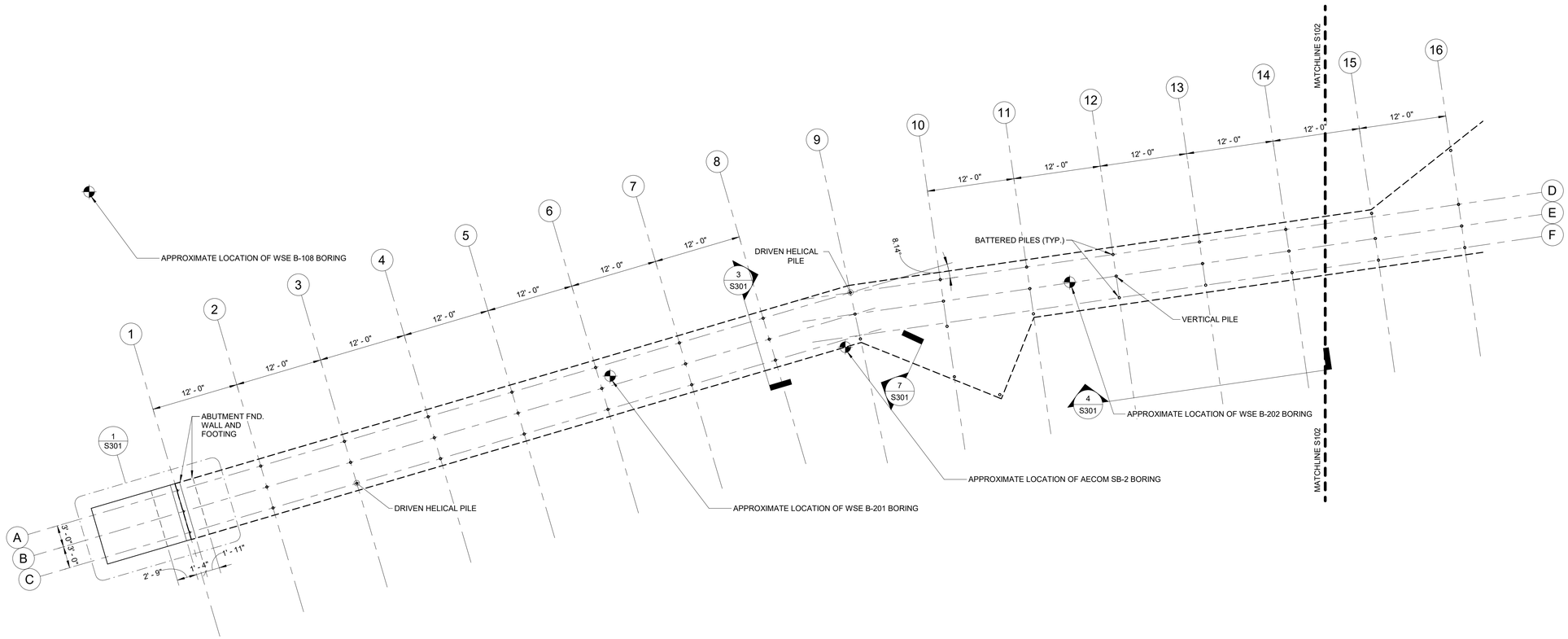
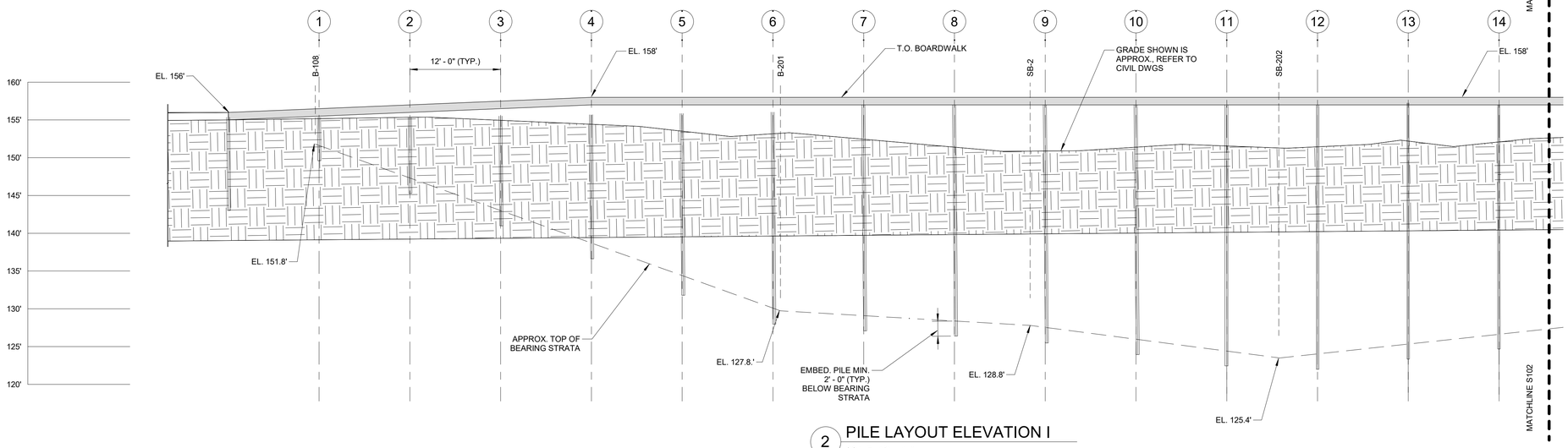


1 PILE LAYOUT PLAN I

SCALE: 1/8" = 1'-0"

NOTES:

1. PILES SHOWN ON PLAN SHALL BE DRIVEN HELICAL PILES. 4.5" DIAMETER PIPE WITH .33" WALL THICKNESS, MINIMUM.
2. TOP OF PILE SHALL BE AT ELEVATION 156.65' UNLESS NOTED OTHERWISE IN THE PLANS.
3. PILE TOP ELEVATION SHALL BE 2 FT MINIMUM EMBEDMENT INTO EXISTING SAND LAYER. SUBSURFACE ____ VARIES ACROSS THE SITE, REFER TO GEOTECHNICAL REPORT BY WESTON & SAMPSON DATED 03/07/2022.
4. PILES SHALL HAVE CAP PLATE FOR BEAM INSTALLATION.
5. ALL BORING LOCATIONS SHOWN ARE APPROXIMATE. SEE CIVIL AND GEOTECHNICAL DWGS FOR EXACT LOCATIONS AND DEPTHS.



2 PILE LAYOUT ELEVATION I

SCALE: 1/8" = 1'-0"

NOTES:

1. APPROXIMATE TOP OF BEARING STRATA BOUNDARY IS BASED ON OUR INTERPRETATION OF DATA PRESENTED ON THE BORING LOGS AND THE ACTUAL TRANSITION MAY BE GRADUAL.
2. SUBSURFACE INFORMATION BASED ON LOGS FOR BORINGS ADVANCED BY SW COLE ENGINEERING, INC. IN 2012 AND 2013, BY AECOM IN 2017, AND WESTON & SAMPSON IN 2021.
3. BOTTOM OF PILE SHALL EMBED A MINIMUM OF 2'-0" BELOW THE TOP OF BEARING STRATA, COORD. WITH GEOTECHNICAL REPORT.

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WALNUT STREET FLOOD MITIGATION

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Drawing Title:

PILE LAYOUT I

Sheet Number:

S101

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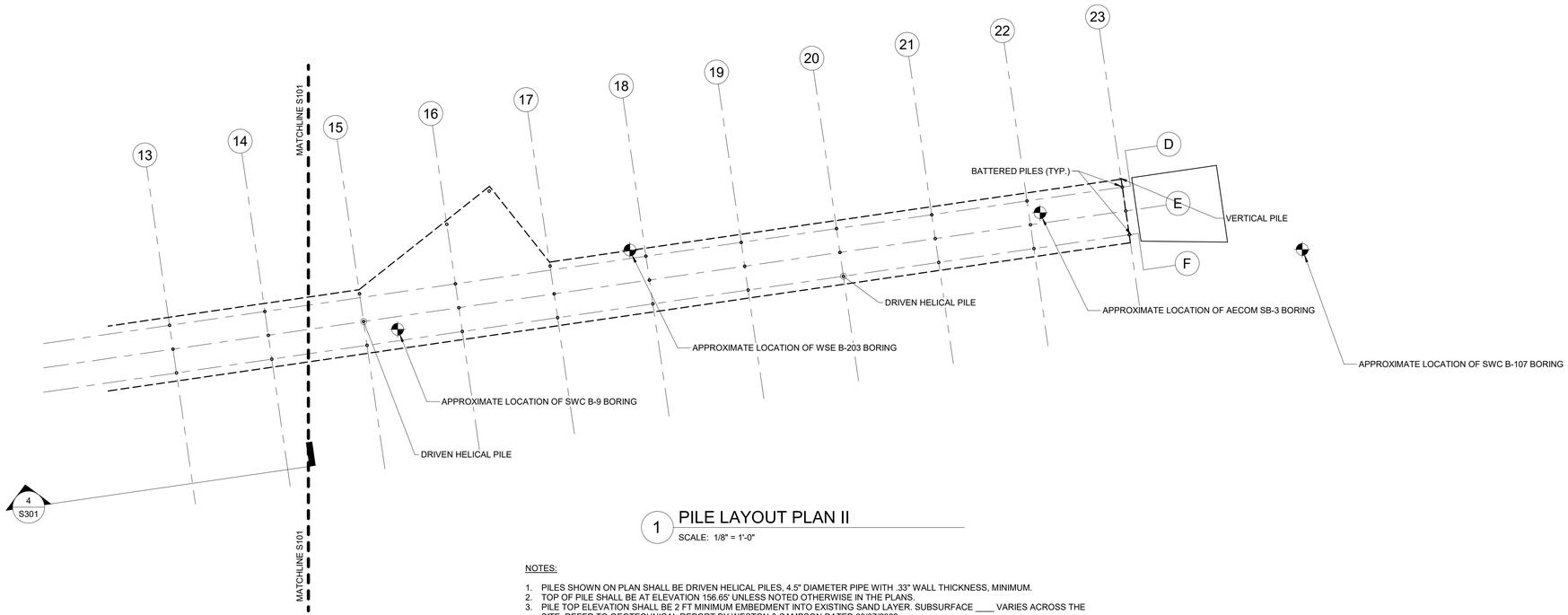
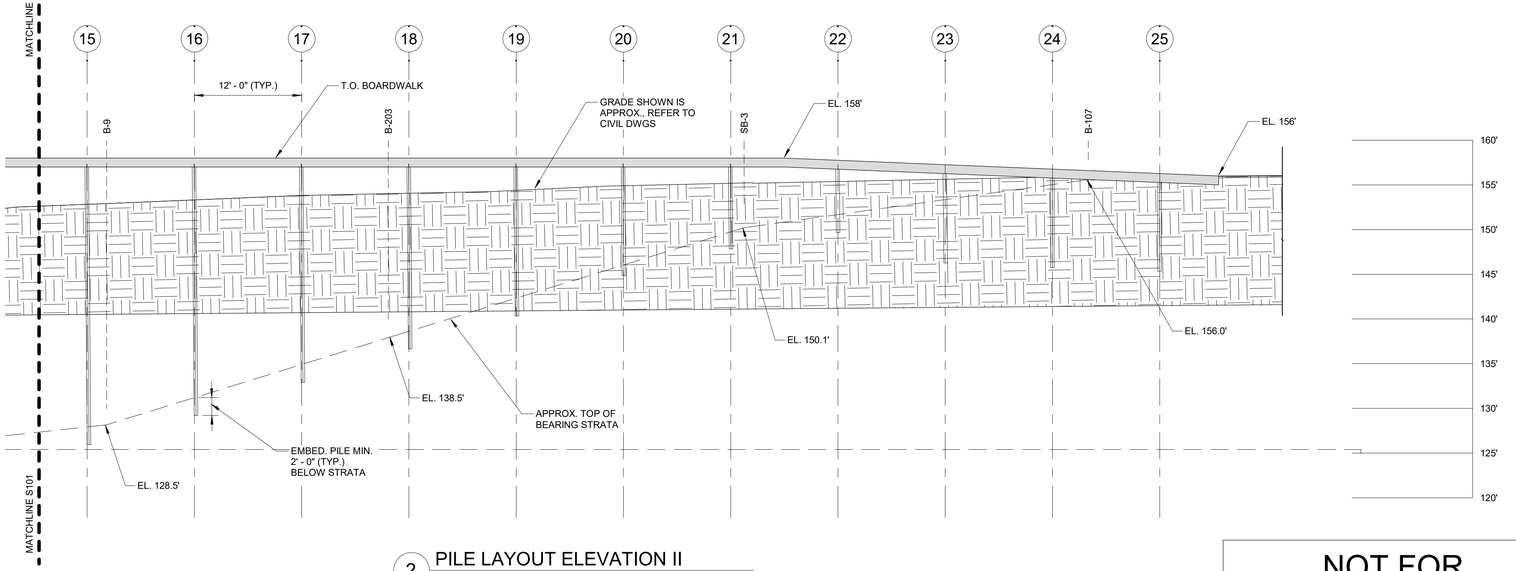


1 PILE LAYOUT PLAN II

SCALE: 1/8" = 1'-0"

NOTES:

1. PILES SHOWN ON PLAN SHALL BE DRIVEN HELICAL PILES, 4.5" DIAMETER PIPE WITH .33" WALL THICKNESS, MINIMUM.
2. TOP OF PILE SHALL BE AT ELEVATION 156.65' UNLESS NOTED OTHERWISE IN THE PLANS.
3. PILE TOP ELEVATION SHALL BE 2 FT MINIMUM EMBEDMENT INTO EXISTING SAND LAYER. SUBSURFACE ____ VARIES ACROSS THE SITE, REFER TO GEOTECHNICAL REPORT BY WESTON & SAMPSON DATED 03/07/2022.
4. PILES SHALL HAVE CAP PLATE FOR BEAM INSTALLATION.
5. ALL BORING LOCATIONS SHOWN ARE APPROXIMATE. SEE CIVIL AND GEOTECHNICAL DWGS FOR EXACT LOCATIONS AND DEPTHS.



2 PILE LAYOUT ELEVATION II

SCALE: 1/8" = 1'-0"

NOTES:

1. APPROXIMATE TOP OF BEARING STRATA BOUNDARY IS BASED ON OUR INTERPRETATION OF DATA PRESENTED ON THE BORING LOGS AND THE ACTUAL TRANSITION MAY BE GRADUAL.
2. SUBSURFACE INFORMATION BASED ON LOGS FOR BORINGS ADVANCED BY SW COLE ENGINEERING, INC. IN 2012 AND 2013, BY AECOM IN 2017, AND WESTON & SAMPSON IN 2021.
3. BOTTOM OF PILE SHALL EMBED A MINIMUM OF 2'-0" BELOW THE TOP OF BEARING STRATA, COORD. WITH GEOTECHNICAL REPORT.

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W&S File No:	ENG21-0957

Drawing Title:

PILE LAYOUT II

Sheet Number:

S102

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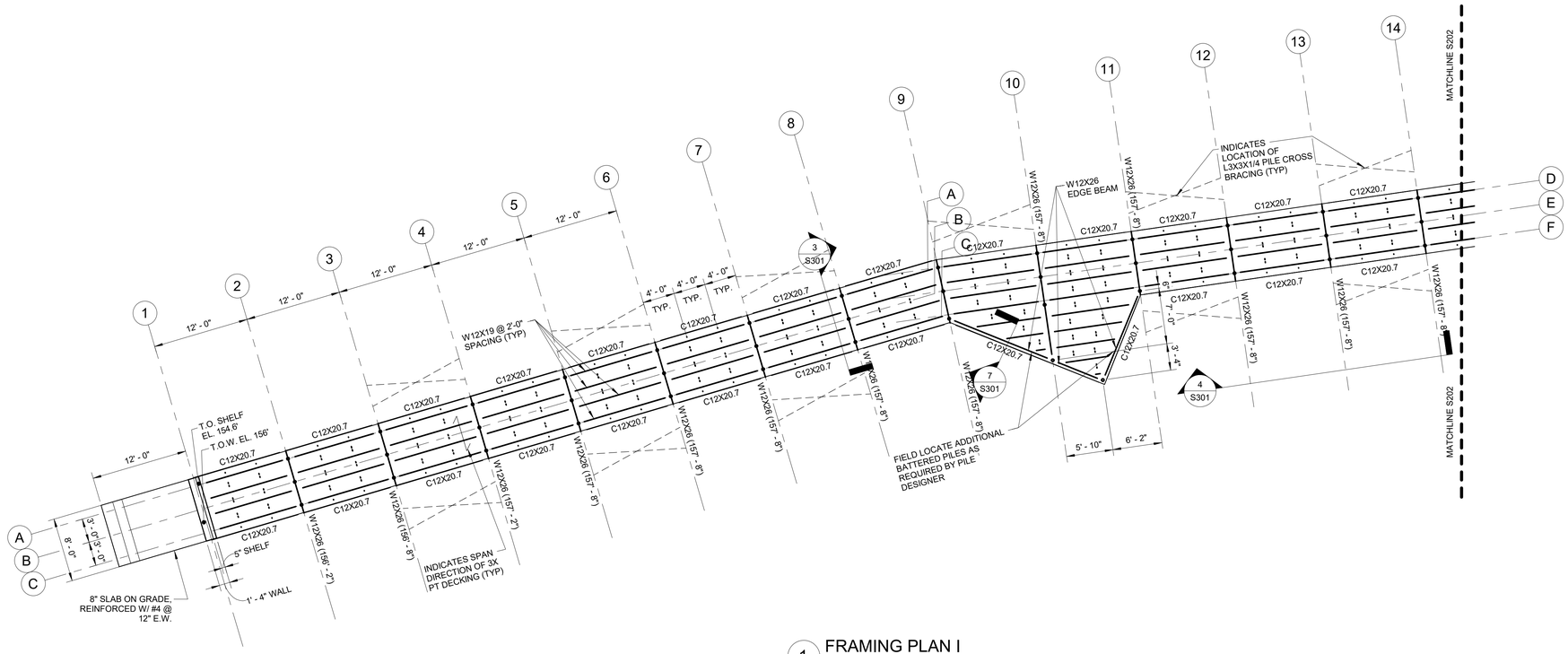

1 FRAMING PLAN I

SCALE: 1/8" = 1'-0"

NOTES:

1. INDICATES SPAN DIRECTION OF PT 3X6 TIMBER ECK, SOUTHERN PINE NO. 1 OR GREATER.
2. T.O. BOARDWALK SHALL BE AT ELEVATION 158' UNLESS NOTED OTHERWISE.
3. T.O. FRAMING SHALL BE AT ELEVATION 156.67' UNLESS NOTED OTHERWISE.
4. A RELATIVE ELEVATION OF (0'-0") REFERS TO ELEVATION 158'.
5. ALL STEEL FRAMING MEMBERS, INCLUDING PLATES & HARDWARE, SHALL BE HOT-DIPPED GALVANZIED IN ACCORDANCE WITH ASTM A 123 & ASTM A 153, RESPECTFULLY.
6. CONCRETE SHALL BE AIR ENTRAINED WITH A COMPRESSIVE STRENGTH F'c = 4500 PSI.

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W&S File No:	ENG21-0957

Drawing Title:

BOARDWALK FRAMING PLAN I

Sheet Number:

S201

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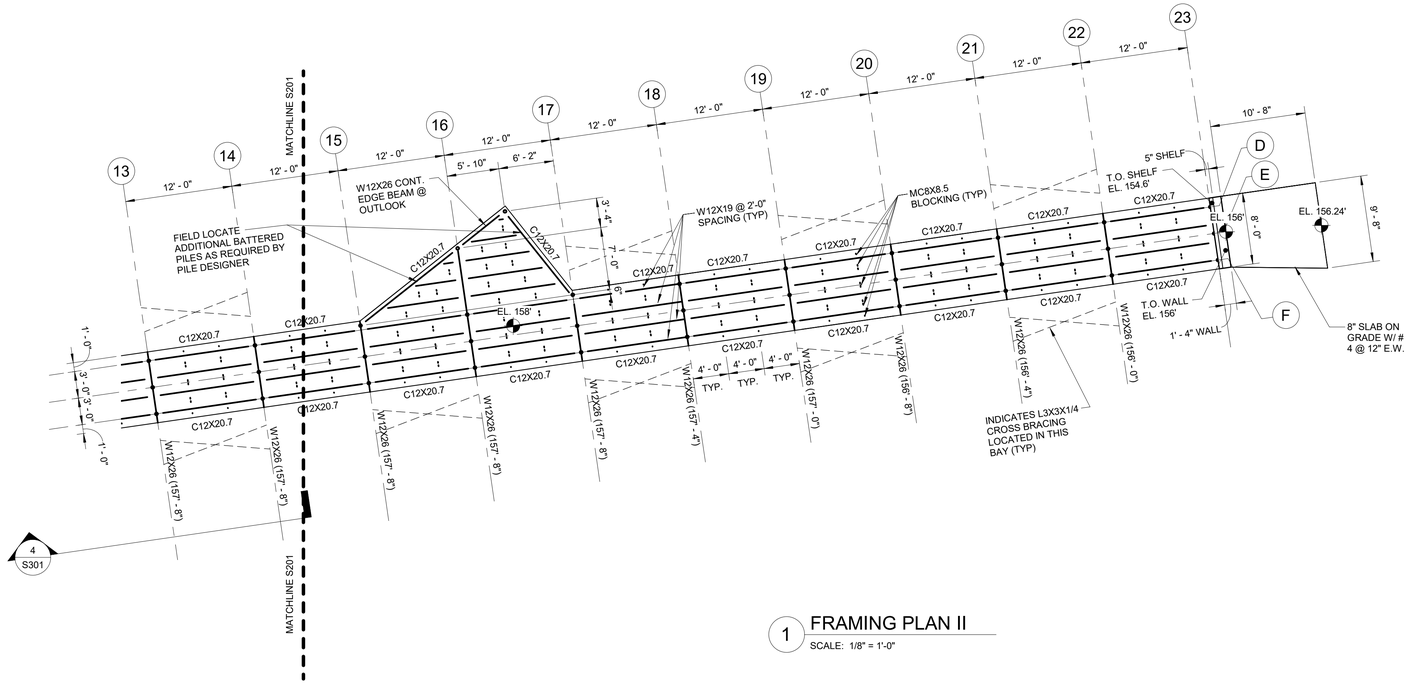

1 FRAMING PLAN II

SCALE: 1/8" = 1'-0"

NOTES:

1. INDICATES SPAN DIRECTION OF PT 3X6 TIMBER ECK, SOUTHERN PINE NO. 1 OR GREATER.
2. T.O. BOARDWALK SHALL BE AT ELEVATION 158' UNLESS NOTED OTHERWISE.
3. T.O. FRAMING SHALL BE AT ELEVATION 156.67' UNLESS NOTED OTHERWISE.
4. A RELATIVE ELEVATION OF (0'-0") REFERS TO ELEVATION 158'.
5. ALL STEEL FRAMING MEMBERS, INCLUDING PLATES & HARDWARE, SHALL BE HOT-DIPPED GALVANZIED IN ACCORDANCE WITH ASTM A 123 & ASTM A 153, RESPECTFULLY.
6. CONCRETE SHALL BE AIR ENTRAINED WITH A COMPRESSIVE STRENGTH F'c = 4500 PSI.

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W&S File No:	ENG21-0957

Drawing Title:

BOARDWALK FRAMING PLAN II

Sheet Number:

S202

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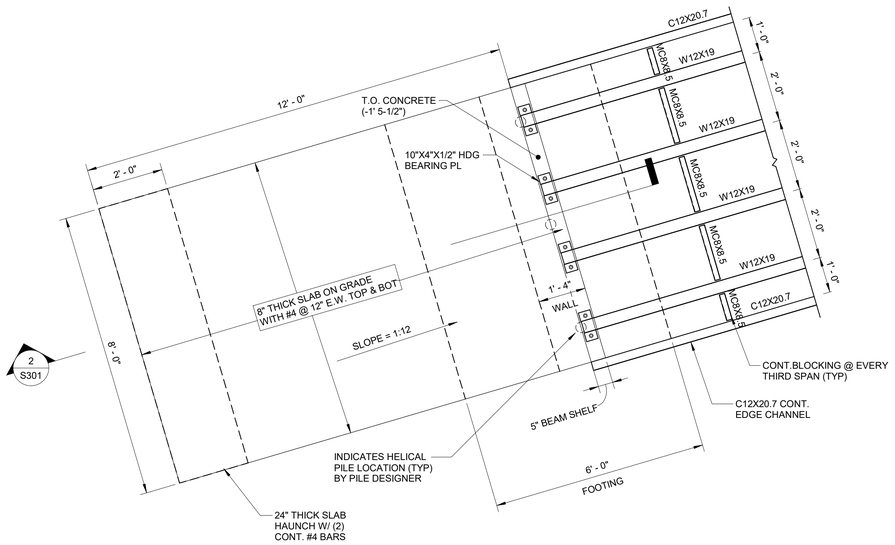
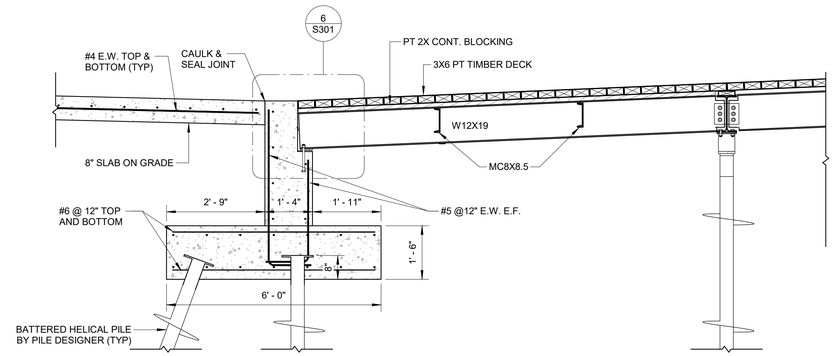


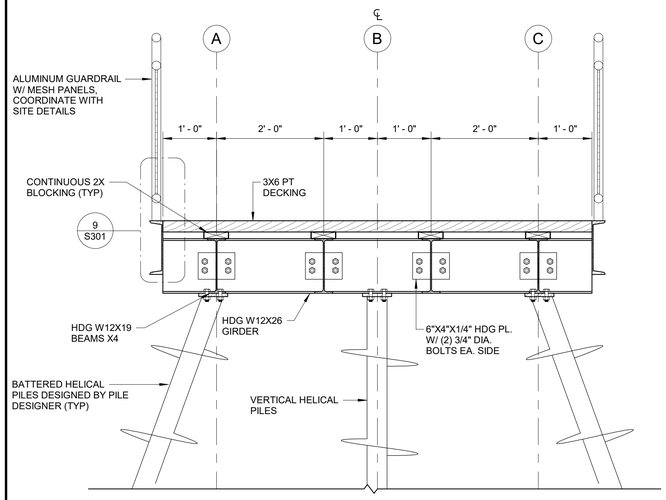
1 ENALRGED RAMP & ABUTMENT PLAN

SCALE: 1/2" = 1'-0"



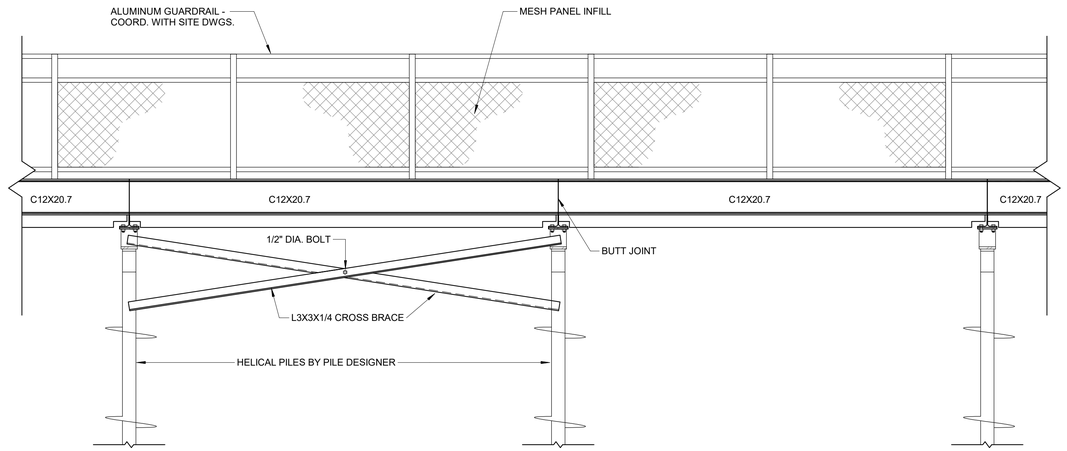
2 TYPICAL RAMP & ABUTMENT SECTION

SCALE: 1/2" = 1'-0"



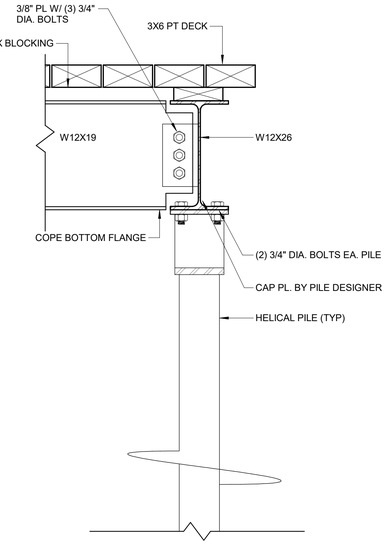
3 TYPICAL BOARDWALK CROSS SECTION

SCALE: 3/4" = 1'-0"



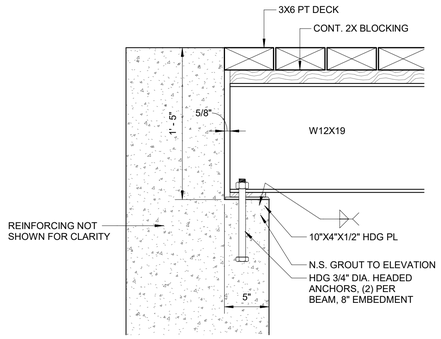
4 TYPICAL BOARDWALK ELEVATION

SCALE: 1/2" = 1'-0"



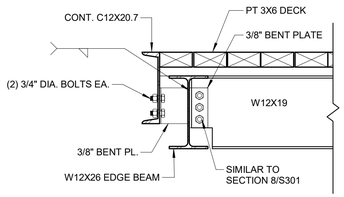
5 GIRDER TO PILE CONNECTION

SCALE: 1 1/2" = 1'-0"



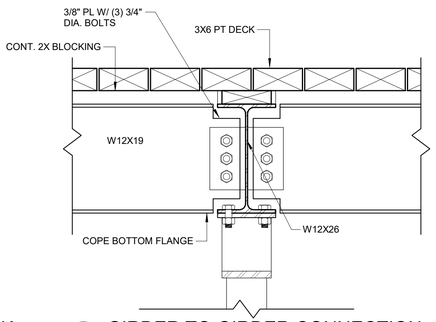
6 TYPICAL BEAM BEARING SECTION @ ABUTMENT

SCALE: 1 1/2" = 1'-0"



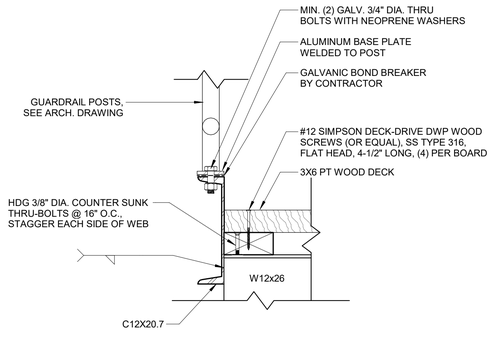
7 SECTION @ EDGE OF OUTLOOK

SCALE: 1" = 1'-0"



8 GIRDER TO GIRDER CONNECTION

SCALE: 1 1/2" = 1'-0"



9 GAURDRAIL TO CHANNEL CONNECTION

SCALE: 1 1/2" = 1'-0"

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Weston & Sampson

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SECTIONS AND DETAILS

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S301

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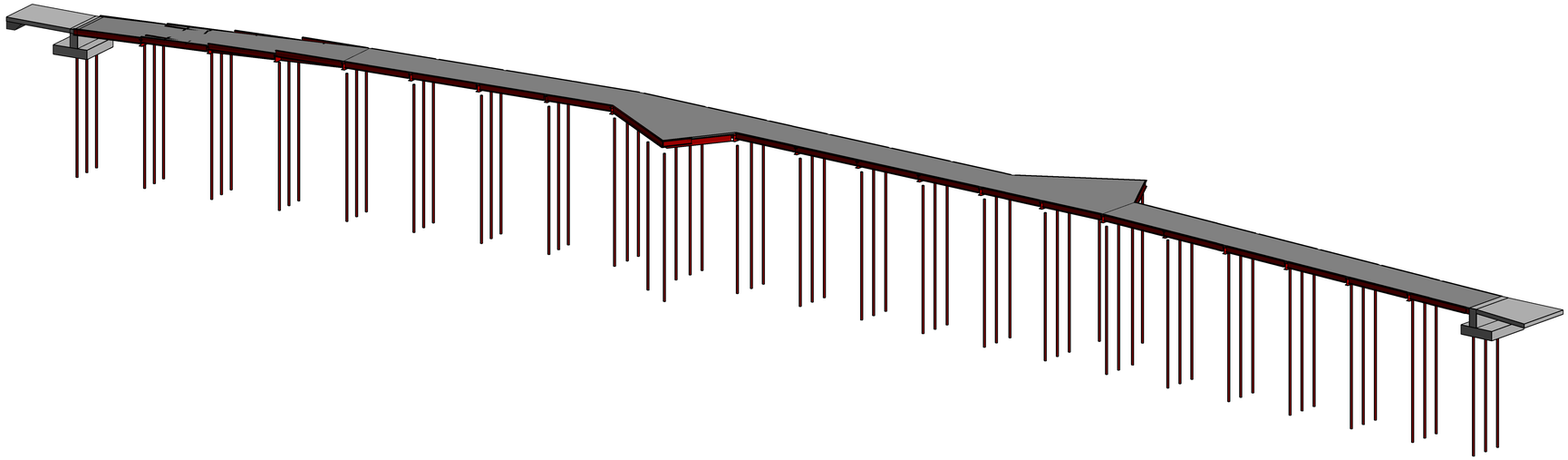
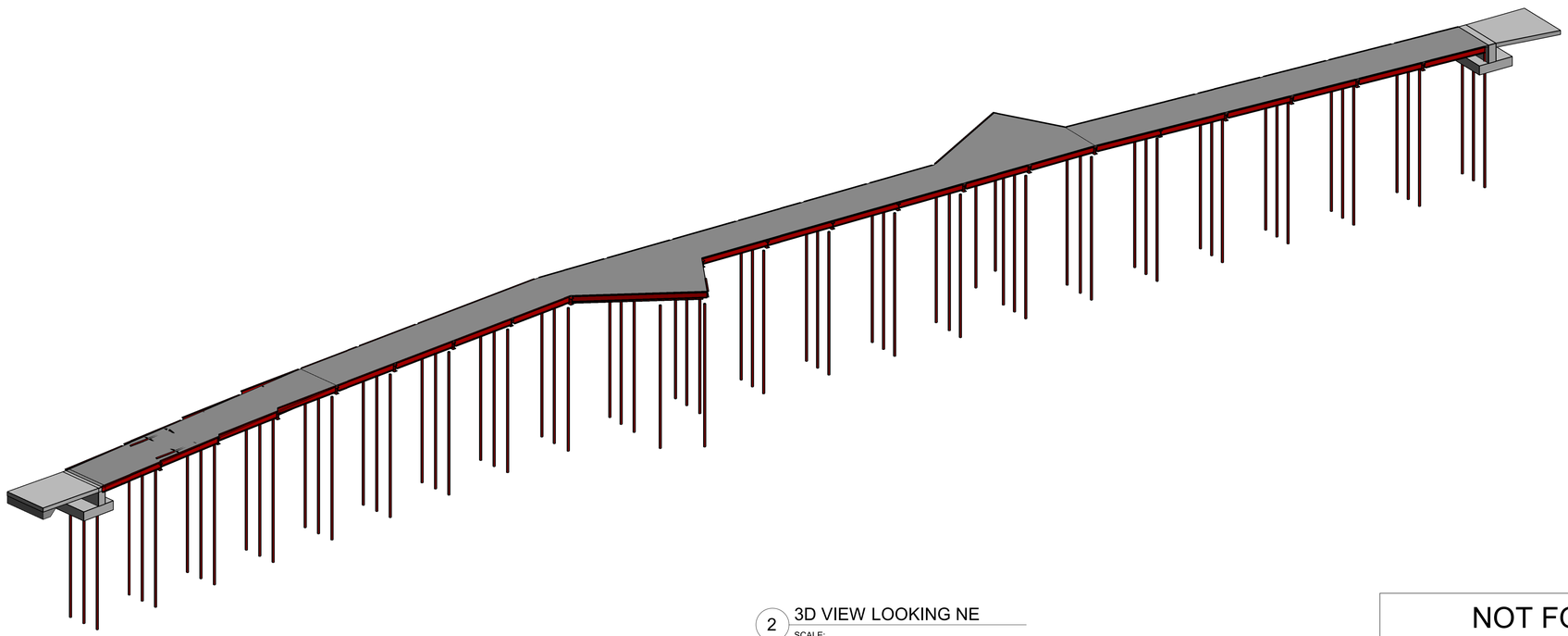


1 3D VIEW LOOKING NW

SCALE:

NOTES:
3D VIEWS ARE FOR REFERENCE ONLY.



2 3D VIEW LOOKING NE

SCALE:

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3D VIEWS

Sheet Number:

S901

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Attachment B – Technical Specifications

SPECIFICATIONS TABLE OF CONTENTS

Walnut Street Flood Mitigation
IFB# XX-XXX
FRAMINGHAM, MASSACHUSETTS

Division		Section Number
0	**BIDDING AND CONTRACT REQUIREMENTS**	
	BID Form	00301
	Subsurface Data	00320
	Permits	00890
1	**GENERAL REQUIREMENTS**	
	Control of Work and Materials	01110
	Measurement and Payment	01024
	Price Adjustments	01250
	Construction Scheduling	01310
	Construction Meetings	01311
	Construction Photographs	01320
	Submittals	01330
	Health & Safety Plan	01380
	Structural Tests and Inspections	01450
	Signage (Traffic Control)	01550
	Portable Changeable Message Sign	01551
	Construction Zone Safety Plan	01552
	Uniformed Officer for Temporary Traffic Control	01553
	Tree Protection and Tree Trimming	01560
	Dust Control	01562
	Existing Fences	01564
	Environmental Protection	01570
	Site Survey	01720
	Cutting, Coring & Patching	01735
	Cleaning Up	01740
	Project As-Built Record Drawings	01765
2	**SITE WORK**	
	Geotextile Fabrics	02071
	Geogrid for Soil Reinforcement	02075
	Asbestos Cement Pipe Removal	02076
	Soil and Waste Management	02080
	Dewatering	02140
	Temporary Water Management	02145

Division		Section Number
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	Support of Excavation	02252
	Earthwork	02300
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	Helical Steel Foundation System	02456
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	Processed Gravel Roadway	02570
	Precast Concrete Culverts & Headwalls	02643
	Stabilized Stone Dust Pavement	02730
	Bituminous Concrete Pavement	02746
	Rehabilitation of Existing Drainage Swales	02779
	Porous Asphalt Paving	02795
	Site Furnishings	02801
	Temporary Chain Link Fence	02821
	Remove and Reset Guard Rails	02843
	Ornamental Bollard with Solar Lighting	02871
	Granite Bounds	02895
	Soil Preparation and Soil Mixes	02910
	Loaming and Seeding	02920
	Trees, Shrubs, Ground Covers and Landscaping	02930
	Wetland Restoration	02955
	Streambed Materials	02956
3	**CONCRETE**	
	Cast-In-Place Concrete	03300
4	**MASONRY**	
	Masonry Re-Pointing	04910
5	**METALS**	
	Structural Steel	05120
	Miscellaneous Metals	05500
6	**WOOD & PLASTICS**	
	Carpentry	06100
	Weirs, Baffles, Launders, and Supports	06606

SECTION 00301

BID FORM

To the City of Framingham, Massachusetts, acting through its Mayor:

The Undersigned, as Bidder, declares as follows:

- The only parties interested in this BID as Principals are named herein;
- this BID is made without collusion with any other person, firm, or corporation;
- no officer, agent, or employee of the Owner is directly or indirectly interested in this BID;
- the Bidder has carefully examined the site of the proposed Work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed Work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this BID, and has carefully read and examined the Drawings, the annexed proposed AGREEMENT and the Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;
- understands that information relative to subsurface and other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) has been furnished only for his information and convenience without any warranty or guarantee, expressed or implied, that the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered will be the same as those shown on the Drawings or in any of the other Contract Documents and agrees that the Bidder shall not use or be entitled to use any such information made available to him through the Contract Documents or otherwise or obtained by him in his own examination of the site, as a basis of or ground for any claim against the Owner or the Engineer arising from or by reason of any variance which may exist between the aforesaid information made available to or acquired by him and the subsurface and/or other conditions, natural phenomena, existing pipes and other structures (surface and/or subsurface) actually encountered during the construction work, and has made due allowance therefore in this BID;
- and the Bidder understands that the quantities of work tabulated in this BID or indicated on the Drawings or in the Specifications or other Contract Documents are only approximate and are subject to increase or decrease as deemed necessary by the Engineer;
- and agrees that, if this is accepted will contract with the Owner, as provided the copy of the Contract Documents deposited in the office of the Engineer, this BID form being part

of said Documents, that the will perform all work and all the materials and equipment, and provide all labor, services, plant, machinery, apparatus, appliances, tools, supplies all other required by Contract Documents the manner within the therein prescribed according to the requirements the

Engineer as therein set forth, and that the Bidder will take in full payment therefore the lump sum or unit price applicable to each item of the Work as stated in the following schedule:

Bidders must bid on each item of the Base Bid. All entries in the entire BID must be made clearly and in ink; prices bid must be written in both words and figures. In case of discrepancy, the amount shown in words will govern.

Bidders shall insert extended item prices obtained from quantities and unit prices. In case of discrepancy between the product obtained by multiplying the estimated quantity by the unit price, the actual product shall apply. In case of discrepancy between the sum of the total figure of the items and the total amount listed, the actual sum shall apply.

Receipt of Addenda numbered_____to_____ , inclusive, is acknowledged.

(Bidder) _____

(by) _____

(Title) _____

BASE BID

Walnut Street Area Flood Mitigation Project

Refer to Section 01024 - Measurement and Payment for Item Descriptions. The work of the General
Bidder, being all work covered by items 1 through 32, inclusive.

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
1	Mobilization and Demobilization _____ Dollars and Cents	LS	1		
2	Traffic Management _____ Dollars and Cents	LS	1		
3	Demolition _____ Dollars and Cents	LS	1		
4	Clearing and Grubbing _____ Dollars and Cents	LS	1		
5	Temporary Water Management/Brook Diversion _____ Dollars and Cents	LS	1		
6	Helical Piles _____ Dollars and Cents	LS	1		
7	Steel Support System _____ Dollars and Cents	Ton	23		
8	Walking Surface Deck _____ Dollars and Cents	SF	2,500		
9	Handrails, Posts, Balusters, Screens _____ Dollars and Cents	LF	600		
10	Removal and Disposal of Fill Under Boardwalk _____ Dollars and Cents	Ton	320		

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
11	Furnish and Install Precast Concrete Headwall and Wingwall – 18-inch RCP Outfall _____ Dollars and Cents	LS	1		
12	Stormwater BMP – 18-inch RCP Outfall _____ Dollars and Cents	LS	1		
13	CIP Reinforced Concrete Approach Ramps _____ Dollars and Cents	CY	20		
14	Permanent Signage _____ Dollars and Cents	EA	1		
15	Education Kiosks at Outlooks _____ Dollars and Cents	EA	2		
16	Permanent Bollards with Solar Lights _____ Dollars and Cents	EA	4		
17	Round Post Lock Removable Bollards _____ Dollars and Cents	EA	2		
18	Bituminous Concrete Binder Course _____ Dollars and Cents	TON	60		
19	Bituminous Concrete Wearing Course _____ Dollars and Cents	TON	50		
20	Stream Restoration – Type A _____ Dollars and Cents	LF	525		
21	Stream Restoration – Type B _____ Dollars and Cents	LF	330		
22	Stream Restoration – Type C _____ Dollars and Cents	LF	480		
23	Stream J Hooks _____ Dollars and Cents	EA	10		

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Extended Amount (In Figures)
24	Stream Cross Veins _____ Dollars and Cents	EA	4		
25	Construction Matting _____ Dollars and Cents	LF	735		
26	Removal and Disposal of Soil/Sediment _____ Dollars and Cents	Ton	1,700		
27	Plantings, Stabilization, Loam and Seed _____ Dollars and Cents	LS	1		
28	Remove and Dispose Channel Debris Dams _____ Dollars and Cents	EA	8		
29	Erosion and Sedimentation Control _____ Dollars and Cents	LS	1		
30	Site Restoration on Private Properties _____ Dollars and Cents	LS	1		
31	Police Detail Allowance _____ Dollars and Cents	LS	1	$20,000	$20,000
32	Miscellaneous Work and Cleanup _____ Dollars and Cents	LS	1		

TOTAL FOR BASE BID

Total Amount of Base Bid (**Basis of Award**) (Items 1 through 32 inclusive).
$_____
(Amount in figures)

_____
(Amount in words)

The bidder understands that the Owner reserves the right to reject any and all bids and to waive any informality in the bidding.

The undersigned agrees that for extra work, if any, will be performed in accordance with Article 10 of the General Conditions of the Contract and will be paid for in accordance with Article 11 of the General Conditions of the Contract.

The bid security accompanying this BID shall be in the amount of 5 percent of the BID payable to the City of Waltham.

The time for completion of this contract is 150 calendar days. Liquidated damages specified in this contract are $1,000 per day for each calendar day beyond the contract completion date that work remains uncompleted.

Bids shall be valid for ninety (90) days and cannot be withdrawn until after the 90-day period has expired.

The undersigned agrees that if the Owner accepts this BID, the bidder will duly execute and acknowledge the AGREEMENT and furnish, duly executed and acknowledged, the required CONTRACT BONDS within ten (10) days, Saturdays, Sundays, and legal holidays excluded, after notification that the AGREEMENT and other Contract Documents are ready for signature.

A performance bond in an amount equal to 100 percent of the total amount of the bid with a surety company qualified to do business in the Commonwealth of Massachusetts will be required for the faithful performance of the contract, as well as a labor and materials bond in an amount equal to 100 percent of the total bid amount.

Should the bidder fail to fulfill any of his agreements as hereinabove set forth, the Owner shall have the right to retain as liquidated damages the amount of the bid check or cash which shall become the Owner's property. If a bid bond was given, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

The bidder, by submittal of this BID, agrees with the Owner that the amount of the bid security deposited with this BID fairly and reasonably represents the amount of damages the Owner will suffer due to the failure of the bidder to fulfill his agreements as above provided.

The undersigned bidder hereby certifies he/she will comply with the minority workforce percentage ratio and specific affirmative action steps contained in the EEO/AA provisions of this Contract, including compliance with the Minority/Woman Business Enterprise as required under these contract provisions. The Contractor receiving the award of the contract shall be required to obtain from each of its subcontractors a copy of the certification by said subcontractor, regardless of tier, that it will comply with the minority workforce ratio and specific affirmative action steps contained in these
contract provisions and submit it to the contracting agency prior to the award of such subcontract.

The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of Section Twenty-Nine F of Chapter Twenty-Nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

Pursuant to M.G.L. Ch. 62C, sec. 49A, I certify under the penalties of perjury that I, to my best knowledge and belief, have filed all state tax returns and paid all state taxes required under law.

The attached Minority Business Participation and Women Business Participation Form (Form EEO- BMF-190) and the attached Minority Business Participation and the Women Business Participation Letters of Intent (Form EEO-BMF-191) must be completed and submitted as part of the Bid Proposal.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work and that he will comply fully with all laws and regulations applicable to awards made subject to MOL Ch. 30, Section 39M. The bidding and award of the contract will be in full compliance with Section 39M inclusive of Chapter 30 of the General Laws of the Commonwealth of Massachusetts as last revised.

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The attached CERTIFICATE OF NON-COLLUSION must be signed and submitted as part of the Bid Proposal.

_____

(Name of General Bidder)

By_____Date_____

(Signature and title of authorized representative)

SEAL

_____ _____

(Telephone) (Business address)

_____ _____

(Fax Number) (City, State, Zip)

The following documents are attached to and made a condition of the bid, and shall be filed with the
bid:

- Bid Security (5%)
- Completed and signed Bid Proposal (Section 00301)
- Contractor's Certification (Attached to Section 00301)
- MBE/WBE Participation and Vendor Information Forms (Attached to Section 00301)
  1. Schedule of Participation for SRF Construction (EEO-DEP-190C)
  2. Letter of intent for SRF Construction (EEO-DEP-191C)
  3. Vendor Information Form- SRF Construction (EEO-DEP-VIF-C)
- Completed Certificate of Non-Collusion (Section 00480)
- Completed Certificate of Corporate Vote (Corporation Only) (Section 00481)
- Completed Certificate as to Payment of State Taxes (Section 00482)
- Completed State "Debarment Disclosure Form for Public Contracts" (Section 00484)

The Bidder is requested to list four or more of your firm's recent projects of a similar character as required for acceptable bid. References will enable the Owner to judge his experience, skill, and business standing.

Project Name:_____

Project
Location:_____

Contract Amount: $_____Completion
Date_____

Owner:_____

Contact Name: _____Telephone: _____

Architect/Engineer:
_____

Contact Name: _____Telephone: _____

Project Name:_____

Project
Location:_____

Contract Amount: $_____Completion
Date_____

Owner:_____

Contact Name: _____Telephone: _____

Architect/Engineer:
_____

Contact Name: _____Telephone: _____

Project Name:_____

Project
Location:_____

Contract Amount: $_____Completion
Date_____

Owner:_____

Contact Name: _____Telephone: _____

Architect/Engineer:
_____

Contact Name: _____Telephone: _____

Project Name:_____

Project
Location:_____

Contract Amount: $_____Completion
Date_____

Owner:_____

Contact Name: _____Telephone: _____

Architect/Engineer:
_____

Contact Name: _____Telephone: _____

Add supplementary page if necessary.

END OF SECTION 00301

SECTION 00320

SUBSURFACE DATA

PART I - GENERAL

1.01 SCOPE:

A. Subsurface exploration programs consisting of soil borings within the alignment of the proposed boardwalk have been performed, with reasonable care, as listed below. Copies of the boring logs can be found in the plans for informational purposes only and are not part of the Contract Documents.

1. Boring B-9 by SW Cole Engineering, Inc. (SWC) in 2012;
2. Borings B-107 and B-108 by SWC in 2013;
3. Borings SB-2 and SB-3 by AECOM in 2017; and
4. Borings B-201 through B-203 by Weston & Sampson in 2021.

B. Samples of the materials encountered in the borings advanced under the direction of Weston & Sampson will be supplied to the awarded contractor. If Contractor deems the subsurface information insufficient, they may, after obtaining Owner's permission, carry out additional subsurface explorations, at no expense to the Owner.

C. The boring logs are provided in the plans for informational purposes only. The Contractor shall not rely on the interpretations between soil strata included therein, only the factual data relative to the specific times, locations, and depths/elevations referenced in the logs. Specific project requirements are referenced only in the Drawings and Specifications.

D. Subsurface information provided in the Contract Documents is limited by the methods used for obtaining and expressing such data, and is subject to various interpretations. The terms used to describe soils, rock, groundwater and such other conditions are subject to local usage and individual interpretation.

E. Borings have been drilled substantially at the approximate locations indicated on the Drawings and advanced to the depths shown on the logs. Soil information presented in the boring logs, as to classification, gradation, properties, density and consistency, is based on visual observation of recovered samples. Groundwater levels reported on the boring logs are those measured in the field at the particular location and at the time measurements were made, and do not necessarily represent permanent groundwater elevations. Groundwater elevations may be affected by temperature, rainfall, tidal fluctuation, and other factors that may not have been present at the time the measurements were made. The Contractor should be aware that groundwater level fluctuations may affect methods of construction.

F. Subsurface exploration, soil and rock data are for the general information of the Contractor. The Contractor is obligated to examine the site, review boring logs, all available information and records of explorations, investigations and other pertinent data

for the site, and then based upon their own interpretations and investigations decide the character of material to be encountered and excavated, the suitability of the materials to be used for backfilling and such other purposes, the groundwater conditions, difficulties or obstacles likely to be encountered, and other conditions affecting the work. The subsurface data is accurate only at the particular locations and times the subsurface explorations were made. No other warranty either expressed or implied by the Owner, Engineer or their agents is made as to the accuracy of the subsurface information and data shown on the Drawings or presented in the Contract Documents.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 00890

PERMITS

PART 1 – GENERAL

1.01 DESCRIPTION:

This Section provides specific information and defines specific requirements of the Contractor regarding the preparation and acquisition of permits required to perform the work of this project.

1.02 RELATED WORK:

A. Section 01110, CONTROL OF WORK AND MATERIALS

B. Section 01550, SIGNAGE (TRAFFIC CONTROL)

C. Section 01562, DUST CONTROL

D. Section 01570, ENVIRONMENTAL PROTECTION

E. Section 02076, ASBESTOS AND CEMENT PIPE

I. Section 02140, DEWATERING

K. Section 02300, EARTHWORK

1.03 GENERAL REQUIREMENTS:

A. The Owner has obtained or will obtain and pay for the permits listed below, which are required for this project. The Contractor shall assist in obtaining certain permits, as indicated. The Contractor shall obtain and pay for all other permits required, as defined under the Permits subsection of Section 00700, GENERAL CONDITIONS.

:

Permits by Owner	Status
Notice of Intent – Framingham Conservation Commission (310 CMR 10.00)	TBD
Massachusetts Environmental Protection Agency- Environmental Notification Form (MEPA, 301 CMR 11.0)	TBD
Mass DEP – Combined Licenses/Permits for Waterways & Water Quality Certification (310 CMR 9.00) (314 CMR 9.00	TBD
Section 106 Mass Historical Commission	TBD
US Army Corps of Engineers General Permit (PCN)	TBD
*Contractor shall prepare permit application and obtain the permit after contract is awarded, bearing all expenses. Owner will pay for and/or waive the permit application fee, if applicable.	

1.04 GENERAL PERMIT AND TERMINATION REQUIREMENTS:

A. The Contractor shall apply for, obtain, and pay for all permits and licenses required, including but not limited to the permits listed below. Contractor shall also be responsible for all fees and costs associated with decommissioning and terminations of services.

B. The Contractor shall procure all other permits, licenses, and approvals from Federal, State, and local authorities and other such agencies as may be necessary in connection with the work of this Contract.

C. The Contractor shall provide all required certificates to show that the work has been completed in conformity with the permits and shall submit such Certificates of Approval to the Engineer before final acceptance of the work.

1.05 FRAMINGHAM FIRE DEPARTMENT / FRAMINGHAM DEPARTMENT OF PUBLIC WORKS:

A. The Contractor shall coordinate with the Framingham Fire Department and Framingham Department of Public Works related to hydrant use for dust control.

1.06 CONSERVATION COMMISSION ORDERS:

A. The Conservation Commission has under the authority of Massachusetts General Laws Chapter 131, Section 40, issued an Order of Conditions on the work under this contract. This Order is to become a part of the Contract Documents and the Contractor shall perform

all work in strict conformance with said Order. A copy of this Order is attached to this section

1.07 NPDES STORMWATER DISCHARGE AND CONSTRUCTION SITE DEWATERING PERMITS:

A. The Contractor shall comply with EPA's Construction General Permit, as required, and obtain the NPDES Stormwater Discharge Permit, as required, and shall prepare a Stormwater Pollution Prevention Plan in accordance with the permit requirements.

B. The Contractor shall, if required, obtain a Construction Site Dewatering Permit (BRPWM 10) from the DEP and the EPA.

1.08 NOTIFICATIONS:

A. The Contractor shall make the appropriate notifications to the DEP and the EPA including, but not limited to, the DEP notification prior to construction or demolition, BWP AQ 06, and EPA notification required under the Federal National Emission Standards for Hazardous Air Pollutants.

1.09 TRENCH PERMIT (520 CMR 14.00):

A. The Contractor shall obtain a Trench Permit, in accordance with the Massachusetts Department of Safety regulations on excavation and trench safety (520 CMR 14.00), prior to excavations of all regulated trenches.

1.10 STORMWATER POLLUTION PREVENTION PLAN:

A. The Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP), as required by the Environmental Protection Agency (EPA).

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PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 PERFORM WORK IN ACCORDANCE WITH REQUIREMENTS:

A. The Contractor shall perform the work in accordance with the Contract Documents, including the attached permits/order of conditions, and any applicable municipal requirements.

B. Prior to commencing any construction activities, the Contractor shall demonstrate to the Owner and the Engineer, through on-site inspection and submitting copies of permits or approvals, that it is in full compliance with the terms and conditions of all permits

specified herein. The Contractor shall maintain full compliance with all permits throughout the performance of the work, and upon request, grant access to permitting authorities to inspect the site for the purpose of verifying such compliance.

END OF SECTION

Document9

SECTION 01110

CONTROL OF WORK AND MATERIALS

PART 1 – GENERAL

Not Used.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 HAULING, HANDLING AND STORAGE OF MATERIALS:

A. The Contractor shall, at its own expense, handle and haul all materials furnished by it and shall remove any of its surplus materials at the completion of the Work.

B. The Contractor shall provide suitable and adequate storage for equipment and materials furnished by it that are liable to injury and shall be responsible for any loss of or damage to any equipment or materials by theft, breakage, or otherwise.

C. All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in

such location as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

D. The Contractor shall be responsible for all damages to the work under construction during its progress and until final completion and acceptance even though partial payments have been made under the Contract.

3.02 EASEMENTS:

A. As indicated on the Drawings, the Work is located in easements obtained by the Owner. The Contractor has no rights outside of the easements unless they are obtained from the property owner by the Owner.

B. Contractor shall schedule Work so that it will cause minimum inconvenience and nuisance to abutting property owners, over the shortest possible time.

C. Easements shall be kept clean; no rubbish or discarded construction materials shall be allowed to accumulate. Storage of excess construction materials, including soil, ledge, equipment, or machinery on easements will not be allowed.

D. Restoration of fences, shrubs, trees and grass shall be completed promptly following completion of the Work in an easement, to minimize disruption and inconvenience to property owners.

3.03 OPEN EXCAVATIONS:

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at its own expense, provide suitable and safe means for completely covering all open excavations and for accommodating travel when work is not in progress.

B. Bridges provided for access to private property during construction shall be removed when no longer required.

C. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer.

D. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, then special construction procedures shall be taken, such as limiting the length of trench and prohibiting stocking excavated material in the street.

E. All street excavations shall be completely backfilled and closed at the end of each work day. Backfilling of adequate strength to carry traffic shall be used.

3.04 MAINTENANCE OF TRAFFIC:

A. Unless permission to close the street is received in writing from the proper authority, all excavated materials and equipment shall be placed so that vehicular and pedestrian traffic may be safely maintained at all times.

B. Should the Chief of Police deem it necessary, uniformed officers will be assigned to direct traffic. The Contractor shall make all arrangements in obtaining uniformed officers required.

C. The Contractor shall at its own expense, as directed by the Police Traffic Control/Safety Officer, provide and erect acceptable barricades, barrier fences, traffic signs, and all other traffic devices not specifically covered in a bid item, to protect the work from traffic, pedestrians, and animals. The Contractor shall provide sufficient temporary lighting such as lanterns/flashers (electric battery operated) or other approved illuminated traffic signs and devices to afford adequate protection to the traveling public, at no additional cost to the Owner. See Section 01552 CONSTRUCTION ZONE SAFETY PLAN.

D. The Contractor shall furnish all construction signs that are deemed necessary by and in accordance with Part VI of the Manual on Uniform Traffic Control Devices as published by the U.S. Department of Transportation. In addition, the Contractor may be required to furnish up to 128 square feet of additional special construction warning signs. Size and exact wording of signs shall be determined by the Engineer during construction.

E. The intent of policing is to ensure public safety by direction of traffic. Police officers are not to serve as watchmen to protect the Contractor's equipment and materials.

F. Nothing contained herein shall be construed as relieving the Contractor of any of its responsibilities for protection of persons and property under the terms of the Contract.

3.05 CARE AND PROTECTION OF PROPERTY:

The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, such property shall be promptly restored by the Contractor, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Engineer and to no additional cost to the Owner

3.06 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES:

A. All existing buildings, utilities, pipes, poles, wires fences, curbings, property line markers and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported and protected from

damage by the Contractor. Should such property be damaged, it shall be restored by the Contractor, at no additional cost to the Owner.

B. The Contractor shall determine the location of all underground structures and utilities (including existing water services, drain lines, electrical lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by Contractor.

C. When fences interfere with the Contractor's operations, the Contractor shall remove and (unless otherwise specified) promptly restore them in accordance with Section 01564 EXISTING FENCES.

D. On paved surfaces the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are shaped so as to cut or otherwise damage such surfaces.

E. All property damaged by the Contractor's operations shall be restored to a condition at least equal to that in which it was found immediately before Work was begun. Suitable materials and methods shall be used for such restoration.

F. Restoration of existing property and structures shall be carried out as promptly as practicable and shall not be left until the end of the construction period.

3.07 MAINTENANCE OF FLOW:

A. The Contractor shall at its own cost, provide for the flow of sewers and drains interrupted during the progress of the work, and shall immediately cart away and dispose of all matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.

B. All existing drainage facilities including, but not limited to, brooks, streams, canals, channels, ditches, culverts, catch basins and drainage piping shall be adequately safeguarded so as not to impede drainage or to cause siltation of downstream areas in any manner whatsoever. If the Contractor damages or impairs any of the aforesaid drainage facilities, the Contractor shall repair the same within the same day.

C. At the conclusion of the work, the Contractor shall remove all silt in drainage structures caused by its operations as described in Section 01740, CLEANING UP.

3.08 REJECTED MATERIALS AND DEFECTIVE WORK:

A. Materials furnished by the Contractor and condemned by the Engineer as unsuitable or not in conformity with the specifications shall forthwith be removed from the Work by

the Contractor and shall not be made use of elsewhere in the Work of no additional cost to the Owner.

B. Any errors, defects or omissions in the execution of the Work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the Work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Engineer.

C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or its employees, as determined by the Engineer, occurring previous to the final payment.

3.09 SANITARY REGULATIONS:

Sanitary conveniences for the use of all persons employed on the work, properly screened from public observation, shall be provided in sufficient numbers in such manner and at such locations as may be approved by the Engineer. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The Contractor shall rigorously prohibit the committing of nuisances within, on or about the Work. Any employees found violating these provisions shall be discharged and not again employed on the Work without the written consent of the Engineer. The sanitary conveniences specified above shall be the obligation and responsibility of the Contractor.

3.10 SAFETY AND HEALTH REGULATIONS:

This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Labor and Industries, Division of Industrial Safety "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et. seq.)." The Contractor shall be familiar with the requirements of these regulations.

3.11 SITE INVESTIGATION:

The Contractor acknowledges that it has satisfied itself as to the conditions existing at the site of the work, the type of equipment required to perform this work, the quality and quantity of the materials furnished insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the drawings and specifications made a part of this contract. Any failure of the Contractor to acquaint itself with available information will not relieve it from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes

no responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner.

3.12 HANGERS, PADS, AND SUPPORTS:

A. Unless otherwise indicated, hangers and supports shall be by the trade providing the supported item.

B. Except where detailed or specified, design of hangers and supports shall be the responsibility of the Contractor. All parts of such hangers or supports shall be designed in accordance with accepted engineering practice, using a factor of safety of at least 2½.

C. When proprietary hangers, etc., are supplied, satisfactory evidence of the strength of such items shall be furnished.

D. Hangers for items hung from steel and concrete shall be centered on the vertical center of gravity of the beam.

E. Locations and sizes of openings, sleeves, concrete pads, steel frames, and other equipment supports are indicated on the Drawings for bidding purposes only. Final sizes and locations of such items shall be obtained from the Bid Documents.

3.13 SLEEVES, HOLES, HANGERS, INSERTS, ETC.:

A. Except where holes and openings are dimensioned, and hangers, inserts, and supports are fully called for on the architectural and structural drawings (or reference is made thereon to drawings containing such information) to accommodate mechanical or electrical items, they shall be by the Contractor

B. Sleeves, inserts, anchors, etc., supplied under the Contractor in sufficient time to so permit, shall be set in concrete, masonry, etc., or fastened to steel deck, etc., by the respective architectural or structural trade. Where not supplied in sufficient time, installation of such items shall be the responsibility of the Contractor.

C. Nothing shall be suspended from the steel roof deck and no fastenings made to it, except with the prior permission of the Engineer. Request for permission shall be accompanied by full details of the hanger or fastener, including the weight of the item to be suspended.

3.15 ELECTRIC SERVICE:

A. The Contractor shall make all necessary applications and arrangements and pay for all fees and charges for electrical energy for power and light necessary for the proper

completion of this contract during its entire progress. The Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.

B. There shall be sufficient electric lighting so that all work may be done in a workmanlike manner where there is not sufficient daylight.

3.16 HAZARDOUS WASTE:

Should the Contractor, while performing work under this contract, uncover hazardous materials, as defined in Massachusetts Hazardous Waste Regulations 310 CMR 30.00, he shall immediately notify the Engineer. The Contractor is not, and has no authority to act as, a handler, generator, operator or disposer of hazardous or toxic substances found or identified at the site, and the Owner shall undertake all such functions.

END OF SECTION

SECTION 01024

MEASUREMENT AND PAYMENT

PART l - GENERAL

1.1 DESCRIPTION

A. For lump sum items, payment shall be made to the Contractor in accordance with an accepted progress schedule and schedule of values on the basis of actual work completed.

B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by final measurements.

1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Resident Project Representative and determine the quantities of unit price work accomplished and/or completed during the work day.
3. The Resident Project Representative will then prepare two "Daily Progress Reports" which shall be signed by both the Resident Project Representative and Contractor's Representative.
4. Once each month the Resident Project Representative will prepare two copies of the "Monthly Progress Summation" form from the month's accumulation of "Daily Progress Reports" which shall also be signed by both the Resident Project Representative and Contractor's Representative.
5. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Daily Progress Reports and Monthly Progress Summation will not be included for payment. Items appearing on forms not properly signed by the Contractor will not be included for payment.
6. After the work is completed and before final payment is made, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 SCOPE OF PAYMENT

A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract

Documents. Upon completion of construction, if these actual quantities show either an increase or decrease from the quantities given in the Proposal Form, the Contract Unit Prices will still prevail.

B. The Contractor shall accept in compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the Work as herein authorized.

C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 OMITTED ITEMS

A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

Partial payments shall be made monthly as the work progresses. Partial payments shall be made subject to the provisions of the Supplemental and General Conditions.

1.6 PAYMENT FOR MATERIAL DELIVERED

A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used and have been delivered to the construction site, or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the General and Supplemental Conditions.

B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.

1.7 FINAL PAYMENT

A. The Engineer will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such Work. Owner shall make final payments of the sum found due less retainages subject to provisions of the General and Supplemental Conditions.

1.8 INCIDENTAL WORK

A. Incidental work items for which separate payment will not be made includes, but is not limited to, the following items:
   1. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents.
   2. Permits not otherwise paid for or provided by the Owner.
   3. Clearing, grubbing, and stripping.
   4. Visits to the Project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
   5. Preconstruction Photos and Videos.
   6. Coordination with the Owner, Utilities and others, including related inspection cost (Refer to Section 01050)
   7. Earthwork (except ledge)
   8. Dust control. Contractor shall have watering equipment on site for the duration of the construction. Watering shall take a place a minimum of two times per day or at the direction of the Engineer.
   9. Dewatering and disposal
   10. Temporary utilities for construction and to maintain existing service during construction, payment is otherwise made.
   11. Temporary construction and other facilities not to be permanently incorporated into the Work necessary for construction sequencing and

maintenance of operations.
12. Steel and/or wood sheeting as required, including that left in place
13. Materials testing
14. Quality assurance testing
15. Utility crossings and relocations, unless payment is otherwise made
16. Traffic Regulation except uniformed police detail and Certified Flaggers.
17. On-site and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the Work
18. Pipe Markings
19. Utility crossings and relocations, unless payment is otherwise made.
20. Weather protection, winter construction equipment and fuel.
21. Restoration of property, and replacement of fences, curbs, structures and other minor items disturbed by the construction activities.
22. Repair and replacement of utilities damaged by construction activities and corresponding proper disposal of removed materials.
23. Clean-up.
24. Loam and seeding.
25. Potable water for cleaning, disinfection and testing.
26. Facilities start-up services required by the Contract Documents.
27. Construction Administration and Insurance.
28. GPS location of all structures
29. Demobilization
30. Project record documents.
31. Rebuilding/reconstruction/modification of tables and inverts where new drain is constructed into an existing drain.

1.9 DESCRIPTION OF PAY ITEMS

A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.

B. Each unit or lump-sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

Item 1: Mobilization and Demobilization

1. For the Lump sum bid price for this Item, the Contractor shall mobilize and demobilize to and from the site all labor, materials, and equipment to complete all work associated with this contract. Demobilization from the site includes, but is not limited to: removal of all equipment and final cleanup to the satisfaction of the City.

2. Payment for the mobilization and demobilization shall be by lump sum. Fifty percent of the lump sum price shall be paid to the Contractor upon completing mobilization activities, and the remaining fifty percent shall be paid upon demobilization from the site.

3. Mobilization and Demobilization Costs cannot exceed 5 percent of the total Bid Price.

Item 2: Traffic Management

1. For the Lump sum bid price for this Item, the Contractor shall prepare a Traffic Management Plan in conformance with all current and applicable requirements and implement the plan throughout the execution of the project. This will include all the signs, electronic displays, safety devices, labor, materials, and equipment to complete all work associated with this contract.

2. Contractor shall provide up to 360 unit days of electronic message sign operation, with possibility of up to three sign units operating for 120 days simultaneously, s required by the Engineer.

3. Payment for the item shall be on a lump sum basis.

Item 3: Demolition

1. For the Lump sum bid price for this Item, the Contractor shall demolish and properly dispose of items shown on the Drawings related to installation of proposed boardwalk. This includes but not limited to existing chain link fence, asphalt pavement, gravel and other surficial fill material, bollards, signs and debris and as directed by the Engineer.

2. Payment for the item shall be on a lump sum basis.

Item 4: Clearing and Grubbing

1. The Lump sum bid price for this Item shall include all labor, materials, and equipment for the removal of trees, shrubs undergrowth and debris including removal and disposal of items not to be reused onsite for stream restoration purposes as shown on plans or as directed by the Engineer. No grubbing will occur unless directed by the Engineer. This item will be used for clearing required for equipment access within the unnamed tributary and Sucker Brook. This item will not be used for clearing necessary to construct mat placement or construct the temporary construction access road.

2. Payment for the item shall be on a lump sum basis.

Item 5: Temporary Water Management/Brook Diversion

1. The Lump sum bid price for this Item shall include all labor, materials, and equipment necessary to temporarily divert existing flows within Sucker Brook to undertake Stream

Restoration Type B and C as well as scour protection at the Stonybrook Road Culvert. Contractor shall submit a Temporary Water Management/Brook Diversion Plan and Schedule using appropriate means and methods in accordance with the Bid Documents and as approved by the Engineer.

2. Payment for the item shall be on a lump sum basis.

Item 6: Helical Piles

1. The Lump sum contract price for this item shall include compensation for all labor, materials, and equipment necessary to complete this work including pile design, excavation, dewatering and all else incidental thereto for which payment is not provided under other item.

2. Payment for the item shall be on a lump sum basis.

Item 7: Steel Support System

1. The Lump sum contract price for this item shall include compensation for all labor, materials, and equipment necessary to complete this work including furnishing, installation, testing and all else incidental thereto for which payment is not provided under other item.

2. Payment for the item shall be on a lump sum basis.

Item 8: Walking Surface Deck

1. The Lump sum contract price for this item shall include compensation for all labor, materials, and equipment necessary to complete this work including furnishing, installation, testing and all else incidental thereto for which payment is not provided under other item.

2. Payment for the item shall be on a lump sum basis.

Item 9: Handrails, Posts, Balusters, Screens

1. The Lump sum contract price for this item shall include compensation for all labor, materials, and equipment necessary to complete this work including furnishing, installation, testing and all else incidental thereto for which payment is not provided under other item.

2. Payment for the item shall be on a lump sum basis.

Item 10: Removal and Disposal of Fill Under Boardwalk

1. The contract unit price for this item shall include compensation for all labor, materials, and equipment necessary to remove, dewater/decant, testing and properly transport and dispose offsite and all else incidental thereto for which payment is not provided under other items.

   Contractor shall submit Excavated Materials Management Plan including proposed stockpiling procedures and proposed disposal/recycling facility. Contractor shall characterize material in accordance with the approved disposal facility requirements and submit characterization sampling results to the Engineer and Owner for review. Excavated surplus soil shall be stockpiled on polyethylene sheeting and covered pending characterization and disposal. Soils shall be shipped offsite for disposal in accordance with the technical specifications and all local, state, and federal regulations.

2. Payment for the item shall be on a per Ton basis.

3. Payment will only be made upon submitting appropriate receipts for acceptance and disposal at appropriate facility.

Item 11: Furnish and Install Precast Concrete Headwall and Wingwall – Existing 18" RCP Outfall

1. The contract lump sum price for this item shall include compensation for all labor, materials, and equipment necessary to furnish and install precast concrete headwall and wingwall as detailed on the Bid Drawings and in accordance with the technical specifications and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a lump sum basis.

Item 12: Stormwater BMP – 18-inch RCP Outfall

1. The contract lump sum price for this item shall include compensation for all labor, materials, and equipment necessary to install the stormwater treatment system as detailed on the Bid Drawings and in accordance with the technical specifications and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a lump sum basis.

Item 13: CIP Reinforced Concrete Approach Ramps

1. CIP Reinforced Concrete accepted for payment shall be the number of cubic yards of concrete placed at the direction of the Engineer within the payment limits shown on the Drawings.

2. Pavement shall be paid for at the Contract unit price per cubic yard stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, equipment and tools necessary for the placement of concrete, preparation of base material and all else incidental thereto for which payment is not provided under other items.

Item 14: Permanent Signage

1. The quantity to be paid for under this item shall be the actual number of new sign posts with signs furnished and installed and as measured in place and accepted by the Engineer. Each new sign post will be counted as one sign, regardless of the number of signs mounted on it. Existing posts or poles that have new signs installed on them will be measured for payment as one sign, regardless of the number of new signs installed on them.
2. Signs shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for excavation, foundations, anchors, concrete, signs, hardware, posts, alignment, backfilling, and for all other work and expenses incidental thereto for which payment is not provided under other items.
3. Removal and delivery to the City of all existing signs to be replaced or removed is incidental to Contract.

Item 15: Education Kiosks at Boardwalk Outlooks

1. The quantity to be paid for under this item shall be the actual number of posts with education kiosks furnished and installed and as measured in place and accepted by the Engineer.
2. Education Kiosks shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for anchoring systems, hardware, posts, kiosks and for all other work and expenses incidental thereto for which payment is not provided under other items.

Item 16: Permanent Bollards with Solar Lights

1. The quantity to be paid for under this item shall be the actual number of bollards furnished and installed and as measured in place and accepted by the Engineer.
2. Bollards shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for excavation, foundations, anchors, concrete, hardware, alignment, backfilling, and for all other work and expenses incidental thereto for which payment is not provided under other items.
3. Removal and delivery to the City of all existing bollards to be replaced or removed is incidental to Contract.

Item 17: Round Post Lock Removable Bollards

1. The quantity to be paid for under this item shall be the actual number of bollards furnished and installed and as measured in place and accepted by the Engineer.
2. Bollards shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; for excavation, foundations, anchors, concrete, hardware, alignment, backfilling, and for all other work and expenses incidental thereto for which payment is not provided under other items.
3. Removal and delivery to the City of all existing bollards to be replaced or removed is incidental to Contract.

Items 18 and 19: Bituminous Concrete Binder Course and Wearing Course

1. Bituminous concrete pavement accepted for payment shall be the number of tons of pavement placed at the direction of the Engineer, calculated as described below, within the payment limits shown on the Drawings.
   A. Actual widths will be used in computing area wherever the width of pavement removed and replaced is less than the limits indicated on the Drawings.
   B. The conversion factor to change volume of bituminous concrete pavement measured in place to tons will be 0.055 tons per square yard per inch of thickness.
2. Pavement shall be paid for at the Contract unit price per ton stated in the Bid Schedule. Said unit price shall be full compensation for furnishing all materials, labor, equipment and tools necessary for the placement and removal of pavement, preparation of base material, application of tack coat, placement and grading of gravel shoulder material to back up overlay pavement, adjusting castings to final grade (includes private utilities) and installation of any pavement markings.

Item 20: Stream Restoration – Type A

1. Under the unit bid price for this Item, the Contractor shall provide all necessary materials equipment and labor to execute Stream Restoration – Type A work as shown on the drawings and as directed by the Engineer. This work shall include but not be limited to, construction of flow deflectors (16" coir log placement , poles to anchor , live stake, emergent plants, coir blanket) sediment removal and beneficial reuse below annual high water within the flow deflectors, labor to place cleared woody material, removal of fill necessary to re-establish hydraulic connection to the channel south of the proposed boardwalk and for all other work and expenses incidental thereto for which payment is not provided under other items. This item excludes clearing, silt barrier, restoration of construction access from Walnut Street.

2. Payment for the item shall be on a liner foot of stream restored measured along the centerline of the channel.

Item 21: Stream Restoration – Type B

1. Under the unit bid price for this Item, the Contractor shall provide all necessary materials equipment and labor to execute Stream Restoration – Type B work as shown on the drawings and as directed by the Engineer. This work shall include but not limited to excavation of accumulated sediment within the thalweg of Sucker Brook and for all other work and expenses incidental thereto for which payment is not provided under other items. This item excludes clearing, placement and restoration of construction mats, hauling and disposal of sediment, siltation barrier, and diversion of water.

2. Payment for the item shall be on a liner foot of stream restored measured along the centerline of the channel.

Item 22: Stream Restoration – Type C

1. Under the unit bid price for this Item, the Contractor shall provide all necessary materials equipment and labor to execute Stream Restoration – Type C work as shown on the drawings and as directed by the Engineer. This work shall include but not limited to the excavation of accumulated sediment within the channel of Sucker Brook, installation of 12" coir logs along the streambank toe and installation of live stakes and for all other work and expenses incidental thereto for which payment is not provided under other items. This item excludes clearing, placement and restoration of construction mats, hauling and disposal of sediment, siltation barrier, and diversion of water.

2. Payment for the item shall be on a liner foot of stream restored measured along the centerline of the channel.

Item 23: Stream J Hooks

1. Stream J Hooks shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; and for all other work and expenses incidental thereto for which payment is not provided under other items for stream restoration purposes as shown on plans or as directed by the Engineer.

2. Payment for the item shall be on the actual number of J hooks installed and as measured in place and accepted by the Engineer.

Item 24: Stream Cross Veins

1. Stream Cross Veins shall be paid for at the unit price per each as stated in the Bid Form. Said unit price shall be full compensation for furnishing all materials, labor, tools, and construction equipment; and for all other work and expenses incidental thereto for which payment is not provided under other items for stream restoration purposes as shown on plans or as directed by the Engineer.

2. Payment for the item shall be on the actual number of cross veins installed and as measured in place and accepted by the Engineer.

Item 25: Construction Matting

1. The contract unit price for this item shall include compensation for all labor, materials, and equipment necessary to construct, maintain, and restore (upon completion of construction) construction access within wetland locations as detailed on the Bid Drawings and in accordance with the technical specifications and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a per linear foot basis.

3. Fifty percent of the linear feet price shall be paid to the Contractor upon placement o of the required construction matting. The remaining fifty percent shall be paid upon removal of construction matting and restoration of area as direct by and to the satisfaction of the Engineer.

Item 26: Removal and Disposal of Sediment

1. The contract unit price for this item shall include compensation for all labor, materials, and equipment necessary to remove, dewater/decant, testing and properly transport and dispose offsite and all else incidental thereto for which payment is not provided under other items.

Contractor shall submit Excavated Materials Management Plan including proposed stockpiling procedures and proposed disposal/recycling facility. Contractor shall characterize material in accordance with the approved disposal facility requirements and submit characterization sampling results to the Engineer and owner for review. Excavated surplus soil shall be stockpiled on polyethylene sheeting and covered by the same pending characterization and disposal. Soils shall be shipped offsite for disposal in accordance with technical specifications and local, state, and federal regulations.

2. Payment for the item shall be on a per ton basis.

3. Payment will only be made upon submitting appropriate receipts for acceptance and disposal at appropriate facility.

Item 27: Plantings, Stabilization, Loam and Seed

1. The contract unit price for this item shall include compensation for all labor, materials, and equipment necessary to place plantings, stabilization with loam and seeding of areas as shown on the drawings and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a per lump sum basis.

Item 28: Remove and Dispose Channel Debris Dams

1. The Lump sum bid price for this Item shall include all labor, materials, and equipment for the removal and disposal of vegetation and other debris obstructing stream flow as shown on Plans or as directed by the Engineer. This item will not be used for clearing necessary to undertake stream restoration work within the identified limits of Stream Restoration Types A, B or C.

2. Payment for the item shall be the unit price per each debris dam removed.

Item 29: Erosion and Sedimentation Control

1. The contract lump sum price for this item shall include compensation for all labor, materials, and equipment necessary to construct, maintain and remove (upon completion of construction) Erosion and Sedimentation Controls as detailed on the Bid Drawings and in accordance with the technical specifications and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a lump sum basis.

Item 30: Site Restoration on Private Properties

1. The contract lump sum price for this item shall include compensation for all labor, materials, and equipment necessary to construct, maintain, and restore (upon completion of construction) a construction access road as detailed on the Bid Drawings and in accordance with the technical specifications and all else incidental thereto for which payment is not provided under other items.

2. Payment for the item shall be on a lump sum basis.

Item 31: Police Detail Allowance

1. Uniformed police details will be paid based on actual invoices submitted by the Contractor and will be paid from the Bid Item allocation.
2. Cash allowance as compensation for fees associated with providing uniformed police officer in accordance with the requirements of the City of Framingham Police Department. The cost associated, MUTCD signage, and other traffic control requirements shall be considered incidental to the work. Adjustment to the final cost for this item will be made as follows. Prior to final payment, Contractor shall present all receipts for this work (if not previously presented to the Engineer), and the amount due will be deducted from the allowance.
3. There will be no markup allowed on the police detail invoices.

Item 32: Miscellaneous Work and Cleanup

1. Under the lump sum price for this Item, the Contractor shall provide all general construction services, labor, materials, supplies, consumables, and equipment necessary to complete all work required to construct the work identified on the Drawings and in the Specifications, which is not included in all other Bid Items. This shall include, but is not limited to, the following:

    a. Attending the pre-construction conference and all required job progress and community meetings, and coordination of all construction activities with the appropriate local authorities and utilities.
    b. Submission of all schedules, lists, laboratory test results, materials and sources, and shop drawings, photographs before and after construction, as required, in a timely manner to the Engineer for review and approval.
    c. Maintenance and repair of all work for one (1) year period.
    d. Providing a Site-Specific Health and Safety Plan for the Contractor's employees in accordance with the minimum standards set forth in OSHA 29 CFR 1910.120 and 29 CFR 1926.
    e. Implementation of the Health and Safety Plan.
    f. Preparation of Excavated Materials Management Plan including proposed stockpiling, dewatering/decanting procedures and proposed disposal/recycling facility.

g. Construction, maintenance, and removal of equipment from any staging or wash down areas.
h. Erosion Control measures to prevent exposed fill, excavated material, or other materials from washing away or otherwise eroding from slopes or into wetlands.
i. Coordination of all construction activities with the City of Framingham.
j. Preparation of As-Built Record Drawings
k. All other project related direct and indirect costs not described above.

2. Payment for this lump sum item will be based on a percentage of the work completed, as determined by the Engineer.

END OF SECTION 01024

SECTION 01250

PRICE ADJUSTMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Price adjustments, as required by MGL Chapter 30, Section 38A, shall be implemented for this Project. Price adjustments, as enumerated in Part 3 of this specification, shall be made for the following items:

- Structural and Reinforcing Steel
- Liquid Asphalt
- Diesel Fuel and Gasoline

B. Price adjustments shall be made in accordance with the methodology adopted by the Massachusetts Department of Transportation in the following SPECIAL PROVISIONS documents, which are attached, but modified as contained herein:

1. Document 00813 Price Adjustments for Structural Steel and Reinforcing Steel, dated October 11, 2018

C. Base and Period Prices used to calculate price adjustments shall be as published by the Massachusetts Department of Transportation as presented in Documents 00811 through 00814.

1.02 CONTRACTOR CREDIT TO OWNER SHOULD PRICES DECREASE:

A. Price adjustments will only be made if the variance between the base price and the period price is Five Percent (5%) or more.

B. In the instance where the period price is below the base price by 5% or more, then the Contractor shall credit the Owner the adjustment.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 DIESEL FUEL AND GASOLINE:

A. Price adjustments shall be determined based on documented quantities of diesel fuel and gasoline usage for site dedicated equipment. This methodology shall replace the price

adjustment basis on fuel usage factors, as described within the Massachusetts Department of Transportation Document 00812.

B. All site dedicated equipment shall be approved by the Engineer for the calculation of any qualifying price adjustment. Prior to the start of work the Contractor shall submit to the Engineer a list of all dedicated equipment for the project. The Contractor shall forward updated submittals, as necessary, throughout the duration of the contract. Only that equipment included within the current approved list shall be considered eligible for calculating a price adjustment under this Section 01250.

C. The Contractor shall submit fuel delivery slips to the Engineer as a basis for calculating total diesel fuel and gasoline usage for site dedicated equipment. At a minimum, the delivery slips will include the name of the fuel delivery company, the date and location of fueling, the type of fuel, description of the fueled equipment and the quantity for each type of fuel delivered in gallons. Any slips not providing the minimum information shall not be included in the calculation of total diesel fuel and gasoline usage for price adjustment purposes.

3.02 LIQUID ASPHALT:

A. The "Period Price Method" shall be used to determine price adjustments. For projects utilizing reclaimed asphalt include Reclaimed Asphalt Pavement (RAP) Factor (0.0 to <1.0) in calculation of the total price adjustment. Otherwise, use RAP Factor = 1.0.

B. For bid items involving asphalt paving that are measured and paid on a linear foot basis, or some other basis besides tonnage, the number of tons shall be determined by the Engineer using compacted measure of thickness within the established payment limits.

C. Asphalt paving not separately measured for payment but rather included as an incidental component of work under a related bid item shall not be considered for price adjustment.

3.03 STRUCTURAL AND REINFORCING STEEL:

A. Steel price adjustments shall not be made for water and sewer projects.

B. Period prices for steel are subject to change up to four (4) months after the date of original publication. Therefore, no price adjustment will be made until the index for the period is finalized.

END OF SECTION

ATTACHMENT FOR SECTION 01250 PRICE ADJUSTMENTS

MASSDOT DOCUMENTS 00811-00814

DOCUMENT 00811
SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES
ENGLISH AND METRIC UNITS
Revised: 07/08/2016

This provision applies to all projects using greater than 100 tons (91 megagrams) of hot mix asphalt (HMA) mixtures containing liquid asphalt cement as stipulated in the Notice to Contractors section of the bid documents.

Price Adjustments will be based on the variance in price, for the liquid asphalt component only, between the Base Price and the Period Price. They shall not include transportation or other charges. Price Adjustments will occur on a monthly basis.

Base Price
The Base Price of liquid asphalt on a project as listed in the Notice to Contractors section of the bid documents is a fixed price determined by the Department at the time of the bid using the same method as the determination of the Period Price detailed below. The Base Price shall be used in all bids.

Period Price
The Period Price is the price of liquid asphalt for each monthly period as determined by the Department using the average selling price per standard ton of PG64-28 paving grade (primary binder classification) asphalt, FOB manufacturer's terminal, as listed under the "East Coast Market - New England, Boston, Massachusetts area" section of the Poten & Partners, Inc. "Asphalt Weekly Monitor". This average selling price is listed in the issue having a publication date of the second Friday of the month and will be posted as the Period Price for that month. The Department will post this Period Price on its website at http://www.mhd.state.ma.us/ within two (2) business days following its receipt of the relevant issue of the "Asphalt Weekly Monitor". Poten and Partners has granted the Department the right to publish this specific asphalt price information sourced from the Asphalt Weekly Monitor. This method of period price determination was formerly called the New Asphalt Period Price Method. Separate website postings using both the New Asphalt Period Price Method and the Old Asphalt Period Price Method were discontinued after June 2013.

Price Adjustment Determination, Calculation and Payment
The Contract Price of the HMA mixture will be paid under the respective item in the Contract. Price Adjustments, as herein provided, either upwards or downwards, will be made after the work has been performed using the monthly period price for the month during which the work was performed.

Price Adjustments will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M3.11.03.

Price Adjustments will be separate payment items. The pay item numbers are 999.401 for a positive price adjustment (a payment) and 999.402 for a negative price adjustment (a deduction). Price Adjustments will be calculated using the following equation:

Price Adjustment = Tons of HMA Placed X Liquid Asphalt Content % X RAP Factor X (Period Price - Base Price)

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

******** END OF DOCUMENT ********

DOCUMENT 00812

SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR DIESEL FUEL AND GASOLINE –
ENGLISH UNITS

Revised: 01/26/2009

This monthly fuel price adjustment is inserted in this contract because the national and worldwide energy situation has made the future cost of fuel unpredictable. This adjustment will provide for either additional compensation to the Contractor or repayment to the Commonwealth, depending on an increase or decrease in the average price of diesel fuel or gasoline.

This adjustment will be based on fuel usage factors for various items of work developed by the Highway Research Board in Circular 158, dated July 1974. These factors will be multiplied by the quantities of work done in each item during each monthly period and further multiplied by the variance in price from the Base Price to the Period Price.

The Base Price of Diesel Fuel and Gasoline will be the price as indicated in the Department's web site (www.mhd.state.ma.us) for the month in which the contract was bid, which includes State Tax.

The Period Price will be the average of prices charged to the State, including State Tax for the bulk purchases made during each month.

This adjustment will be effected only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No adjustment will be paid for work done beyond the extended completion date of any contract.

Any adjustment (increase or decrease) to estimated quantities made to each item at the time of final payment will have the fuel price adjustment figured at the average period price for the entire term of the project for the difference of quantity.

The fuel price adjustment will apply only to the following items of work at the fuel factors shown:

ITEMS COVERED	**FUEL FACTORS**	
	Diesel	**Gasoline**
Excavation: and Borrow Work: Items 120, 120.1, 121, 123, 124, 125, 127, 129.3, 140, 140.1, 141, 142, 143, 144., 150, 150.1, 151 and 151.1 (Both Factors used)	0.29 Gallons / CY.	0.15 Gallons / CY
Surfacing Work: All Items containing Hot Mix Asphalt	2.90 Gallons / Ton	Does Not Apply

******** END OF DOCUMENT ********

DOCUMENT 00813

SPECIAL PROVISIONS

PRICE ADJUSTMENTS FOR STRUCTURAL STEEL AND REINFORCING STEEL

October 11, 2018

This special provision applies to all projects containing the use of structural steel and/or reinforcing steel as specified elsewhere in the Contract work. It applies to all structural steel and all reinforcing steel, as defined below, on the project. Compliance with this provision is mandatory, i.e., there are no "opt-in" or "opt-out" clauses. Price adjustments will be handled as described below and shall only apply to unfabricated reinforcing steel bars and unfabricated structural steel material, consisting of rolled shapes, plate steel, sheet piling, pipe piles, steel castings and steel forgings, and.

Price adjustments will be variances between Base Prices and Period Prices. Base Prices and Period Prices are defined below.

Price adjustments will only be made if the variances between Base Prices and Period Prices are 5% or more. A variance can result in the Period Price being either higher or lower than the Base Price. Once the 5% threshold has been achieved, the adjustment will apply to the full variance between the Base Price and the Period Price.

Price adjustments will be calculated by multiplying the number of pounds of unfabricated structural steel material or unfabricated reinforcing steel bars on a project by the index factor calculated as shown below under Example of a Period Price Calculation.

Price adjustments will *not* include guardrail panels or the costs of shop drawing preparation, handling, fabrication, coatings, transportation, storage, installation, profit, overhead, fuel costs, fuel surcharges, or other such charges not related to the cost of the unfabricated structural steel and unfabricated reinforcing steel.

The weight of steel subject to a price adjustment shall not exceed the final shipping weight of the fabricated part by more than 10%.

Base Prices and Period Prices are defined as follows:

Base Prices of unfabricated structural steel and unfabricated reinforcing steel on a project are fixed prices determined by the Department and found in the table below. While it is the intention of the Department to make this table comprehensive, some of a project's unfabricated structural steel and/or unfabricated reinforcing steel may be inadvertently omitted. Should this occur, the Contractor shall bring the omission to the Department's attention so that a contract alteration may be processed that adds the missing steel to the table and its price adjustments to the Contract.

The Base Price Date is the month and year in which MassDOT opened bids for the project. This date is used to select the Base Price Index.

Period Prices of unfabricated structural steel and unfabricated reinforcing steel on a project are variable prices that have been calculated using the Period Price Date and an index of steel prices to adjust the Base Price.

The Period Price Date is the date the steel was delivered to the fabricator as evidenced by an official bill of lading submitted to the Department containing a description of the shipped materials, weights of the shipped materials and the date of shipment. This date is used to select the Period Price Index.

The index used for the calculation of Period Prices is the U.S. Department of Labor Bureau of Labor Statistics Producer Price Index (PPI) Series ID WPU101702 (Not Seasonally Adjusted, Group: Metals and Metal Products, Item: Semi-finished Steel Mill Products.) As this index is subject to revision for a period of up to four (4) months after its original publication, no price adjustments will be made until the index for the period is finalized, i.e., the index is no longer suffixed with a "(P)".

Period Prices are determined as follows:

Period Price = Base Price X Index Factor
Index Factor = Period Price Index / Base Price Index

Example of a Period Price Calculation:

Calculate the Period Price for December 2009 using a Base Price from March 2009 of $0.82/Pound for 1,000 Pounds of ASTM A709 (AASHTO M270) Grade A36 Structural Steel Plate.

The Period Price Date is December 2009. From the PPI website*, the Period Price Index = 218.0.

The Base Price Date is March 2009. From the PPI website*, the Base Price Index = 229.4.

Index Factor = Period Price Index / Base Price Index = 218.0 / 229.4 = 0.950
Period Price = Base Price X Index Factor = $0.82/Pound X 0.950 = $0.78/Pound

Since $0.82 - $0.78 = $0.04 is less than 5% of $0.82, no price adjustment is required.

If the $0.04 difference shown above was greater than 5% of the Base Price, then the price adjustment would be 1,000 Pounds X $0.04/Pound = $40.00. Since the Period Price of $0.78/Pound is less than the Base Price of $0.82/Pound, indicating a drop in the price of steel between the bid and the delivery of material, a credit of $40.00 would be owed to MassDOT. When the Period Price is higher than the Base Price, the price adjustment is owed to the Contractor.

* To access the PPI website and obtain a Base Price Index or a Period Price Index, go to http://data.bls.gov/cgi-bin/srgate

End of example.

The Contractor will be paid for unfabricated structural steel and unfabricated reinforcing steel under the respective contract pay items for all components constructed of either structural steel or reinforced Portland cement concrete under their respective Contract Pay Items.

Price adjustments, as herein provided for, will be paid separately as follows:

Structural Steel
Pay Item Number 999.449 for positive (+) pay adjustments (payments to the Contractor)

Pay Item Number 999.457 for negative (-) pay adjustments (credits to MassDOT Highway Division)

Reinforcing Steel
Pay Item Number 999.466 for positive (+) pay adjustments (payments to the Contractor)

Pay Item Number 999.467 for negative (-) pay adjustments (credits to MassDOT Highway Division)

No price adjustment will be made for price changes after the Contract Completion Date, unless the MassDOT Highway Division has approved an extension of Contract Time for the Contract.

BASE PRICES

The Department's table of Base Prices specified above is updated monthly. The current table is attached to this Document 00813 and included in each new contract.

DOCUMENT 00814

SPECIAL PROVISIONS
PRICE ADJUSTMENT FOR PORTLAND CEMENT CONCRETE MIXES

January 12, 2009

This provision applies to all projects using greater than 100 Cubic Yards (76 Cubic Meters) of Portland cement concrete containing Portland cement as stipulated in the Notice to Contractors section of the Bid Documents. This Price Adjustment will occur on a monthly basis.

The Price Adjustment will be based on the variance in price for the Portland cement component only from the Base Price to the Period Price. It shall not include transportation or other charges.

The Base Price of Portland cement on a project is a fixed price determined at the time of bid by the Department by using the same method as for the determination of the Period Price (see below) and found in the Notice to Contractors.

The Period Price of Portland cement will be determined by using the latest published price, in dollars per ton (U.S.), for Portland cement (Type I) quoted for Boston, U.S.A. in the **Construction Economics** section of *ENR Engineering News-Record* magazine or at the ENR website http://www.enr.com under **Construction Economics**. The Period Price will be posted on the MassHighway website the Wednesday immediately following the publishing of the monthly price in ENR, which is normally the first week of the month.

The Contract Price of the Portland cement concrete mix will be paid under the respective item in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the work has been performed, using the monthly period price for the month during which the work was performed.

The price adjustment applies only to the actual Portland cement content in the mix placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M4.02.01. No adjustments will be made for any cement replacement materials such as fly ash or ground granulated blast furnace slag.

The Price Adjustment will be a separate payment item. It will be determined by multiplying the number of cubic yards of Portland cement concrete placed during each monthly period times the Portland cement content percentage times the variance in price between the Base Price and Period Price of Portland cement.

This Price Adjustment will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

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END OF DOCUMENT

SECTION 01310

CONSTRUCTION SCHEDULING

PART 1- GENERAL

1.01 PROGRAM DESCRIPTION:

A. A Critical Path Method (CPM) construction schedule shall be used to control the Work of this Contract and to provide a definitive basis for determining job progress. The Contractor shall prepare the construction schedule. All Work shall be done in accordance with the established CPM schedule and the Contractor and its subcontractors, shall be responsible for cooperating fully with the Engineer and the Owner in effectively utilizing the CPM schedule.

B. The CPM schedule to be prepared and submitted by the Contractor shall consist of a CPM network (diagram of activities) and a computer-generated schedule (print-out) as specified herein. The format shall be the activity-on-node precedence network.

C. The Contractor shall develop his own outline of the Work and prepare his proposed CPM schedule. The computer-based schedule shall be the product of a recognized commercial computer software producer and shall meet all of the requirements defined herein.

1.02 QUALIFICATIONS:

A. The Contractor shall have the capability of preparing and utilizing the specified CPM scheduling technique. A statement of CPM capability shall be submitted by the Contractor in writing to the Engineer within 10 days after the issuance of the Notice to Proceed to verify that either the Contractor's organization has in-house capability qualified to use the technique or that the Contractor employs a consultant who is so qualified. Capability shall be verified by description of the construction projects to which the Contractor or his consultant has successfully applied the CPM scheduling technique and which were controlled throughout the duration of the project by means of systematic use and updating of a computer-based CPM schedule. The submittal shall include the name of the individual on the Contractor's staff who will be responsible for the CPM schedule and for providing the required updating information.

1.03 SUBMITTALS:

A. Submit under provisions of Section 01330.

B. Within 10 days following the issuance of the Notice to Proceed, the Contractor shall submit the CPM Schedule to the Engineer for review and acceptance. The Contractor shall submit to the Engineer a preliminary network defining the planned operations during the first 60 calendar days after the issuance of the Notice to Proceed. The Contractor's general approach for the balance of the

project shall be indicated. Cost of activities expected to be completed or partially completed before submission and approval of the complete network shall be included.

1.04 APPROVED CPM SCHEDULE:

A. Following review by the Engineer, the Contractor shall incorporate the Engineer's comments into the network and submit the revised network and computer-generated schedule. This final submittal shall be delivered to the Engineer within 60 days after the issuance of the Notice to Proceed.

B. CPM schedules, which contain activities showing negative, float or which extend beyond the contract completion date in the computer-generated schedule will not be approved.

C. The approved network shall then be the approved CPM schedule to be used by the Contractor for planning, organizing and directing the work, and reporting progress.

D. Approval of the CPM activity network by the Engineer is advisory only and shall not relieve the Contractor of responsibility for accomplishing the Work within the Contract completion date. Omissions and errors in the approved CPM schedule shall not excuse performance less than that required by the Contract. Approval by the Engineer in no way makes the Engineer an insurer of the CPM schedule's success or liable for time or cost overruns flowing from its shortcomings. The Owner hereby disclaims any obligation or liability by reason of approval by its agent, the Engineer, of the CPM schedule.

E. The CPM activity network shall be submitted on sheets 24-in by 36-in and may be divided into as many separate sheets as required. An electronic file in PDF format shall be submitted concurrent with the hard copy schedule.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 NETWORK REQUIREMENTS:

A. The network shall show the order and inter-dependence of activities and the sequence in which the Work is to be accomplished as planned by the Contractor. The basic concept of a network analysis diagram shall be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities.

B. Detailed network activities shall include: construction activities, the submittal and approval of shop drawings, the procurement of materials and equipment, fabrication of materials and equipment and their delivery, installation and testing, start-up and training. The Contractor shall break the Work into activities with

durations no longer than twenty working days each, except as to non-construction activities (such as procurement of materials and delivery of equipment) and any other activities for which the Engineer may approve the showing of longer duration. To the extent feasible, activities related to a specific physical area of the Work should be grouped on the network for ease of understanding and simplification.

C. Separate activities shall be provided for each significant identifiable function in each trade area. Activities shall be so identified that there will be no reasonable doubt as to how much work remains on each. Specific activities which shall be included are: all subcontract work, all interface work between subcontractors and between the Contractor and subcontractors, leakage tests of pipelines, electrical connections to each item of equipment, supplier and manufacturer technical assistance, mechanical connections to each item of equipment, all tests, concrete finishing, each item of site work, (including restraints on other activities) and all utilities, fuels and chemicals.

D. Each activity on the network shall have the following indicated on the NODE representing it.

1. A single duration (i.e., the single best estimate of elapsed time considering the scope of the work involved in the activity and the resources planned for accomplishing the activity) expressed in working days.

2. A five character (or less) code indicative of the party responsible for accomplishing the activity.

3. A cost estimate for each activity which, when accumulated with the cost of all activities, equals the total contract cost. Estimated overhead and profit shall be prorated throughout all activities. Materials costs shall be assigned to delivery activities.

4. A brief description of the activity.

E. The selection and number of activities shall be subject to the Engineer's approval. The detailed network need not be time scaled but shall be drafted to show a continuous flow from left to right with no flow from right to left. In addition to the brief description, the Contractor shall submit a separate list of all activities containing a detailed narrative of the scope of each activity, including the trades, subcontractors involved, and number of man-hours estimated.

F. To the extent that the network or any revision thereof shows anything not jointly agreed upon or fails to show anything jointly agreed upon, it shall not be deemed to have been approved by the Engineer. Failure to include on a network any element of work required for the performance of this Contract shall not excuse the Contractor from completing all work required within any applicable completion date, notwithstanding the review of the network by the Engineer.

G. Except where earlier completions are specified, CPM schedules, which show completion of all work prior to the contract completion date, may be approved by

the Engineer but in no event shall they be acceptable as a basis for claim for delay against the Owner by the Contractor.

3.02 COMPUTER-GENERATED SCHEDULE REQUIREMENTS:

A. Each computer-generated schedule submittal from the CPM activity network shall include the following tabulations: a list of activities in numerical order, a list of activity precedence's, a schedule sequenced by Early Start Date and a schedule sequenced by Total Float. Each schedule shall include the following minimum items:

1. Activity numbers

2. Estimated duration

3. Activity description

4. Early start date (calendar dated)

5. Early finish date (calendar dated)

6. Latest allowable start date (calendar dated)

7. Latest allowable finish date (calendar dated)

8. Status (whether critical)

9. Estimated cost of the activity

10. Total float and free float

B. In addition, each schedule shall be prefaced with the following summary data:

1. Contract name and number

2. Contractor's name

3. Contract duration

4. Contract schedule

5. The effective or starting date of the schedule.

C. The workday to calendar date correlation shall be based on an 8-hour day and 40-hour week with adequate allowance for holidays, adverse weather and all other special requirements of the work.

3.03 PROGRESS REPORTING:

A. Progress under the approved CPM schedule shall be evaluated monthly by the Contractor. Not less than seven (7) days prior to each monthly progress meeting, the Contractor shall evaluate the status of each activity on which Work has started or is due to start, based on the preceding CPM schedule; to **show actual progress,** to identify those activities started and those completed during the previous period, to show the estimated time required to complete or the percent complete of each activity started but not yet completed and to reflect any changes indicated for the network. Activities shall not be considered complete until they are, in fact, 100 percent complete.

B. At each progress meeting, the Contractor shall submit a narrative report, based on the CPM schedule evaluation described above, in a format agreed upon by the Contractor and the Engineer. The report shall include a description of the progress during the previous period in terms of completed activities, an explanation of each activity which is showing a delay, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates and an explanation of corrective action taken or proposed. This report, as well as the CPM Status Report, will be discussed at each progress meeting.

3.04 RESPONSIBILITY FOR SCHEDULE COMPLIANCE:

A. Whenever it becomes apparent from the current CPM schedule and narrative report that delays to the critical path have resulted and the Contract completion date will not be met, the Contractor shall take some or all of the following actions at no additional cost to the Owner. He shall submit to the Engineer for approval, a written statement of the steps he intends to take to remove or arrest the delay to the critical path in the approved schedule.

3.05 ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME:

A. If the Contractor desires to make changes in his method of operating which affect the approved CPM schedule, he shall notify the Engineer in writing stating what changes are proposed and the reason for the change. If the Engineer approves these changes, the Contractor shall revise and submit for approval, without additional cost to the Owner, all of the affected portions of the CPM network. The Contractor shall adjust the CPM schedule only after prior approval of his proposed changes by the Engineer.

B. If the completion of any activity, whether or not critical, falls more than 100 percent behind its approved duration, the Contractor shall submit for approval a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted work.

C. Shop Drawings which are not approved on the first submission or within the schedule time and equipment which do not pass the specified tests shall be immediately rescheduled.

D. The Contract Times will be adjusted only for causes specified in this Contract. In the event the Contractor requests an extension of any contract completion date, he shall furnish such justification and supporting evidence as the Engineer may deem necessary to determine whether the Contractor is entitled to an extension of time under the provisions of this Contract. The Engineer will, after receipt of such justification and supporting evidence, make findings of fact and will advise the Contractor in writing thereof. If the Engineer finds that the Contractor is entitled to any extension of any contract completion date, the Engineer's determination as to the total number of days extension shall be based upon the currently approved CPM schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule. Actual delays in activities, which, according to the CPM schedule, do not affect any contract completion date shown by the critical path in the network, will not be the basis for a change therein.

E. Each request for change in any Contract completion date shall be submitted by the Contractor to the Engineer within 30 days after the beginning of the delay for which a time extension is requested, but before the date of final payment under this Contract. No time extension will be granted for requests which are not submitted within the foregoing time limit.

3.06 COORDINATING SCHEDULES WITH OTHER CONTRACT SCHEDULES:

A. Where Work is to be performed under this Contract concurrently with or contingent upon work performed on the same facilities or area under other contracts, the Contractor's CPM Schedule shall be coordinated with the schedules of the other contracts. The Contractor shall obtain the schedules of the other appropriate contracts from the Owner for the preparation and updating of his CPM schedule and shall make the required changes in his schedule when indicated by changes in corresponding schedules.

B. In case of interference between the operations of different contractors, the Owner will determine the work priority of each Contractor and the sequence of work necessary to expedite the completion of the entire project. In all such cases, the decision of the Owner shall be accepted as final. The temporary delay of the Contractor's work due to such circumstances shall not be considered as justification for claims for additional compensation.

END OF SECTION

SECTION 01311

CONSTRUCTION MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This Section specifies requirements for project meetings including but not limited to Pre-Construction Conference and Progress Meetings.

B. It shall be the responsibility of the Contractor to coordinate work between all subcontractors, sections, and trades required for the proper completion of the Work.

1.02 PRE-CONSTRUCTION CONFERENCE:

A. After the bids have been opened but prior to the start of the construction there will be a pre-construction conference to discuss the phasing and scheduling of the Project. The specific time and place of the conference shall be arranged by the Engineer after the Contract has been awarded.

B. This pre-construction conference is intended to establish lines of communication between the parties involved, review responsibilities and personnel assignments, establish project schedules, discuss proposed performance methods, and coordinate Work to be performed by subcontractors.

C. Authorized representatives of the Owner, Engineer and their consultants, the Contractor, its Superintendent and Site Foreman, and all others invited by the Contractor, shall attend the pre-construction conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

D. Discuss items of significance at the pre-construction conference that could affect progress including at least the following:

1. Tentative construction schedule
2. Critical Work sequencing
3. Designation of responsible personnel
4. Procedures for processing field decisions and Change Orders
5. Procedures for processing Applications for Payment
6. Review of Davis Bacon and other federal requirements

7. Distribution of Contract Documents
8. Submittal of Shop Drawings, Product Data and Samples
9. Preparation of record documents
10. Use of the premises
11. Office, work and storage, and laydown areas
12. Equipment deliveries
13. Construction safety procedures
14. Environmental health and safety procedures
15. First aid
16. Security
17. Housekeeping
18. Working hours
19. Traffic Control
20. Emergency Vehicle Access to and around work site
21. Environmental protection measures for construction site

1.03 PROGRESS MEETINGS:

A. During the course of the Project, the Contractor shall attend weekly progress meetings as scheduled by the Owner. The Owner, based on work progress and activities, may adjust the progress meetings to biweekly or other. The attendance of subcontractors may be required during the progress of the Work. The Contractor's delegate to the meeting shall be prepared and authorized to discuss the following items:

1. Progress of Work/Critical Work Sequencing in relation to Contract Schedule.
2. Proposed Work activities for forthcoming period.
3. Resources committed to Contract.
4. Coordination of Work with others.
5. Status of procurement of equipment and materials.
6. Status of Submittals.
7. Outstanding actions, decisions, or approvals that affect Work activities.
8. Site access and/or security issues
9. Hazards and risks
10. Housekeeping
11. Quality issues
12. Potential Claims
13. Change Orders
14. Costs, budget, and payment requests

B. The Contractor shall revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized and the revised schedule shall be submitted to the Engineer and Owner.

PART 2 - PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01320

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This section covers construction progress photographs to be furnished by the Contractor on the project.

B. Construction photographs shall be provided and acceptable to the Engineer.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHS AND PRINTS:

A. Digital photographs shall be in .gif, .jpeg, .bmp or .tif format.

B. Prints shall be 8 x 10 full color on single weight, white base, and glossy paper, mounted with binder tabs.

C. Photographs shall be taken using a digital camera before groundbreaking, monthly throughout the Work, and on final acceptance of the project.

D. Twenty-four views shall be taken once per month. The Engineer shall approve selection of views. The Engineer will select eight views from each disc produced at the frequency specified above.

E. Three views of each of the eight views shall be furnished at the frequency specified above.

F. A preconstruction video shall be taken to show existing conditions in the vicinities off all houses impacted.

G. Utilize a drone equipped with a digital camera capable of video to capture conditions including existing conditions, conditions during construction and final conditions.

PART 3 - EXECUTION

3.01 COMPUTER DISC:

A. The twenty-four views shall be delivered to the Engineer via a sharefile within six days of exposure.

B. Files turned over to the Engineer shall be retained by the Engineer for future reference during the project.

3.02 FILES:

A. Each file shall be identified in the file name with name of project, phase, orientation of view, date and time of exposure, name and address of photographer, and photographer's numbered identification of exposure.

B. Files shall be delivered within 15 days after Engineer selects the views to print.

END OF SECTION

SECTION 01330

SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The Contractor shall provide the Engineer with submittals according to the Standard General Conditions and as required by the Contract Documents.

1.02 RELATED WORK:

A. Divisions 1 – 6 of these specifications that require submittals.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 GENERAL:

A. As required by the Standard General Conditions Paragraph 6.13, Contractor shall submit a schedule of shop and working drawing submittals.

B. The Contractor shall submit the shop and working drawing submittals electronically.

3.02 ELECTRONIC SUBMITTALS:

A. In accordance with the accepted schedule, the Contractor shall submit promptly to the Engineer through the Owner's Smart File site (fdpw.smartfile.com), one electronic copy in Portable Document Format (PDF) of shop or working drawings required as noted in the specifications, of equipment, structural details and materials fabricated especially for this Contract.

B. Each electronic copy of the shop or working drawing shall be accompanied by the Engineer's standard shop drawing transmittal form, included as Exhibit 1 of this section, on which is a list of the drawings, descriptions and numbers and the names of the Owner, Project, Contractor and building, equipment or structure.

C. The Contractor shall receive a shop drawing memorandum with the Engineer's approval or comments via email.

3.03 SHOP AND WORKING DRAWINGS:

A. Shop and working drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish of shop coat, grease fittings, etc., depending on the subject of the drawings. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this Contract.

B. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his vendors and subcontractors and returning reviewed drawings to them. All shop and working drawings shall be prepared on standard size, 24-inch by 36-inch sheets, except those, which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the Owner, Project, Contractor and building, equipment or structure to which the drawing applies, and shall be suitably numbered. Each shipment of drawings shall be accompanied by the Engineer's (if applicable) standard shop drawing transmittal form on which is a list of the drawings, descriptions and numbers and the names mentioned above.

C. Only drawings that have been prepared, checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Contract Documents in all respects. Shop drawings shall be reviewed and marked with the date, checker's name and indication of the Contractor's approval, and only then shall be submitted to the Engineer. Shop drawings unsatisfactory to the Contractor shall be returned directly to their source for correction, without submittal to the Engineer. Shop drawings submitted to the Engineer without the Contractor's approval stamp and signature will be rejected. Any deviation from the Contract Documents indicated on the shop drawings must be identified on the drawings and in a separate submittal to the Engineer, as required in this section of the specifications and General Conditions.

D. The Contractor shall be responsible for the prompt submittal and resubmittal, as necessary, of all shop and working drawings so that there will be no delay in the work due to the absence of such drawings.

E. The Engineer will review the shop and working drawings as to their general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections of comments made on the drawings during the review do not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner. The review of the shop drawings is general and shall not relieve the Contractor of the responsibility for details of design, dimensions, code compliance, etc., necessary for interfacing with other components, proper fitting and construction of the work required by the Contract and for achieving the

specified performance. The Engineer will review submittals two times: once upon original submission and a second time if the Engineer requires a revision or corrections. The Contractor shall reimburse the Owner amounts charged to the Owner by the Engineer for performing any review of a submittal for the third time or greater.

F. With few exceptions, shop drawings will be reviewed and returned to the Contractor within 30 days of submittal.

G. No material or equipment shall be purchased or fabricated especially for this Contract nor shall the Contractor proceed with any portion of the work, the design and details of which are dependent upon the design and details of equipment or other features for which review is required, until the required shop and working drawings have been submitted and reviewed by the Engineer as to their general conformance and compliance with the project and its Contract Documents. All materials and work involved in the construction shall then be as represented by said drawings.

H. Two copies of the shop and working drawings and/or catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when he needs more than two copies or when so requested.

3.05 SAMPLES:

A. Samples specified in individual Sections include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the work.

B. The number of samples submitted shall be as specified. Submittal and processing of samples shall follow the procedures outlined for shop and working drawings unless the specifications call for a field submittal or mock-up.

C. Acceptance of samples will be acknowledged via a copy of the transmittal noting status. When samples are not acceptable, prompt resubmittal will be required.

END OF SECTION

EXHIBIT 1 TO SECTION 01330 SUBMITTALS

SHOP DRAWING TRANSMITTAL FORM

Shop Drawing Transmittal

Weston & Sampson SM

Instruction for Preparing Transmittal

No action will be taken on any item unless accompanied by this form.
TRANSMITTAL NOS. to be consecutive (1, 2, 3, etc.).
Each resubmittal of same item shall use same number with suffix letter (A, B, etc.).
SPEC. SECT. NO: Only one spec. section no. to each transmittal.
DESCRIPTION: Complete identification of document or group of documents.
SOURCE: Originator of document(s) being submitted.

DRAWING NO: Identification of document(s).
CONTRACT DRAWING REFERENCE: Contract drawing number(s) showing details of document(s).
SPECIAL INSTRUCTIONS: Special cases and emergencies, changes in distribution and special handling requests, etc. should be entered here.
SIGNATURE OF CONTRACTOR: Signature of individual who reviews and approves material prior to submittal to engineer.

THIS SECTION TO BE COMPLETED BY CONTRACTOR

TRANSM. NO.	SPEC. SECT. NO.	DATE	CONTRACTORS JOB NO.	W&S JOB NO.

PROJECT NAME & CONTRACT NO.	LOCATION

TO	Attention: CSD (Mahoney.Carolyn@wseinc.com) Weston & Sampson Engineers, Inc. 55 Walkers Brook Drive Reading, MA 01867	FROM	

						BY W&S	
ITEM NO.	DESCRIPTION	SOURCE	DRAWING NO. CATALOG NO. BROUCHURE, ETC	NO. OF COPIES	CONTRACT DRAWING REF.	ACTION CODE	REVIEWED BY
1							
2							
3							
4							

THIS CERTIFIES THAT ALL ITEMS SUBMITTED HEREWITH HAVE BEEN CHECKED BY THE CONTRACTOR, ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, EXCEPT AS NOTED, AND ARE APPROVED BY THE CONTRACTOR FOR THIS PROJECT.	SIGNATURE & TITLE	

THIS SECTION TO BE COMPLETED BY W&S

ACTION CODE:
1. FURNISH AS SUBMITTED
2. FURNISH AS NOTED
3. REVISE AND RESUBMIT
4. REJECTED- SEE REMARKS
5. ACKNOWLEDGEMENT
6. SUBMITTAL NOT REQUIRED, RETURNED WITHOUT REVIEW

a. INSTALLATION SHALL PROCEED ONLY WHEN ACTION CODE IS 1 OR 2
b. ACTION CODED 3 SHALL BE RESUBMITTED WITHIN TIME LIMIT SET IN CONTRACT
c. REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY OF COMPLIANCE WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS

Weston & Sampson

SECTION 01380

HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Prior to the start of work on the site, Contractor shall prepare and submit a site-specific health and safety plan that includes consideration of all known and potential hazards at the site. Work may not proceed at the Project Site until the Contractor's health and safety plan has been received and reviewed by the Engineer.

1.02 REFERENCES:

A. OSHA 29 CFR 1910.120

PART 2 – PRODUCTS

2.01 HEALTH AND SAFETY PLAN:

A. The health and safety plan shall include, but not necessarily be limited to the following:

1. Identification of Contractor's Site Safety Officer.
2. Identification of Hazards and Risks Associated with Project.
3. Contractor's Standard Operating Procedures, Including Personnel Training and Field Orientation.
4. Respiratory Protection Training Requirements.
5. Levels of Protection and Selection of Equipment Procedures.
6. Type of Medical Surveillance Program.
7. Personal Hygiene Requirements and Guidelines.
8. Zone Delineation of the Project Site.
9. Site Security and Entry Control Procedures.
10. Field Monitoring of Site Contaminants.
11. Contingency and Emergency Procedures.

12. Listing of Emergency Contacts.

PART 3 - EXECUTION

3.01 PERSONAL PROTECTIVE EQUIPMENT:

A. The personal protective equipment required to provide the appropriate level of dermal and respiratory protection shall be determined based on the results of continuous air monitoring performed by the Contractor and the standards set forth in the Contractor's health and safety plan. The Engineer may conduct duplicate air monitoring for quality control purposes. Modified Level D protection shall be the minimum requirement for all on-site personnel.

END OF SECTION

SECTION 01450

STRUCTURAL TESTS AND INSPECTIONS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Obtaining, coordinating, and providing notifications to the Owner and Engineer.
2. Provide safe access to the Work of this Contract to accommodate the indicated tests and inspections.
3. Implementing corrective action and providing additional tests and/or inspections for work identified as non-conforming by the Independent Testing Agency approved by the Engineer.

1.02 GENERAL REQUIREMENTS:

A. The Massachusetts State Building Code, Latest Edition, 780 CMR, requires the Structural Engineer of Record (SER) to provide a program of structural tests and inspections for this project.

B. Attachment A, Program of Structural Tests and Inspections, shall not relieve the Contractor or its subcontractors of their responsibilities and obligations for quality control of the Work; their other obligations for supervising the Work; for any design work which is included in their scope of services; for full compliance with the requirements of the Contract Documents; the detection of, or failure to detect, deficiencies or defects, whether detected or undetected, in all parts of the Work, and to otherwise comply with all requirements of the Contract Documents.

C. The Program of Structural Tests and Inspection does not apply to the Contractor's equipment, temporary structures used by the Contractor to construct the project, the Contractor's means, methods, procedures, and job site safety.

1.03 CONTRACTOR RESPONSIBILITIES:

A. The Contractor shall provide free and safe access to the Work for the SER and all other individuals who are observing the Work or performing structural tests or inspections. The Contractor shall provide all ladders, scaffolding, staging, and up-to-date safety equipment, all in good and safe working order, and qualified personnel to handle and erect them, as may be required for safe access.

B. The Contractor shall give reasonable notice to the Owner and the Engineer of when the various parts of the Work will be ready for testing and/or inspection. The Contractor shall notify the Owner and the Engineer a minimum of 48 hours before such tests and/or inspections are to take place.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

NOT USED.

ATTACHMENT A

PROGRAM OF STRUCTURAL TESTS AND INSPECTIONS

The following is a summary of Work subject to Tests and Inspections under the Program.

1. In-situ Bearing Strata for Footings
2. Controlled Structural Fill
3. Cast-In-Place Concrete
4. Structural Steel

Abbreviation	Agent
SER	Structural Engineer of Record
ITA	Contractor – Independent Testing Agency

IN-SITU BEARING STRATA FOR FOOTINGS

Item	Agent	Scope
1. Bearing Strata QC Review	ITA	Review Contractor's field quality control procedures.
2. General Excavation	ITA	Inspect strata for conformance to the structural drawings, specifications, and/or geotechnical report.
3. General Excavation	ITA	Ensure that excavation is to proper depth or material.
4. General Excavation	ITA	Ensure that excavation is controlled and contains no unsuitable materials.
5. Bearing surfaces for footings	ITA	Inspect bearing surfaces for conformance to the requirements of the structural drawings, specifications, and/or geotechnical report.

CONTROLLED STRUCTURAL FILL

Item	Agent	Scope
1. Controlled Structural Fill QC Review	SER	Review Contractor's field quality control procedures
2. Fill Material	ITA	Test material for conformance to specifications or geotechnical report. Perform laboratory compaction tests in accordance with the specifications to determine optimum water content and maximum dry density.
3. Installation of controlled structural fill	ITA	Provide full-time inspection of the installation, in accordance with the specifications.
4. Density of Fill	ITA	Perform field density tests of the in-place fill in accordance with the specifications.

CAST-IN-PLACE CONCRETE CONSTRUCTION

Item	Agent	Scope
1. Cast-In-Place Concrete Construction QC Review	SER	Review Contractor's field quality control procedures. Review frequency and scope of field testing and inspections.
2. Mix Design	SER	Review Mix Designs
3. Materials	SER	Review material certifications for conformance to Specifications
4. Batching Plant	ITA	Review Plant quality control procedures and batching and mixing methods
5. Reinforcement Installation	ITA	Inspect reinforcing for size, quantity, condition and placement
6. Anchor Rods	ITA	Inspect anchor rods prior to and during placement of concrete.
6. Formwork	ITA	Inspect form sizes for proper sizes of concrete members.
7. Concrete Placement and Sampling fresh Concrete	ITA	Observe concrete placement operations. Verify conformance to specifications including cold-weather and hot-weather placement procedures. Perform slump, density and air content tests at point of discharge.
8. Evaluation of Concrete	ITA	Test and evaluate in accordance with the specifications.
9. Curing and Protection	ITA	Observe procedures for conformance to the specifications.

STRUCTURAL STEEL

Item	Agent	Scope
1. Fabricator Certification/Quality Control Procedures	SER	Review Contractor's field quality control procedures. Review frequency and scope of field testing and inspections.
2. Fabricator Certification/Quality Control Procedures	SER	Review each Fabricator's quality control procedures.
3. Fabricator Inspection	SER	Inspect in-plant fabrication, or review Fabricator's approved Independent Inspection Agency's reports.
4. Materials	SER	Review materials certifications for conformance to the specifications.
5. Anchor Rods	SER	Review Contractor's as-built survey.
6. Anchor Rods	ITA	Verify that all anchor rods have been properly torqued and have adequate fit-up.
7. Bolting	ITA	Test and inspect bolted connections in accordance with specifications. Verify bolt size and grade.
8. Welding	ITA	Check welder qualifications. Visually inspect fillet welds and test full penetration field welds in accordance with specifications
9. Shear Connectors	ITA	Inspect for size and placement. Test for proper weld attachment
10. Structural Framing, Details, and Assembly	ITA	Inspect for size, grade of steel, camber, installation and connection details. Check against Contract Documents and approved shop drawings.
11. Open Web Steel Joists	ITA	Inspect for size, placement, bridging, bearing and connection to structure. Visually inspect all welds of a minimum of 5% of the joists randomly selected.

12. Expansion and Adhesive Anchors	SER	Review installation procedures for both mechanical anchors and adhesive anchors. Verify that materials are suitable for job conditions.
13. Metal Decking	ITA	Verify gage, width, and type. Inspect placement, laps, welds, side laps attachment and screws or other mechanical fasteners. Check welder qualifications.
14. Field Correction of Fabricated Items	ITA	Review documentation of approved repairs and verify completion of repairs.

END OF SECTION

SECTION 01550

SIGNAGE (TRAFFIC CONTROL)

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers furnishing and installing traffic control signs and other devices.

1.02 SYSTEM DESCRIPTION:

The Contractor shall furnish and install all construction signs deemed necessary by and in accordance with the latest edition of Part VI of the Manual on Uniform Traffic Control Devices(MUTCD) as published by the U.S. Department of Transportation.

PART 2 - PRODUCTS

2.01 TRAFFIC WARNING AND REGULATING DEVICES:

Contractor shall provide warning signs, barricades and other devices in accordance with the specifications provided in the MUTCD. Size of signs, lettering, colors, method of support and other factors prescribed in the MUTCD shall be adhered to.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Contractor shall erect barricades, barrier fences, traffic signs, and other traffic control devices as required by the MUTCD, or as required by the Engineer, to protect the work area from traffic, pedestrians, and animals.

B. Contractor shall relocate barricades, signs and other devices as necessary as the work progresses.

C. Unless extended protection is required for specific areas, when the work has been completed, all temporary warning and regulatory devices used by the Contractor shall be removed so that traffic can move unimpeded through the area.

END OF SECTION

SECTION 01551

PORTABLE CHANGEABLE MESSAGE SIGN

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The work covered under this section shall consist of furnishing, maintaining, transporting and using a Trailer - Mounted Changeable Message Sign.

B. All messages displayed shall be approved by the Engineer.

1.02 REFERENCES:

A. The following standards form part of these specifications and indicates a minimum required standard:

PART 2 - PRODUCTS

2.01 GENERAL:

A. Materials required under this Section need not be new but must be in first class condition and acceptable to the Engineer. Any materials that in the judgement of the Engineer are unsatisfactory in appearance and/or performance shall be immediately replaced by acceptable units.

2.02 SPECIFIC REQUIREMENTS:

A. The Trailer-Mounted Changeable Message Sign shall meet the requirements of this specification and shall consist of the following major components;

1. Message Board
2. Operator Interface (CPU and Keyboard)
3. Power Supply
4. Towable Trailer

B. Message Board

1. Type - The display can be Flip Disk, LED or a combination of both Flip Disk and LED (Hybrid).

2. Colors - The display shall be either fluorescent yellow or ITE amber.

3. Lines - The sign board shall have the capability of displaying at least three lines of 18- inch high characters with 1 to 8 characters per line.

4. Visibility and Viewing Angle - The sign shall be visible for one-half mile and legible from a minimum distance of 650 feet with a viewing angle of no less than 30 degrees, during both daytime and nighttime operation.

5. The entire message code shall be readable at least twice by the motorists when traveling at the posted speed limit.

2.03 OPERATOR INTERFACE:

A. A means of creating/controlling the on-site display message(s) shall be provided with each sign. The operator interface shall contain as a minimum the following:

1. Operator's Display terminal with keyboard will provide a full screen display to allow the operator to preview the message content and format before it is sent to the sign panel. The keyboard shall be of a standard design.

2. Controller (CPU)

3. Lockable weatherproof enclosure for interface components.

2.04 CONTROLLER:

A. The controller shall possess, as a minimum, the following features:

1. Full 32K user memory with the option for an additional 32K archive memory.

2. Capacity to store a minimum of 199 pre-defined messages and a minimum of 50 user-created messages (not to exceed 32K).

3. Changeable message flash rate capability.

4. A minimum of 24 hour battery back-up.

5. Password activation shall be software available.

2.05 POWER-SUPPLY:

A. The sign shall be capable of operation from the following sources:

1. A diesel powered generator with a battery backup.

2. A battery with diesel generator charging or solar charging.

3. The power supply shall have a cover for weather protection and shall be lockable for security.

2.06 TOWABLE TRAILER:

A. The trailer shall be of rugged construction suitable for towing at highway speeds and at low speed over rugged construction site terrain. The trailer shall have at least the following features:

1. Complete lighting to standard highway specifications.

2. A single axle with two (2) – 15-inch wheels (3500 GVW rated).

3. Two (2) inch ball coupler with heavy duty safety chains.

4. Four (4) corner-located leveling swivel jacks capable of leveling the trailer on one (1) in six (6) grade and capable of stabilizing the trailer in high winds of up to 80 MPH. in addition, a tongue leveling swivel jack shall be provided.

5. Surge breaks with lockable parking in conformance with Federal weight regulations.

6. The sign shall be capable of being locked in a stowed position while being towed.

7. A hydraulic lift mechanism shall be provided to elevate the sign to its operating position.

8. It shall be possible to lock the sign panel in several off-angle positions with respect to the trailer axis for enhanced visibility.

2.07 ENVIRONMENTAL:

A. The Trailer-Mounted Changeable Message Sign shall be capable of performing all functions at ambient temperatures ranging from -30 degrees F to +165 degrees F. There shall be no degradation of operation due to fog, rain or snow.

2.08 MAINTENANCE:

A. All components of the Trailer-Mounted Changeable Message Sign shall be readily accessible for ease of maintenance. Standard commercially available parts shall be used where possible.

B. The sign shall require no special scheduled maintenance. Maintenance shall include periodic cleaning. When not being used, at the discretion of the Engineer, the sign shall be stored in an approved secure area.

2.09 DOCUMENTATION:

A. As a minimum, the following documentation shall be supplied with each Trailer-mounted Changeable Message Sign:

1. Operating Manual

2. Parts Manual

3. Wiring Diagrams

4. Troubleshooting Guide

PART 3 - EXECUTION

3.01 INSTALLATION:

A. All warning devices shall be subject to removal, replacement and/or repositioning as often as necessary. The changeable message unit shall be available for immediate use on the project and be positioned as required by the Engineer. The Contractor shall be responsible for the maintenance of such device and appurtenances, throughout its use on the project, with no additional compensation thereof, other than as provided under the contract unit price. Should the unit be found defective in any way it shall be replaced immediately at the Contractor's expense.

B. For work under this contract, Contractor shall provide up to 360 unit days of message sign operation, with possibly up to three sign units operating for 120 days simultaneously, as required by the Engineer.

END OF SECTION

SECTION 01552

CONSTRUCTION ZONE SAFETY PLAN

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section covers the provisions for complying with Commonwealth of Massachusetts requirements for construction zone safety plans on public works projects.

1.02 DESCRIPTION:

A. The Contractor shall implement traffic safety and control measures through the construction zone through road closures and detours and mitigate impacts on traffic outside of the construction zone in accordance with these contract documents.

1.03 RELATED WORK:

A. SECTION 01110, CONTROL OF WORK AND MATERIALS (MAINTENANCE OF TRAFFIC)

B. SECTION 01550, SIGNAGE (TRAFFIC CONTROL)

C. SECTION 01553, UNIFORMED OFFICERS FOR TEMPORARY TRAFFIC CONTROL

1.04 REFERENCES:

701 CMR 7.00 Use of Road Flaggers and Police Details on Public Works Projects

Massachusetts Department of Transportation Standard Specifications for Highways and Bridges – latest edition

PART 2 - PRODUCTS

2.01 Traffic control devices utilized by the Contractor shall meet the requirements of these contract documents and the latest Massachusetts Department of Transportation (MassDOT) Standard Specifications and Manual On Uniform Traffic Control Devices (MUTCD).

PART 3 - EXECUTION

3.01 OPERATION:

A. Contractor shall be responsible for providing all temporary traffic control devices including barricades, barrier fences, signs, drums, cones, impact attenuators and other traffic control devices in accordance with typical traffic management plans and details shown on the drawings or as required by the Engineer.

B. The Contractor shall prepare temporary traffic management plans and details that deviates significantly from the typical plans shown on the drawings and submit to the Engineer for review and approval prior to start of the work.

C. Contractor shall relocate barricades, signs and other devices as necessary as the work progresses as required by the Owner's Traffic Control Officer or the Engineer.

D. If police details and/or road flaggers fail to show up for work at the construction zone at the usual time for start of work, or otherwise leave the jobsite before work is completed for the day, the provisions of the Alternative Plan will be followed by the Contractor.

3.02 ALTERNATIVE PLAN:

A. In accordance with 701 CMR 7.06(6), whenever required police details/road flaggers do not arrive on time or fail to show up for work, the Alternative Plan will be implemented by the Contractor.

END OF SECTION

SECTION 01553

UNIFORMED OFFICERS FOR TEMPORARY TRAFFIC CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section covers the provisions for furnishing Uniformed Officers for Traffic Control and Maintenance of Traffic as described in Section 01110 CONTROL OF WORK AND MATERIALS.

1.02 DESCRIPTION:

A. The Contractor shall coordinate with the Framingham Police Department to determine the number of Officers deemed necessary to provide for public safety and to maintain a smooth flow of traffic through the construction area(s) affected.

1.03 RELATED WORK:

A. SECTION 01110, CONTROL OF WORK AND MATERIALS

B. SECTION 01550, SIGNAGE (TRAFFIC CONTROL)

C. SECTION 01552, CONSTRUCTION ZONE SAFETY PLAN

PART 2 - PRODUCTS

2.01 UNIFORMED OFFICERS:

A. Contractor shall provide the Traffic Control Officer with a minimum of 24 hours notice indicating the time of day, street location and confirm number of officers required for traffic control.

B. Contractor shall give the Traffic Control Officer a minimum of 90 minutes prior cancellation notice should Contractor determine that due to weather or conditions beyond his control he would not need the scheduled officers.

C. Contractor shall pay for officer(s) at the prevailing rate established by the local police department should officers not be needed and the Contractor fails to cancel the officers as noted in 2.01.B above.

D. Where the Owner is paying directly for Traffic Officers and the Contractor cancels scheduled officers, the Contractor shall be responsible for payment of the wages for cancellations if not cancelled in accordance with 2.01.B and 2.01.C above.

PART 3 - EXECUTION

3.01 OPERATION:

A. Contractor shall provide barricades, barrier fences, traffic signs, and other traffic control devices as required by the Owner's Traffic Control Officer, or as required by the Engineer, to protect the work area from traffic, pedestrians, and animals.

B. Contractor shall relocate barricades, signs and other devices as necessary as the Work progresses as required by the Owners Traffic Control Officer or the Engineer.

END OF SECTION

SECTION 01560

TREE PROTECTION AND TRIMMING

PART 1 – GENERAL

1.01 WORK INCLUDED:

A. This section includes the protection and trimming of trees that are to remain but interfere with, or are affected by, execution of the Work, whether temporary or new construction.

1.02 RELATED WORK:

A. SECTION 02230 CLEARING AND GRUBBING

B. SECTION 02300 EARTHWORK

C. SECTION 02910 SOIL PREPARATION AND SOIL MIXES

D. SECTION 02920 LOAMING AND SEEDING

E. SECTION 01570 ENVIRONMENTAL PROTECTION

1.03 QUALITY ASSURANCE:

A. Tree Pruning Standards: Comply with the National Arborist Association's "Pruning Standards for Shade Trees" except where more stringent requirements are indicated.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D448, size 24, with 90 to 100 percent passing a 2-½-inch (63-mm) sieve and not more than 10 percent passing a ¾-inch (19-mm) sieve.

B. Topsoil: As per Specification Section 02910: Soil Preparation and Soil Mixes.

C. Filter Fabric: Manufacturer’s standard, non-woven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Temporary Protection: Provide temporary fencing, barricades, or other suitable guards located outside the drip line (outer perimeter of branches) to protect remaining trees and other plants from damage.

B. Protect tree root systems from damage due to noxious materials caused by run-off or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

C. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line and prevent soil compaction over root systems.

D. Do not allow fires.

3.02 EXCAVATION:

A. Install shoring or other protecting support systems to minimize sloping or benching of excavations.

B. Do not excavate within tree drip line, unless otherwise indicated.

C. Where excavation for new construction is required within tree drip lines, hand excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

1. Relocate roots in backfill areas wherever possible. If encountering large, main lateral roots, expose beyond excavation limits as required to bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3-inches (75 mm) back from new construction.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition and temporarily support and protect roots from damage until they are permanently relocated and covered with earth.

D. Where utilities trenches are required within tree drip lines, tunnel under or around the roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots to tap roots; cut only smaller roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.

3.03 REGRADING:

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree drip line. Maintain existing grades within tree drip lines.

1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots to tap roots; cut only smaller roots. Cut roots cleanly with sharp pruning instruments; do not break or chop.

B. Minor Fill: Where existing grade is 6-inches (150 mm) or less below elevation of finish grade shown, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

C. Moderate Fill: Where existing grade is more than 6-inches (150 mm) but less than 12-inches (300 mm) below finish grade elevation, place a layer of drainage fill, filter fabric, and a final layer of topsoil on existing grade.

1. Carefully place drainage fill against tree trunk approximately 2-inches (50 mm) above finish grade elevation and extend not less than 18-inches (450 mm) from tree trunk on all sides. For balance of area within drip line perimeter, place drainage fill to an elevation 6-inches (150 mm) below grade.
2. Place filter fabric with overlapping edges of 6-inches (150 mm) minimum.
3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.04 TREE PRUNING:

A. If required, prune remaining trees to compensate for root loss caused by damaging or cutting root system as required by the Landscape Architect/Engineer provided by the Engineer in accordance with accepted horticultural practices.

B. Cut branches with sharp pruning instruments; do not break or chop.

3.05 TREE REPAIR AND REPLACEMENT:

A. Promptly repair trees damaged by construction operations to prevent progressive deterioration.

1. Provide new trees of similar size and species to be replaced, due to abuse/damage/neglect of contractor.

3.06 DISPOSAL OF WASTE MATERIALS:

A. Burning on Owner's Property: Burning is not permitted.

B. Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property.

END OF SECTION

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via calcium chloride and water, complete.

PART 2 - PRODUCTS

2.01 CALCIUM CHLORIDE:

A. Calcium chloride shall conform to the requirements of AASHTO-M 144, Type I or Type II and Specification for Calcium Chloride, ASTM D98. The calcium chloride shall be packaged in moisture proof bags or in airtight drums with the manufacturer, name of product, net weight, and percentage of calcium chloride guaranteed by the manufacturer legibly marked on each container.

B. Calcium chloride failing to meet the requirements of the aforementioned specifications or that which has become caked or sticky in shipment, may be rejected by the Engineer.

2.02 WATER:

A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

A. Calcium chloride shall be applied when ordered by the Engineer and only in areas which will not be adversely affected by the application. See Section 01570, ENVIRONMENTAL PROTECTION.

B. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard or at any other rate as required by the Engineer. Application shall be by means of a mechanical spreader, or other approved methods. The number and frequency of applications shall be determined by the Engineer.

C. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.

D. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

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SECTION 01564

EXISTING FENCES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section of the specification covers the removal and resetting of existing fences.

B. Where the removal of existing fences, at locations shown on the plans and where required by the Engineer, is required, the Contractor shall remove and reset such fences as required by the Engineer.

PART 2 - PRODUCTS

2.01 FENCING:

A. The materials removed shall be utilized to reset the fence. Where necessary, new posts and bases shall be furnished and installed by the Contractor. Any materials damaged or lost during or subsequent to removal shall be replaced by the Contractor at no additional cost the Owner.

B. All new materials required shall be equal in quality and design to the materials in the present fences.

PART 3 - EXECUTION

3.01 REMOVAL OF EXISTING FENCES:

A. The present fences shall be carefully removed together with all appurtenances and satisfactorily stored and protected until required for resetting.

3.02 ERECTION:

A. Fences shall be reset plumb and to the grades required and shall conform to the original fence or as the Engineer requires. Backfilling around the posts shall consist of suitable material satisfactorily compacted. If the fence posts were originally set in concrete bases they shall be reset in concrete bases.

3.03 PAINTING:

A. Painting, if required, shall be done as required by the Engineer.

END OF SECTION

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to cross-country areas, river and stream crossings, and construction in and adjacent to wetlands, unless otherwise specifically stated.

C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00890, PERMITS. In the case of a discrepancy, terms n the Order of conditions shall take precedence over requirements elsewhere in the Contract Documents.

D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 RELATED WORK:

A. Section 00890, PERMITS

B. Section 01330, SUBMITTALS

C. Section 01562, DUST CONTROL

D. Section 02230, CLEARING AND GRUBBING

E. Section 02140, DEWATERING

F. Section 02252, SUPPORT OF EXCAVATION

G. Section 02300, EARTHWORK

1.03 SUBMITTALS:

A. The Contractor shall submit details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 125 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 SILT FENCE:

A. The silt fence shall consist of a 3-foot wide continuous length sediment control fabric, stitched to a mesh backing, and stapled to preweathered oak posts installed as shown on the drawings. The oak posts shall be 1-1/4-inches by 1-1/4-inches (Minimum Dimension) by 48-inches and shall be tapered. The bottom edge of the silt fence shall be buried as shown on the drawings.

B. The silt fence shall be DOT Silt Fence PPDM3611, as manufactured by U.S. Silt & Site Supply/Getsco, Concord, NH, or approved equal.

C. Silt fence properties:

Physical Properties	**Test Method**	**Minimum Value**
Grab Strength, lbs.	ASTM-D-4632	124
Grab Elongation, %	ASTM-D-4632	15
Mullen burst, psi	ASTM-D-3786	300
Puncture, lbs.	ASTM-D-4833	65
Trapezoidal Tear, lbs.	ASTM-D-4533	65
UV Resistance2, %3	ASTM-D-4355	80@500 hrs.
AOS, US Sieve No.	ASTM-D-4751	30
Flow Rate, gal/min/sq. ft.	ASTM-D-4491	10
Permittivity, (1/sec) gal/min/sq. ft.	ASTM-D-4491	0.05 sec^{-1}

2.02 STRAW BALES:

A. Straw bales shall consist of certified seed free stems of agricultural grain and cereal crops and shall be free of grasses and legumes. Standard bales shall be 14-inches high, 18-inches wide and 36- to 40-inches long tied with polypropylene twine and weigh within 5 percent of 7 lbs. per cubic ft.

2.03 STRAW WATTLES:

A. Straw Wattles shall consist of a 100% biodegradable exterior jute or coir netting with 100% wheat straw interior filling as manufactured by GEI Works, Sebastian, Florida (Phone: 772-646-0597; website: www.erosionpollution.com), or approved equal.

2.04 SILT CURTAIN:

A. The silt curtain shall be a Type-1-Silt-Barrier consisting of 18-ounce vinyl fabric skirt with a 6-inch marine quality floatation device. The skirt shall be ballasted to hang vertical in the water column by a minimum 3/16-inch galvanized chain. The silt curtain shall extend into the water as shown on the drawings. If necessary, join adjacent ends of the silt curtain by connecting the reinforcing grommets and shackling ballast lines.

2.05 CATCH BASIN PROTECTION:

A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer. Contractor shall monitor catch basins when they are fitted with siltation sacks to confirm that catch basin operation is not impeded, especially during storm events when accumulated debris could lead to flooding.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants or discharge of untreated contaminated water from excavation dewatering into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 125-feet of wetland resource areas. Total easement widths shall be limited to the widths shown.

B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.

C. The elevations of areas designated as wetlands shall not be unduly disturbed by the Contractor's operations outside of the trench limits. If such disturbance does occur, the Contractor shall take all measures necessary to return these areas to the elevations which existed prior to construction.

D. In areas designated as wetlands, the Contractor shall carefully remove and stockpile the top 24 inches of soil. This topsoil material shall be used as backfill for the trench excavation top layer. The elevation of the trench shall be restored to the preconstruction elevations wherever disturbed by the Contractor's operation.

E. The Contractor shall use a trench box, sheeting or bracing to support the excavation in areas designated as wetlands.

F. Excavated materials shall not be permanently placed or temporarily stored in areas designated as wetlands. Temporary storage areas for excavated material shall be as required by the Engineer.

G. The use of a temporary gravel roadway to construct the pipeline in the wetlands area is not acceptable. The Contractor will be required to utilize timber or rubber matting to support his equipment in these areas. The timber or rubber matting shall be constructed in such a way that it is capable of supporting all equipment necessary to install the pipeline. The timber or rubber matting shall be constructed of materials and placed in such a way that when removed the material below the matting will not be unduly disturbed, mixed or compacted so as to adversely affect recovery of the existing plant life.

H. During construction, easements within wetlands shall be lined with a continuous line of straw wattles (aka compost filter tube, silt/filter sock).

F. Refer to Section 02252

3.05 PROTECTING AND MINIMIZING EXPOSED AREAS:

A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided.

B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Engineer.

3.06 LOCATION OF STORAGE AREAS:

A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (125 feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled straw around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

C. There shall be no storage of equipment or materials in areas designated as wetlands.

D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

E. Storage areas in cross-country locations shall be restored to pre-construction conditions with the planting of native species of trees and shrubs.

3.07 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original

condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under the provisions of Section 02230, CLEARING AND GRUBBING.

D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.08 CLEARING AND GRUBBING:

A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer. Removal of mature trees (4 inches or greater at diameter at breast height (DBH)) will not be allowed on temporary easements.

B. The Contractor shall not remove trees in the Owner's temporary easements without permission of the Engineer.

3.09 DISCHARGE OF DEWATERING OPERATIONS:

A. Any water that is pumped and discharged from the trench and/or excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands. When constructing in a wetlands area, the Contractor shall discharge water from dewatering operations directly to the nearest drainage system, stream, or waterway after filtering by an approved method.

C. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

D. Refer to section 02140

3.10 DUST CONTROL:

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed. Calcium chloride shall be as specified under Section 01562, DUST CONTROL.

B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.11 SEPARATION AND REPLACEMENT OF TOPSOIL:

A. Topsoil shall be carefully removed from cross-country areas where excavations are to be made, and separately stored to be used again as required. The topsoil shall be stored in an area acceptable to the Engineer and adequate measures shall be employed to prevent erosion of said material.

3.12 STRAW:

A. To trap sediment and to prevent sediment from clogging drainage systems, straw shall be used where shown on the drawings. Care shall be taken to keep the bales from breaking apart. The bales should be securely staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically.

3.13 ERECTION AND MAINTENANCE OF SILT FENCE:

A. Where indicated on the drawings or where required by the Engineer, the Contractor shall erect and maintain a temporary silt fence. In areas designated as wetlands, the Contractor shall line the limits of the construction easement with a silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

3.14 SURFACE RESTORATION OF CROSS COUNTRY AREAS:

A. Plantings detailed in Section 02920 shall be conducted when construction of the pipeline has been completed within the areas designated. A one-year guarantee of maintenance will be required on these plantings to ensure that they establish in the area.

3.15 CATCH BASIN PROTECTION:

A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins

are to be protected, each catch basin sump shall be cleaned of all debris and protected. The Contractor shall properly dispose of all debris at no additional cost to the Owner.

B. All catch basin protection shall be removed by the Contractor after construction is complete.

3.16 STRAW WATTLES:

A. The wattles will be placed in a shallow trench (2-3 inches deep) and staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

B. The wattles shall be regularly inspected and before and after every forecasted major weather event. All deposited sediment shall be removed and not allowed to accumulate to the top of the wattles. Wattles damaged during construction shall be repaired or replaced as required by the Engineer at no additional cost to the Owner.

C. The Contractor shall remove all wattles after construction is completed.

END OF SECTION

Document5

SECTION 01720

SITE SURVEY

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section includes the following:

1. Layout for all site work performed by a licensed surveyor.
2. Maintaining site control.
3. Locate property and/or easement lines, building or other facilities that could affect construction.

1.02 RELATED WORK

A. SECTION 01765 Project As-Built Record Drawings

1.03 DEFINITIONS:

A. Licensed Surveyor: Registered in the Commonwealth of Massachusetts and acceptable to the Owner.

1.04 QUALITY ASSURANCE:

A. All survey calculations of field work, where the accuracy could affect construction or the original design intent, shall be performed under the supervision of the Licensed Surveyor. If requested by the Engineer/Owner's Representative, the Contractor shall have the portion of survey in question certified that the work was done under the supervision of the Licensed Surveyor.

B. Perform survey work in accordance with recognized professional surveying practices, complying with local and state laws, rules and regulations. Ensure work performed by qualified personnel acceptable to Engineer.

C. Maintain Project Survey field work in a condition such that it can be checked by the Engineer and provide assistance in carrying out these checks. Checking by the Engineer does not relieve the Contractor of its responsibilities under this item.

1.05 SUBMITTALS: IN ACCORDANCE WITH SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Legible, comprehensive and complete survey notes, computations, sketches, drawings and similar records kept in a conventional format acceptable to the Engineer.

B. Record Plans or As-Builts of all site improvements performed under this Project.

C. Calculations and field notes required to reestablish or modify the original control.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

A. Surveying instruments and equipment used in performing the Project Survey shall be of the type(s) appropriate for the application at hand and shall be kept in acceptable calibration and good working order.

2.02 MATERIALS:

A. All temporary materials used in field shall be weather resistant and of standard quality.

B. All permanent materials incorporated into the project shall be a type that prevents movement from freeze-thaw, minor contact or other expected occurrences and is found to be acceptable by the Owner and local or state authority. When possible, use material specified on the Drawings.

PART 3 - EXECUTION

3.01 FIELD SURVEY AND OBTAINING RIGHT OF ENTRY:

A. All survey layout work shall be tied or referenced to the control survey data shown on the plans or supplied by the Engineer. The existing control shall be maintained in its original condition throughout the term of the Contract. If alteration of the original baseline condition is unavoidable, notify the Owner's Representative of this situation and present a plan and procedure to the Owner's Representative for review to remedy this alteration. Bring any error, apparent discrepancy in or absence of control survey data provided, to the Engineer's attention for resolution.

B. At the direction of the Owner, establish, stake and reference all rights-of-way, easement limits, and building corners, and where required, stake under the direction of the Licensed Surveyor. The Licensed Surveyor shall, through the Contractor, present to the Engineer a certificate with the professional's seal in an acceptable format that such information has been accomplished under his or her direction.

C. At all times maintain the project survey field work in a condition such that it can be reviewed by the Engineer and render reasonable assistance to the Engineer in carrying out such checks. However, reviewing by the Engineer does not relieve the Contractor of its responsibilities under this Item.

D. Assume sole responsibility for obtaining right of entry to properties, other than those properties on which the Owner has obtained easements with surface rights, for the purpose of conducting layout and survey work.

3.02 RECORD DRAWINGS/AS BUILT DRAWINGS:

A. Upon completion of the work under this Item, present a certificate to the Engineer attached to the As-built drawings, stating that all the facilities shown on the Drawings have been located in accordance with such Drawings or approved modifications thereof.

END OF SECTION

SECTION 01735

CUTTING, CORING AND PATCHING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers the cutting, coring, rough and finish patching of holes and openings in existing structures.

1.02 RELATED WORK:

A. SECTION 03300 CAST-IN-PLACE CONCRETE

PART 2 - PRODUCTS

2.01 SEALING MATERIALS:

A. Mechanical seals shall be modular, adjustable, bolted, mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve. The seal shall be rated by the manufacturer for 40 feet of head or 20 psig. Mechanical seals shall be Link-Seal, manufactured by Thunderline Corp., Wayne, MI., or approved equal.

B. Sealant shall be a two part foamed silicone elastomer as manufactured by Dow Corning Co., product No. 3-6548 silicone R.T.V.; 3M brand fire barrier products caulk C.P. 25 and 3M brand putty 303; Flame-Safe fire stop systems Fig. No. FS-500 by Thomas & Betts Corporation, or approved equal. Packing shall be a fire retardant pliable material, Fig. 310 by Sealtite Co.; White Oakum W.S.-600 by American Manufacturing Co., or approved equal. Sealant bead configuration, depth and width shall be in accordance with manufacturer's recommendations.

2.02 MISCELLANEOUS MATERIALS:

A. Bonding compound shall be Sikadur Hi-Mod epoxy by Sika Corporation, or equivalent by Euclid Chemical Corporation, Master Builders Company, or approved equal.

B. Non-shrink grout shall be Masterflow 713 by Master Builders Company; Euco N-S by Euclid Chemical Co.; Five Star Grout by U.S. Grout Corp. or approved equal.

C. Materials for finish patching shall be equal to those of adjacent construction.

PART 3 - EXECUTION

3.01 GENERAL:

A. The Contractor shall leave all chases or openings for the installation of his own or any other contractor's or subcontractor's work, or shall cut the same in existing work, and shall see that all sleeves or forms are at the work and properly set in ample time to prevent delays. He shall see that all such chases, openings, and sleeves are located accurately and are of proper size and shape and shall consult with the Engineer and the contractors and subcontractors concerned in reference to this work.

B. In case of his failure to leave or cut all such openings or have all such sleeves provided and set in proper time, Contractor shall cut them or set them afterwards at his own expense, but in so doing he shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the written consent of the Engineer.

C. The Contractor shall not cut or alter the work of any subcontractor or any other contractor, nor permit any of his subcontractors to cut or alter the work of any other contractor or subcontractor, except with the written consent of the contractor or subcontractor whose work is to be cut or altered or with the written consent of the Engineer. All cutting and patching or repairing made necessary by the negligence, carelessness, or incompetence of the Contractor or any of his subcontractors shall be done by or at the expense of the Contractor and shall be the responsibility of the Contractor.

D. All cutting and coring shall be performed in such a manner as to limit the extent of patching.

E. All holes cut through concrete and masonry walls, slabs or arches shall be core drilled unless otherwise approved. No structural members shall be cut without the approval of the Engineer and all such cutting shall be done in a manner required by him. No holes may be drilled in beams or other structural members without obtaining prior approval. All work shall be performed by mechanics skilled in this type of work.

3.02 CORING:

A. Coring shall be performed with an approved non-impact rotary tool with diamond core drills. Size of holes shall be suitable for pipe, conduit, sleeves, equipment or mechanical seals to be installed.

B. If holes are cored through floor slabs they shall be drilled from below.

C. All equipment shall conform to OSHA standards and specifications pertaining to plugs, noise and fume pollution, wiring and maintenance.

D. Provide protection for existing equipment, utilities and critical areas against water or other damage caused by drilling operation.

E. Slurry or tailings resulting from coring operations shall be vacuumed or otherwise removed from the area following drilling.

3.03 CUTTING:

A. Cutting shall be performed with a concrete saw and diamond saw blades of proper size and application.

B. Provide for control of slurry generated by sawing operation on both sides of wall or slab.

C. When cutting a reinforced concrete wall, the cutting shall be done so as not to damage bond between the concrete and reinforcing steel left in the structure. Cut shall be made so that steel neither protrudes nor is recessed from the face of the cut.

D. Adequate bracing of area to be cut shall be installed prior to start of cutting. Check area during sawing operations for partial cracking and provide additional bracing as required to prevent a partial release of cut area during sawing operations.

E. Provide equipment of adequate size to remove cut panel.

F. For cutting a trench in a floor slab, a full-depth cut shall be made using a concrete saw for the desired width of the trench. A partial-depth cut shall be made to expose the reinforcing bars. The width of the partial cut shall be to the required lap length of the reinforcing bars. Care shall be taken not to cut exposed reinforcing bars but if any are cut, dowel holes shall be drilled and dowels epoxied in. Reinforcing of the same size, as the existing shall be tied to the existing exposed reinforcing and/or dowels with the proper lap length.

3.04 PATCHING:

Rough patching shall be such as to bring the cut or cored area flush with existing construction unless otherwise shown. Finish patching shall match existing surfaces as approved.

Trenches in floor slabs shall be repaired as described in 3.03F above and concrete meeting the requirements of Section 03300 CAST-IN-PLACE CONCRETE shall be poured and cured.

END OF SECTION

SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

1.02 RELATED WORK:

A. Section 01110 CONTROL OF WORK AND MATERIALS

B. Section 01570 ENVIRONMENTAL PROTECTION

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.

B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.

C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be

entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

A. On or before completion of the work, the Contractor shall, unless otherwise specifically required or permitted in writing, tear down and remove all temporary buildings and structures it built; shall remove all temporary works, tools and machinery or other construction equipment it furnished; shall remove all rubbish from any grounds which it has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by its operations in a neat and satisfactory condition.

3.04 RESTORATION OF DAMAGED PROPERTY:

A. The Contractor shall, at no additional cost to the Owner, restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.05 FINAL CLEANUP:

A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

SECTION 01765

PROJECT AS-BUILT RECORD DRAWINGS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers the Contractor's As-Built Record drawings for the project. The As-Built Record drawings for the project shall include, but are not limited to:

A. The Contractor's construction coordination drawings for all the project disciplines. The Contractor's construction coordination drawings for the project disciplines shall be submitted to the Engineer prior to Construction of the said discipline. The Contractor's construction coordination drawings for the project disciplines shall include but are not limited to the following:

1. Architectural
2. Civil
3. Structural

B. Draft Record Documents Review

Upon completion of the project construction the Contractor shall submit a complete electronic version of 24- by 36-inch Record Drawings to the Owner and the Engineer for review. The Owner and the Engineer shall jointly review the Record Drawings and provide comments to the Contractor. The Contractor shall modify the Record Drawings as necessary based on the comments provided by the Owner and the Engineer. These files shall be submitted using electronic file sharing.

C. Final Record Documents

Upon incorporation and acceptance of the Draft Record Drawings comments from the Owner and the Engineer, the Contractor shall submit the Final Record Drawings and documentation. The Contactor shall submit two sets of 24- by 36-inch Record Drawings to the Owner and an additional two sets of 24- by 36-inch Record Drawings to the Engineer for their records. The Contractor shall use an electronic file sharing method to submit to the Engineer the electronic Record Drawing files. The electronic Record Drawing files shall be obtained from the Owner (the Engineer shall provide on behalf of the Owner if the Engineer was the project designer) and developed in AutoCAD 2010/Revit 2017 (or later) and the submittal shall include the Final AutoCAD DWG/Revit RVT file documents, drawing line types, blocks, etc. The actual version of AutoCAD/Revit shall be coordinated with the Engineer.

D. Pre- and Post-Construction Survey

The Contractor shall perform a pre- and post-construction survey of the entire project area. The topographic survey shall be performed by or under the supervision of and certified by a Registered Land Surveyor in the State of Massachusetts. The Contractor shall use an electronic file sharing method to submit to the Engineer the electronic pre- and post-construction survey files. The Contractor shall send the electronic pre- and post-construction survey files to the Engineer which shall be developed in AutoCAD 2010/ Revit 2017 (or later) and the submittal shall include the Final AutoCAD DWG / Revit RVT file documents, drawing line types, blocks, etc. The actual version of AutoCAD / Revit shall be coordinated with the Engineer. The Contractor shall notify the Owner and Engineer at least 48-hours in advance of each survey.

1.02 RELATED WORK:

A. SECTION 01720

1.03 AS-BUILT DOCUMENTS:

A. Contractor shall maintain electronically on SmartFil, separate from the documents used for construction, one complete set of the documents listed below, and as construction progresses, shall legibly record on these documents all changes made during construction.

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.
6. Written interpretations and clarifications.
7. Field Orders.
8. Field test reports properly verified.

B. The completed set of documents shall include but are not limited to:

1. Significant deviations of any nature made during construction.

C. The completed set of as-built documents shall be submitted to the Engineer with the final Application for Payment.

PART 2 - MATERIALS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 02071

GEOTEXTILE FABRICS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers furnishing of all labor, materials, and equipment necessary to install specified geotextile fabrics in locations shown on the drawings and as required by the Engineer.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Shop drawings or working drawings and material specifications shall be submitted to the Engineer for review for each type of geotextile fabric furnished. General installation practices and installation schedule shall be included.

1.03 RELATED WORK:

A. Section 01570, ENVIRONMENTAL PROTECTION

PART 2 - PRODUCTS

2.01 EROSION CONTROL FABRIC "A":

A. Erosion control fabric "A" shall be composed of continuous-filament fibers bonded together to form a sheet. The fabric shall be an average of 20 mils thick and possess the pore-size distribution of Tencate Mirafi 600X Fabric.

B. Erosion Control fabric "A" shall be Tencate Mirafi 600X as manufactured by Tencate Geosynthetics, Pendergrass, GA; or approved equal.

2.02 EROSION CONTROL FABRIC "B":

A. Erosion Control Fabric "B" shall be of the best quality proven design and construction and shall be entirely suitable in every respect for the intended service.

B. Erosion Control fabric "B" shall be Tencate Miramesh as manufactured by Tencate Geosynthetics, Pendergrass, GA; Enkamat Soil Erosion Matting as manufactured by Bonar, Asheville, N.C.; Tenax Radix Erosion Control Netting as manufactured by Tenax Corp., Baltimore, MD or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. GENERAL:

Installation of geotextile fabrics shall be strictly in accordance with manufacturer's instructions and specific layout plans and details reviewed by the Engineer.

B. EROSION CONTROL FABRIC “A”:

Erosion control fabric “A” shall be installed on detention basin slopes and at drainage swale ends prior to placement of riprap and at other locations as shown on the drawings or as required by the Engineer. The fabric in place shall cover the entire riprap area. Each width of fabric shall be overlapped by the subsequent width a minimum of two feet. The Contractor shall follow the manufacturer's installation recommendations to ensure proper completion of the fabric installation, including top toe-in and bottom toe wrap.

C. EROSION CONTROL FABRIC “B”:

Erosion control fabric “B” shall be placed over the prepared surface in drainage swales and other locations as required by the Engineer. The fabric shall be unrolled, placed in the direction of water flow, overlapped by six inches, pinned down with wood stakes, and seeded. All installation work shall be in accordance with manufacturer's recommendations or as required by the Engineer.

3.02 FINAL INSPECTION AND ACCEPTANCE:

A. The Contractor shall, at his expense, have a manufacturer's representative inspect the work at completion of the installation. Any work found to be unsatisfactory shall be corrected at the Contractor's expense.

B. The Engineer, at the Contractor's expense, reserves the right to have a manufacturer's representative inspect the installation process at any time during construction.

END OF SECTION

SECTION 02075

GEOGRID FOR SOIL REINFORCEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the work of furnishing and constructing soil reinforcement geogrids as specified, shown on the plans, or as required by the Engineer. The work shall include the furnishing of materials, labor, and other incidentals necessary to maintain the geogrid in the required position until the completion of any other associated work item.

1.02 RELATED WORK:

Section 02300 EARTHWORK

1.03 REFERENCES:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM	D123	Terminology Relating to Textile Materials
ASTM	D1388	Test Methods for Stiffness of Fabrics
ASTM	D1777	Method for Measuring Thickness of Textile Materials
ASTM	D4218	Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM	D4354	Practice for Sampling of Geotextiles for Testing
ASTM	D4439	Terminology for Geotextiles
ASTM	D4595	Test Method for Tensile Properties of Geotextiles by the Wide Width Strip Method.
ASTM	G22	Recommended Practice for Determining Resistance of Plastics to Bacteria

GEOSYNTHETIC RESEARCH INSTITUTE (GRI)

GRI:GGI	Geogrid Rib Tensile Strength
GRI:GG2	Geogrid Junction Strength
GRI:GG3	Tension Creep Testing of Stiff Geogrids

GRI:GG4 Standard Practice for Determination of the Long-Term design Strength of Stiff Geogrids

GRI:GG5 Geogrid Pullout Behavior

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 9090 Test Method Capability Tests for Wastes and Membrane Liners

1.04 DEFINITIONS:

Geogrids - A geosynthetic formed by a regular network of tensile elements with apertures of sufficient size to allow for interlocking with surrounding soil to perform the primary function of reinforcement.

Apertures - The open spaces formed between the interconnected network of longitudinal and transverse ribs of a geogrid.

Strike-Through - The ability of the soil backfill to be continuous through the apertures of the geogrid allowing for bearing capacity against the transverse ribs.

Longitudinal Ribs - The elements of a geogrid which are in the machine (length) direction as manufactured.

Transverse Rib - The elements of a geogrid which are in cross machine (width) direction as manufactured.

Junctions (or Nodes) - the interconnections between the longitudinal and transverse ribs of a geogrid which hold the grid structure together providing dimensional stability and load transfer mechanisms.

Joints (or Connections) - The connections made between separate geogrid rolls or between geogrids and wall facing units or other parts of a structural system.

Design Tensile Strength (Td) - The reinforcing strength required for successful functioning of the system. It is often arrived at by an appropriate geotechnical design model.

Ultimate Strength (Tult) - The reinforcing strength determined by a short-term strength test in accordance with an accepted ASTM or GRI test method (e.g., ASTM D-4595 and GRI:GG1).

Allowable Strength (Tallow) - The reinforcing strength available after accounting for all of the phenomena which could reduce strength during service lifetime (e.g., creep, site damage, dimensional stability, chemical degradation, and biological degradation).

Design Factor-of-Safety - A numeric comparison of the geogrid's allowable tensile strength to the design tensile strength. The minimum acceptable value reflects the accuracy in defining load conditions, uncertainties in design methods, definition of soil strength and other design parameters.

Partial Factors-of-Safety - A set of numeric values each of which is focused on a particular phenomenon which may negatively impact performance.

Atmosphere for Testing - Ambient air conditions maintained at a temperature of 21± 2 EC (70± EF) and a relative humidity of 65±5%.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. At least 45 days before the material is required in the field, the Contractor shall submit to the Engineer a sample of the geogrid proposed for soil reinforcement, with all manufacturer's literature describing, material properties plus the information listed below.

B. The Contractor shall supply certification that the geogrids supplied meet the design properties and respective index criteria measured in full accordance with all test methods and standards specified. The manufacturer's certification shall include a submittal package of documented test results that confirm the design values and the respective partial factors of safety used in calculating design strength (Td).

C. In case of dispute over validity of design values, the Engineer may require submittal of design property test data from an approved laboratory to support the certified values submitted.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Contractor shall check the geogrid upon delivery to ensure that the proper material has been received.

B. All shipments of geogrids shall be accomplished by a mill certificate, or affidavit, signed by a legally authorized official from the company manufacturing the geogrid certifying that the material meets all design and index property criteria specified in contract documents, plans and drawings.

C. During all periods of shipment and storage, the geogrid shall be protected from direct sunlight, ultraviolet rays, temperatures greater than 140 degrees F, mud, dirt, dust, and debris.

D. At the time of installation, the geogrid shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by the Engineer, torn or punctured sections may be repaired by placing a patch over the damaged area. The patch shall be large enough to overlap a minimum of five feet in all direction from the damaged area.

E. Any geogrid damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 DESCRIPTION:

A. The geogrid shall be a regular grid structure formed by uniaxially drawing a continuous sheet of select high density polyethylene material and shall have aperture geometry and rib and junction cross-sections sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced and shall also have high continuity of tensile strength through all ribs and junctions of the grid structure. The geogrid shall have high resistance to deformation under sustained long term design load while in service and shall also be resistant to ultraviolet degradation.

B. The geogrid shall also conform in all respects to the property requirements listed in Table A for Uniaxial Geogrids.

TABLE A
UNIAXIAL GEOGRID

PROPERTY	TEST METHOD	UNITS	VALUE
Interlock			
Apertures (Note 1)	I.D. Calipered (Note 2)	in	5.70 (nom)
MD		in	0.66 (nom)
CMD			
Open area	COE Method (Note 3)	%	60 (nom)
Thickness	ASTM D1777-64		
Ribs		in	0.030 (nom)
Junctions		in	0.110 (nom)
Reinforcement			
Long-term design load-MD	GRID GG#-87 (Note 4)	lb/ft	1,000 (min)
Flexural rigidity	ASTM D1388-64 (Note 5)	mg-cm	670,000 (min)
Tensile modulus-MD	GRI GG1-87 (Note 6)	lb/ft	50,000 (min)
Junctions	GRI GG2 – 87 (Note 7)		
Strength		lb/ft	3.330 (min)
Efficiency		%	90 (min)

PROPERTY	TEST METHOD	UNITS	VALUE
Material			
High density polyethylene	ASTM D4218 Type III/Class A Grade 5	%	90 (min)
Carbon black	ASTM D4218	%	2.0 (min)
Dimensions			
Roll length		ft	90
Roll width		ft	4.3
Roll weight		lb	44

Notes:

1. MD dimension is along roll length. CMD dimension is across roll width.

2. Maximum inside dimension in each principal direction measured by calipers.

3. Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.

4. Long term load capacity measured through junction tensile creep testing to 10,000 hours as described in Geosynthetic Research institute test method GG3-87 "Creep Behavior and Long Term Design Load of Geogrids."

5. ASTM D1388-64 modified to account for wide specimen testing.

6. Secant modulus at 2% elongation measured by Geosynthetic Research institute test method GG2-87 "Geogrid Junction Strength." No offset allowances are made in calculating secant modulus.

7. Geogrid junction strength and junction efficiency measured by Research Institute test method GG2-87 "Geogrid Junction Strength."

PART 3 - EXECUTION

3.01 SITE EXCAVATION:

A. All areas immediately beneath the installation area for the geogrid shall be properly prepared as detailed on the plans, as specified, or as required by the Engineer.

B. Subgrade surface shall be level, free from deleterious materials, and loose or otherwise unsuitable soils.

C. Prior to placement of geogrids, subgrade shall be proofrolled to provide a firm surface. Any soft areas, as determined by the Engineer, shall be overexcavated and replaced with suitable compacted soils.

D. Foundation surface shall be inspected and approved by the Engineer prior to fill placement.

E. Benching the backcut into competent soil is recommended, to improve stability.

3.02 GEOGRID PLACEMENT:

A. The geogrid shall be installed in accordance with the manufacturer's recommendations. The geogrid shall be placed within the layers of the compacted soil as shown on the plans or as directed.

B. The geogrid shall be placed in continuous longitudinal strips in the direction of main reinforcement and adjacent strips need not be overlapped. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the Engineer's approval. This joint shall be made for the full width of the strip by using a similar material with similar strength. The joint mechanism shall allow a minimum of 95 percent load transfer from piece to piece of geogrid.

C. Only that amount of geogrid required for immediately pending work shall be placed, to prevent undue damage to the geogrid. After a layer of geogrid has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil has been placed, the next geogrid layer shall be installed. The process shall be repeated for each subsequent layer of geogrid and soil.

D. After a layer of geogrid has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geogrid in position until the subsequent soil layer can be placed. Under no circumstances shall a track-type vehicle be allowed on the geogrid before at least six inches of soil has been placed on the geogrid.

E. All geogrid shall be placed to lay flat and pulled tight prior backfilling.

F. During construction, the surface of the fill should be kept approximately horizontal. Geogrids shall be placed directly on the compacted horizontal fill surface. Geogrids are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise required by the Engineer. Correct orientation of the geogrid shall be verified by the Contractor.

3.03 FILL PLACEMENT:

A. Backfill shall be placed, spread, and compacted as specified, in a manner to minimize development of wrinkles and/or displacement of the geogrid.

B. Tracked construction equipment shall not be operated directly upon the geogrid. A minimum fill thickness of six inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geogrid.

C. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

3.04 FINAL SLOPE GEOMETRY VERIFICATION:

Contractor shall confirm that as-built slope geometries conform to approximate geometries shown on construction drawings.

END OF SECTION

SECTION 02076

ASBESTOS-CEMENT PIPE REMOVAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Pre-Construction Asbestos Survey Form;

B. Daily Asbestos Project Checklist, refer to the form at the end of this Section;

C. Waste Shipment Record (WSR) or equivalent;

D. City of Framingham, DEP-approved template Non-Traditional Work Plan (NTWP);

E. Framingham Department of Public Works Asbestos Cement Pipe Standard Operating Procedure (SOP), October 22, 2018 (or most recent revision).

1.02 SCOPE OF WORK

A. Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of identified or assumed asbestos-cement pipe (ACP) and asbestos-containing waste material (ACWM) specified herein, and required to complete the installation of the replacement piping as shown on the drawings. The Contractor's work shall be performed with qualified persons with appropriate worker training in accordance with MADLS Regulation 453 CMR 6.00. Alternatively, work involving the removal of non-friable, asbestos-cement pipe may be performed by workers with (minimum) MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.

B. The Contractor shall inform and include the Owner in all communications with any regulatory authorities during the project or having to do with the project. This includes initial asbestos notification (ANF-001) filing and any changes to the notification (e.g., end date extensions, project closure, quantity changes, etc.).

C. If suspect ACP is uncovered during the course of excavation, the Contractor shall cease all excavation activities and consult with the Resident Engineer and Framingham DPW before proceeding.

1.03 PROJECT DESCRIPTION

A. The Work includes removal, packaging, transporting, and disposing ACP and ACWM, as identified herein, conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class II work. This shall include all necessary excavation to access ACP for removal.

B. Materials, as discovered outside of those listed (either above or below), will be measured and paid or credited by unit prices to be negotiated prior to commencement of the Work. The quantities are estimates only and should be field-verified by the Contractor.

C. The following table summarizes the locations of the Work with estimated ACP quantities. Note quantities provided below are order-of-magnitude estimates only. Refer to drawings for specific locations of known/assumed ACP.

MATERIAL TYPE	LOCATION	QUANTITY	NOTES
Asbestos-Cement Pipe Removal	Sucker Brook, Boardwalk, Unnamed Stream along Walnut Street	0	There is no known asbestos-cement pipe.

CY = Cubic Yards; LF = Linear Feet;

Notes:

A portion of the Work may be performed in multiple mobilizations, at different periods of time, in conjunction with other utility/road work. The Contractor shall be responsible for providing temporary water, power, heat (as needed), and trench shoring at the Site to perform the Work.

1.04 DEFINITIONS

A. The following definitions relative to ACP abatement apply:

1. Amended Water: Water to which a surfactant (wetting agent) has been added.
2. Asbestos: The name given to a number of naturally-occurring, fibrous silicates. This includes the serpentine and the amphiboles forms, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically-altered.
3. Asbestos Cement Pipe (ACP): Fiber-reinforced cement pipe where the reinforcing fibers are asbestos.
4. Asbestos Competent Person: One who is capable of identifying existing asbestos hazards and selecting the appropriate control strategy for asbestos exposure and who has the authority to eliminate them.
5. Asbestos-Containing Waste Material (ACWM): Any friable ACM removed during a demolition/renovation project and anything contaminated in the course of a demolition/renovation project including asbestos waste from control devices, bags or containers that previously contained asbestos, contaminated clothing, materials used to enclose the work area during the demolition/renovation operation, and demolition/renovation debris.
6. Asbestos Notification Form (ANF-001): Official form used to notify MassDEP and MADLS prior to the start of an asbestos abatement project.
7. Asbestos Project Designer: The MADLS-certified Asbestos Project Designer.

8. Asbestos Project Monitor: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring, personal protection equipment, and ACP removal procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
9. Asbestos Supervisor: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Supervisor.
10. Asbestos Work Area: A regulated area, as defined by OSHA Title 29 CFR, Part 1926.1101, where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated areas for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
11. Asbestos Worker: Any employee of a MADLS-licensed Asbestos Abatement Contractor who possesses a valid MADLS certification and EPA accreditation as an Asbestos Worker, or any person who has completed a MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
12. Consultant: A company, retained by the Owner, to provide services enumerated in this Section during asbestos removal activities.
13. Contractor: Company with qualified persons with appropriate worker training in accordance with: MADLS Regulation 453 CMR 6.00; or MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
14. Deteriorated ACP: ACP that is crushed, flattened, or pulverized as determined by the Contractor's Asbestos Competent Person.
15. EPA: The United States Environmental Protection Agency.
16. Friable: Material that, when dry, can be crumbled, shattered, pulverized or reduced to powder by hand pressure. (310CMR 7.15)
17. HEPA Filter: High-Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.
18. HEPA-Vacuum Equipment: Vacuum equipment where all the air drawn into the machine is expelled through a HEPA filter with none of the air leaking past it and with a HEPA-filter as the last filtration stage.
19. MADLS: The Commonwealth of Massachusetts Department of Labor Standards.
20. MassDEP: The Commonwealth of Massachusetts Department of Environmental Protection.
21. Negative Exposure Assessment: A demonstration by the Contractor that Asbestos Worker exposure during an operation is or will be consistently below the PEL.
22. NESHAP: National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.

23. Non-Friable ACM: Any material that contains > 1% asbestos as determined using the method specified in EPA Title 40 CFR, Part 763, Appendix A, Subpart F, Section 1, via PLM, or is presumed to contain asbestos, that cannot be crumbled, pulverized, or reduced to powder by hand pressure (when dry).
24. OSHA: The Occupational Safety and Health Administration.
25. Owner: City of Framingham, Department of Public Works.
26. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers/cc of air as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc of air averaged over a sampling period of thirty (30) minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.
27. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 - 265).
28. Regulated Area: An area established by the employer to demarcate where Class II asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate.
29. Site: Property address and facility included on Asbestos Notification Form ANF-001 as required for notification of the Work.
30. Supervisor: Competent person with appropriate 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course.
31. Surfactant: A chemical wetting agent added to water to improve penetration into ACM.
32. Survey: Any pre-demolition or pre-renovation activity undertaken at a facility for the purpose of determining the presence, location, amount, and condition of ACM or material assumed to contain asbestos. Activities including but not limited to the following do not meet the requirements for a survey pursuant to 310 CMR 7.15:
    a. Inspections performed by employees or agents of federal, state or local government solely for the purpose of determining compliance with applicable statutes or regulations; or
    b. Inspections, surveillance and testing conducted for the purpose of compliance with AHERA. (Per 310 CMR 7.15)
33. Temporary ACWM Storage Location (TASL): Secure, Owner controlled area located within Framingham, Massachusetts where the Contractor shall maintain a suitable covered, locked container(s), used for the storage of ACWM for 30 days or less (from project completion) prior to transportation and disposal of ACWM at final receiving facility.
34. TWA: Time-Weighted Average.

1.05 CONSULTANT

A. The Owner shall retain a third-party, firm for the purposes of overseeing the Contractor and advising the Owner on all asbestos handling compliance requirements. The Consultant will represent the Owner during the removal project.

1.06 USE OF THE CONTRACT DOCUMENTS

A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.

B. All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.

C. It is not intended that this Section show every detail of the Work, but the Contractor shall be required to furnish, within the Contract Sum, all material and labor necessary for the completion of the Work in accordance with the intent of this Section.

D. In case of ambiguity among the Contract Documents, the more stringent requirement, as determined by the Consultant, shall prevail.

E. The Work includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts.

F. All items not specifically mentioned in the Contract Documents, but implied by trade practices to complete the Work, shall be included.

1.07 SITE EXAMINATION

A. It is understood that the Contractor has examined the Site, and reviewed information made available by Framingham DPW relating to assumed ACP, to make their own estimates of the existing conditions and difficulties attending to the execution of the Work and has based their price thereon.

1.08 CONTRACTOR QUALIFICATIONS

A. The Contractor (including their proposed subcontractors) shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year of similar size and scope. The Contractor shall list the experience and training of the Asbestos Supervisor (or Supervisor) and the Asbestos Abatement Workers (or Trained Workers) The information that should be included is as follows:

1. Project Name and Address
2. Owner's Name and Address
3. Consultant's Name
4. Summary of work
5. Contract Amount
6. Date of Completion
7. Extras and Changes

B. The Contractor selected must employ workers who have received the (at a minimum) MADLS-approved, 8-hour specialized OSHA Class II Asbestos Training: Asbestos-Cement Pipe (ACP) Worker Safety course. MADLS-certified Asbestos Workers (32-hour Asbestos Worker training) are also qualified to perform this work. At least one asbestos trained worker shall be on-site when any excavation work is being conducted.

1. If the Contractor intends to use an Abatement Subcontractor, the Contractor shall ensure the Subcontractor meets all contractor requirements established herein.

1.09 ADDITIONAL GENERAL REQUIREMENTS

A. The Contractor shall employ an Asbestos Competent Person, with experience on projects of similar scope and magnitude, who shall be responsible for all work involving ACP removal (as described in the Contract Documents and defined in applicable regulations) and have full-time, daily supervision of the Work during excavation activities.

B. If required by federal, state, local, or any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this contract to be inspected. The Contractor shall immediately notify the Owner and Consultant and shall maintain written evidence of such inspection for review by the aforementioned parties.

C. The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.

D. The Contractor shall immediately notify the Owner and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or of occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the aforementioned parties for verification and recording.

E. Contractor’s storage container shall be delivered to the TASL prior to any scheduled work.

1.10 SUBMITTALS

A. The Contractor shall submit the following Asbestos Work Plan to the Consultant, in one complete package, prior to the pre-construction meeting and at least ten (10) business days before the start of the Work:

1. Submit a schedule to the Owner and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final visual inspection.
2. Submit a draft ANF to be reviewed by the City prior to submitting to DEP.

3. Submit copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
4. Submit the name and address of the hauling contractor and the receiving facility to be used.
5. Submit a detailed, site-specific work plan including, but not limited to, work area isolation and removal methods.
6. Submit the training certificate, medical and respirator fit test records, and current, valid MADLS certification of each employee who may be on the Site (as applicable).
7. If the Contractor's Asbestos Competent Person is not conducting OSHA-required employee exposure monitoring, submit the name, address, and qualifications of the air sampling professional that the Contractor proposes to use on this project for this task. The Contractor shall note if this does not apply. Alternatively, the Contractor may submit a Negative Exposure Assessment performed within the last 12 months that documents that personnel were not exposed to asbestos levels above the established PEL.
8. Submit the name, address, and qualifications of proposed laboratories intended to be utilized for Contractor personal air sampling analysis as required by this Section (if applicable).
9. Submit detailed product information on all materials and equipment proposed for ACP removal work on this project.
10. Submit pertinent information regarding the qualifications of the Asbestos Competent Person for this project.
11. Submit a chain-of-command for the project. The chain-of-command should include the name, title, and contact number for each person listed.
12. Unless submitted as part of the Contractor's Emergency Response Plan, submit a site-specific emergency response information for the project. The emergency response information may include emergency procedures to be followed by Contractor personnel to evacuate the Site, hospital name and phone number, most direct transportation route from the Site, emergency telephone numbers, etc. If this information is contained within an Emergency Action Plan prepared by the Site's General Contractor, a copy shall be submitted for review.
13. Submit a written, site-specific Respiratory Protection Program for employees undertaking the Work, including make, model, and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable). The Contractor shall note if the Respiratory Protection Program is not required at the Site (i.e., Negative Exposure Assessment completed within the last 12 months).
14. Submit a worker orientation plan that, at a minimum, includes a description of asbestos hazards and removal methodologies, a review of worker protection requirements, and the outline of safety procedures.

B. No work on the Site will be allowed to begin until the Owner and the Consultant approve the Asbestos Work Plan. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension.

C. The Contractor shall be responsible for submitting the abovementioned submittal requirements for subcontractors hired by the Contractor to address ACP.

D. The Contractor shall submit the following to the Consultant during the Work:

1. Copies of training, MADLS certifications, respirator fit test records, and medical records for new employees to start work 24 hours in advance of the new employee arriving at the Site (as applicable).

E. The Contractor shall submit the following to the Consultant during the Work on a daily basis (refer to Part 4 in this Section):

1. Completed Daily Asbestos Project Checklist.
2. WSR completed for transport from generation site to TASL.

F. The Contractor shall submit the following to the Consultant at the completion of the Work. The Owner reserves the right to retain payment(s) until all items are received in completion:

1. Final completed copies of the WSR, signed by all transporters and the designated disposal site owner/operator within 30 days.
2. Final completed copies of weight tickets, recycling tickets, and manifests for all specified materials.
3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, MADLS certifications, medical records, and respirator fit test records (as applicable).
4. Copies of all OSHA personal air monitoring results.

1.11 REGULATIONS AND STANDARDS

A. The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:

1. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) Regulations (Title 40 CFR, Part 61, Subpart M).
2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E).
3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101).
4. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 - 180).

5. MassDEP Asbestos Regulations (310 CMR 7.00 and 7.15).
6. MassDEP Asbestos Cement Pipe Guidance Document, July 2019.
7. MADLS "The Removal, Containment or Encapsulation of Asbestos" Standards for Asbestos Abatement (453 CMR 6.00).
8. Life Safety Code, National Fire Protection Association (NFPA).
9. Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).
10. Framingham Department of Public Works Asbestos Cement Pipe Standard Operating Procedure, October 22, 2018.

1.12 EXEMPTIONS

A. Any deviations from the Contract Documents require the written approval and authorization from the Owner and Consultant. Any modifications from the standard work practices identified in MADLS Regulations 453 CMR 6.00, or MassDEP Regulations 310 CMR 7.15, or MassDEP Asbestos Cement Pipe Guidance Document, July 2019, must be requested in writing and approved in writing by both regulatory agencies.

B. When conditions deviate from the conditions and work practices established herein, the Contractor shall immediately stop work.

C. A Non-Traditional Asbestos Work Plan (NTWP) will be required if any of the following are required or occur during the project:

1. Bulk loading of soil;

2. Cleanup of contaminated soil stockpile; or

3. Any other occurrence outside of the conditions and work practices described herein, or at the City of Framingham's discretion.

Note: A template NTWP has been reviewed and approved by the MassDEP for the City of Framingham. A copy of the template will be provided if necessary. The template should be modified to be project and situation specific, and signed by the Contractor's Asbestos Project Designer.

1.13 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

A. Planned Work

1. The Contractor shall make the following notifications and provide the submittals to the following agencies prior to the start of work. Submissions may be made electronically on eDEP, MassDEP's online filing system. Prior to submission, a draft copy of the notification shall be provided to the Consultant and Owner. This notification to DEP/DLS is required ten (10) calendar days prior to the start of the abatement project. The information submitted on the form must be accurate or a revision will be required.

    a. Commonwealth of Massachusetts Department of Environmental Protection
    Asbestos Program
    Enforcement Division
    P.O. Box 4062
    Boston, MA 02211

    b. Commonwealth of Massachusetts Department of Labor Standards
    19 Staniford Street, 2nd Floor
    Boston, MA 02114

2. The minimum information included in the notification to these agencies includes:

    a. Work location/address.
    b. Name of Supervisor (Asbestos Competent Person).
    c. Work type (water, sewer, drain, etc.)
    d. Amount of asbestos to be removed.
    e. Work schedule, including proposed start and completion date.
    f. Asbestos removal procedures to be used.
    g. Name and location of disposal site for generated asbestos waste, residue, and debris.

3. If the ACP quantity exceeds the estimated total, a new asbestos notification (ANF-001) will be required.

B. Emergency Notification

1. The Contractor shall request and receive the Owner's approval before the Consultant files an Emergency Asbestos Notification with MassDEP on behalf of the Contractor.

2. In Consultation with the Owner, the Contractor shall adhere to the following procedures when an Emergency Asbestos Notification Form (ANF-001) is needed.

    a. The Consultant shall contact the MassDEP Northeast Regional Office to obtain an emergency waiver number.
    b. If no one responds at MassDEP, the Consultant shall leave a phone/email message with the following information:

i. Work location/address;
ii. Contractor contact information;
iii. Work type (water, sewer, drain, etc.); and
iv. Methodology for ACP removal (reference ASBESTOS CEMENT PIPE GUIDANCE DOCUMENT, July 2019).

c. MassDEP will issue a project specific waiver number that shall be included in the Notification (NAW#).
d. If no project specific waiver number is issued within 24-hours, the Contractor shall again contact the MassDEP Northeast Regional Office.
e. The Consultant shall provide the waiver number to the Owner and Contractor.
f. The Contractor shall file and provide a copy to the Owner and Consultant.

1.14 WORK SITE SAFETY PLAN

A. The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:

1. Injured worker evacuation.
2. Emergency and fire exit routes from all work areas.
3. Emergency first aid treatment.
4. Local telephone numbers for emergency services including ambulance, fire, and police.
5. A method to notify persons on a public right-of-way, or at adjacent private properties, in the event of an emergency requiring area closures.

B. The Contractor shall be responsible for training all workers in these procedures.

1.15 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY (IF APPLICABLE)

A. The Contractor shall independently retain an air-sampling professional or the Asbestos Competent Person shall monitor total airborne fiber concentrations in the worker breathing zones to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101 (if applicable). Alternatively, a Negative Exposure Assessment completed within the last 12 months can be submitted.

B. The Contractor's air sampling professional shall document all air sampling results and provide a report to the Owner or Consultant within 48 hours after sample collection (if applicable).

C. All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101 (if applicable).

1.16 PROPER WORKER PROTECTION

A. This Subsection describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

B. In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:

1. Methods of recognizing asbestos,
2. Health effects associated with asbestos,
3. Relationship between smoking and asbestos in producing lung cancer,
4. Nature of operations that could result in exposure to asbestos,
5. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
    a. Engineering controls,
    b. Work Practices,
    c. Respirators,
    d. Housekeeping procedures,
    e. Hygiene facilities,
    f. Protective clothing,
    g. Decontamination procedures,
    h. Emergency procedures, and
    i. Waste disposal procedures.
6. Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134,
7. Appropriate work practices for the work,
8. Requirements of medical surveillance program,
9. Review of OSHA Title 29 CFR, Part 1926,
10. Pressure Differential Systems,
11. Work practices including hands on or on job training,
12. Personal Decontamination procedures, and
13. Air monitoring, personal and area.

C. The Contractor shall provide medical examinations (as required for respirator use) for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA.

D. The Contractor shall maintain control of, and be responsible for, access to all work areas to ensure the following requirements:

1. Non-essential personnel are prohibited from entering the Regulated Area.
2. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with this specification Section.

3. Any materials, equipment, or supplies that are removed from the Regulated Area shall be thoroughly cleaned and decontaminated by wet-cleaning methods and/or HEPA vacuuming of all surfaces.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Deliver all materials in the original packages, containers, or bundles bearing the brand name, manufacturer name, and product technical description.

B. The Contractor shall have a sufficient inventory of, or dated purchase orders for, materials necessary for the Work (e.g., protective clothing, respirators, respirator filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, spray adhesive, air filters, etc.).

C. Damaged or deteriorating materials are not permitted for use and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as ACWM.

D. Poly sheeting (packaged in a roll to minimize the frequency of joints) shall be delivered to the Site with factory label indicating thickness.

E. Poly disposable bags shall be 6-mil with OSHA-required pre-printed labels (OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii)).

F. Tape or adhesive spray shall be capable of sealing joints in adjacent poly sheeting, and shall be able to attach poly sheeting to finished or unfinished surfaces of dissimilar materials. Tape and adhesive spray shall also be capable of adhering under both dry and wet conditions (including use of amended water).

G. Surfactant (wetting agent) shall consist of fifty percent (50%) polyoxyethylene ether and 50% polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of 1 ounce surfactant to 5 gallons of water, or as directed by manufacturer.

H. The Contractor shall have spray equipment capable of mixing wetting agent with water. Spray equipment shall be capable of generating sufficient pressure and volume; the hose length must reach all areas within the Regulated Area.

I. Impermeable containers shall be used to receive and retain any asbestos-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii). Containers must be airtight and watertight.

J. Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used.

2.02 TOOLS AND EQUIPMENT

A. The Contractor shall provide all clean tools and equipment necessary for asbestos abatement activities.

B. If required/requested by Framingham DPW, the Contractor's air monitoring professional or Asbestos Competent Person shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly and air samples shall be calibrated with a recently calibrated (within 6 calendar months) rotameter.

C. The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work, including protective clothing, respirators, respirator filter cartridges, poly sheeting of proper size and thickness, labels, tape, spray adhesive, and air filters.

D. The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and/or electrical power sources (e.g., generators, etc.).

E. The Contractor shall be responsible for coordinating electrical and water services, and shall pay for these services for the duration of the project (if applicable).

F. The Contractor's supervisor shall perform project monitoring activities (e.g., final visual inspection(s), etc.).

G. HEPA-Vacuum Equipment, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter or larger.

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. Consultant to complete a Pre-Construction Asbestos Survey Form.

B. A pre-construction meeting will be scheduled prior to the start of Work. The Contractor must attend this meeting (as required by the Owner); the assigned Asbestos Competent Person must also attend this meeting.

C. The Contractor shall present a detailed project schedule and project submittals at the pre-construction meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.

D. Following the pre-construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

E. Review known or suspect AC locations within project.

3.02 WORK AREA PREPARATION

A. The Contractor shall demarcate the work area by restricting access to authorized personnel.

B. The Contractor shall expose the pipe in a manner that will minimize the risk of making it friable or releasing asbestos dust into the environment.

C. The Contractor shall start by exposing the ACP with minimal disturbance by excavating no closer than 6 inches of the pipe.

D. The Contractor shall carefully uncover the remainder of the soil surrounding the pipe by hand or shovel.

E. The Contractor shall stockpile the excavated soil adjacent to the excavation in accordance with OSHA set-back requirements.

F. The Contractor's Asbestos Competent Person shall assess the ACP to determine if it is damaged, cracked, or broken.

G. Regardless of ACP assessment, the Contractor shall place 6-mil think poly sheeting under the ACP to prevent soil contamination. Note that if the excavation is filled with water, the placement of poly sheeting is not required.

3.03 ACP REMOVAL PROCEDURES – INTACT ACP

A. The Contractor shall have an Asbestos Competent Person on the Site at all times to ensure proper work practices are followed throughout the project.

B. If a sub-contractor is retained for pre-abatement services, abatement work shall not commence until authorized by the Consultant/Owner.

C. The Contractor shall adequately wet the full-length of exposed ACP with amended water before and during removal.

D. The Contractor shall separate ACP at the nearest coupling (i.e., bell or compression fitting), if possible.

E. The Contractor shall prepare the excavation for saw cutting of intact ACP. Note that is breakage or cutting of the ACP is required, the procedure in Damaged ACP section (3.05) shall be followed.

F. Slide the ACP apart at the joints (no saw cutting) or use other methods that do not cause the pipe to break, become friable, or otherwise create the potential to release asbestos fibers.

G. Wrap the wet ACP in two layers of 6-mil poly sheeting, seal with duct tape, and label in accordance with the requirements set forth in this Section. Note this work can be done in the excavation or adjacent to the excavated area.

H. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work area at an appropriate time in the cleaning sequence.

I. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections verify decontamination.

J. After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person or Asbestos Project Monitor. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation.

3.04 ACP REMOVAL PROCEDURES – DAMAGED ACP

A. If visible ACP debris is observed in the excavation, the Contractor shall remove it with (minimum) one inch of underlying soil and disposed of as ACWM.

1. Soil must be containerized in 6-mil poly bags or drums lined with 6-mil poly. Bulk loading of soil is not permitted without MassDEP approval of a NTWP.

B. Adequately wet full-length of exposed ACP with amended water before and during removal.

C. Saw cutting of ACP shall only be conducted with approved wet-cutting equipment (ICS or Wachs Guillotine).

D. Wrap wet ACP in two layers of 6-mil poly sheeting, seal with duct tape, and label.

E. Manage wrapped ACP, poly, and any other material contaminated with visible asbestos debris as ACWM.

F. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work area at an appropriate time in the daily cleaning sequence.

G. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections verify decontamination.

H. After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person or Asbestos Project Monitor. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation.

3.05 SOIL CONTAINING ACP FRAGMENTS – BEFORE LOADING

A. If less than 3 cubic yards of soil is observed to contain ACP fragments, before it is loaded, the Contractor shall containerize the soil in 6-mil poly bags or lined drums and handle it as ACWM in accordance with this Section and SOP.

B. If greater than 3 cubic yards of soil is observed or containerization is not feasible, the Contractor shall contact the Consultant and City of Framingham Project Manager to contact MassDEP to approve an NTWP to address the bulk loading of contaminated soil.

3.06 SOIL CONTAINING ACP FRAGMENTS – AFTER LOADING

A. If soil is observed to contain ACP fragments after it has been loaded onto the Contractor's vehicle the Contractor shall immediately cease loading operations.

B. The Contractor shall secure the vehicle and the soil shall be covered with poly sheeting or tarpaulin.

C. The Contractor's Asbestos Competent Person shall inform the Consultant and City of Framingham Project Manager.

D. Consultant shall contact MassDEP NERO to provide Emergency Notification and submit request for NTWP approval within 1 business day.

E. The Contractor shall transport the soil to a designated TASL (at the direction of the City of Framingham Project Manager) using WSR.

F. Soil shall be transferred directly into a form-fitted, 10-mil double lined and labeled dumpster after emergency notification provided (whether or not a live person is reached on the phone at MassDEP NERO).

G. Transport vehicle shall be free of suspect debris and decontaminated in accordance with SOP.

H. Once MassDEP has approved the NTWP, soil shall be handled and disposed of in accordance with that plan.

3.07 SOIL CONTAINING ACP – OFF-SITE STOCKPILE LOCATION

A. If soil is observed to contain ACP fragments after it has been transferred to the Contractor's off-site temporary location, the Contractor shall cease operations impacting the stockpile.

B. The Contractor shall cover the stockpile with poly sheeting or tarpaulin.

C. The Contractor shall contact the Consultant and City of Framingham Project Manager.

D. Stockpile shall be handled and disposed of in accordance with a MassDEP-approved NTWP.

3.08 ASBESTOS CEMENT PIPE TAPPING

A. The Contractor shall place 6-mil poly sheeting under the ACP to prevent soil contamination.

B. The Contractor shall adequately wet the ACP with amended water before tapping to avoid creating airborne dust.

C. The Contractor shall dispose of any material contaminated with visible asbestos debris as ACWM.

3.09 DEWATERING

A. If water is observed within an excavation, the Contractor shall try to pump the water out of the excavation to expose the ACP.

B. The Contractor shall assess the condition of the ACP and determine whether it is intact or deteriorated.

C. If ACP is intact the Contractor shall pump the water from the excavation and discharge it to the closest storm drain.

D. If the ACP is broken or deteriorated, the Contractor shall pass the standing water (after initial pump and discharge to storm drain) through a 5-micron filter before being discharged to the closest storm drain. The filter shall then be disposed of as ACWM.

3.10 CONSULTANT'S/CONTRACTOR'S INSPECTION RESPONSIBILITIES

A. The Contractor's Asbestos Competent Person or the Owner's Resident Engineer may conduct inspections throughout the progress of the removal project. Inspections will be conducted to document the removal work progress, as well as the Contractor's procedures and practices.

B. The Contractor's Asbestos Competent Person or the Owner's Resident Engineer may perform the following inspections during abatement activities:

1. Pre-Commencement Inspection: If required or retained for this service, pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 24 hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
2. Work Area Inspections: If required or retained for this service, work area inspections shall be conducted on a daily basis, at the discretion of the Consultant. During the work inspections, the Consultant's Asbestos Project Monitor shall observe the Contractor's removal procedures, assess project progress, and, if deficiencies are noted, inform the Contractor of specific remedial activities.

C. The Contractor's Asbestos Competent Person or the Owner's Resident Engineer shall perform the following inspections after removal activities are completed:

1. Final Visual Inspection: When removal is complete, the Contractor's Asbestos Competent Person or the Owner's Resident Engineer will conduct a final visual inspection inside each excavation. The Consultant shall be informed 24 hours prior to the time that the inspection is needed. After completion of the initial final cleaning procedure, including removal of all containers, but prior to backfilling, a final visual inspection shall be conducted by the Contractor's Asbestos Competent Person. The final visual inspection shall verify that ACP and residual debris has been removed from the excavation. If residual debris is identified during the final visual inspector, the Contractor shall re-clean the excavation to meet the "no visible, suspect dust or debris" standard.

2. Contractor's Asbestos Supervisor shall complete Daily Asbestos Project Checklist.

3. RE shall review completed Daily Asbestos Project Checklist.

3.11 TEMPORARY ASBESTOS STORAGE LOCATION (TASL)

A. Unless approved by the City in advance and taken to a DLS licensed Contractor's yard, all ACP waste material shall be transported to the Owner's Temporary Asbestos Storage Location (TASL) (229 Arthur Street, Framingham, MA) using a WSR or equivalent. City PM to sign WSR prior to ACM transport to TASL.

B. The Contractor shall provide a locked, covered, lined and labeled container for the storage of ACP waste.

C. The Owner shall provide space at the TASL for the Contractor's waste container.

D. The Owner will provide access to the secured TASL through the Resident Engineer or City PM.

E. The Contractor shall be responsible for the 30-day disposal deadline and final transport to an approved disposal facility.

3.12 ASBESTOS DISPOSAL

A. ACM and/or ACWM disposal (including supplies, rags, disposable clothing, respirator filter cartridges, etc.) shall be completed in accordance with MassDEP and EPA regulations. Waste receptacles (bags, drums, etc.) shall be labeled in accordance with the most current OSHA regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101) and contain the following:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

B. In addition to the warning label, each individual container and/or package of ACWM shall be labeled prior to being transported off the site of generation with the following information:

1. Name of the waste Generator (City of Framingham),
2. Waste generation location (e.g. “in the vicinity of…”),
3. Generation date.

C. Disposal site approvals shall be obtained and accepted prior to the start of asbestos removal activities.

D. A copy of the signed disposal authorization shall be provided to the Owner, Consultant, and any required federal, state, or local agencies.

E. Copies of all Waste Shipment Records (WSR) shall be provided to the Owner no later than 35 calendar days from when the waste was removed from the Site for inclusion in the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator shall sign the WSR so the quantity of asbestos debris leaving the Site and arriving at the landfill is documented for the Owner.

F. All wash water and shower water shall be collected and filtered through a five-micron filter before discharge to a sanitary sewer with prior appropriate permitting or publicly-owned treatment works (POTW) approval. Alternately, wash and shower water can be used to moisten ACWM.

G. All ACWM shall be transported in covered sealed vans, boxes, or dumpsters which are physically isolated from the driver by an airtight barrier. All vehicles must be properly-licensed to meet Commonwealth of Massachusetts and United State Department of Transportation (DOT) requirements.

H. Any incident and/or accident that may result in spilling or exposure of ACWM outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

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SECTION 02080

SOIL AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 QUALIFICATIONS

A. The Contractor shall demonstrate the necessary skills, experience, training, and qualifications to conduct the work as specified herein.

B. The Contractor shall possess all required licenses, insurance, permits and trained employees to properly execute the work as specified herein.

C. All personnel involved in the transportation of waste from the site shall have the required skills, experience, training, and qualifications including, but not limited to, Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) training.

1.2 EXISTING CONDITIONS

A. The following documents are available for review and appended to these Technical Specifications.

1. The Sediment Analytical Results, include sample results from preliminary investigations.

B. For soil and sediment characteristics of the site, refer to the Sediment Analytical Results. The Contractor is obligated to review existing environmental assessment reports and manage the soil and groundwater in accordance with applicable state and federal regulations.

1.3 DEFINITIONS

A. Asphalt, Brick and Concrete (ABC): Asphalt, Brick and Concrete material that is waste from construction or found in fill material during excavation. ABC material found in clean, reusable fill may be reused onsite to the greatest extent possible. All excess ABC generated during construction shall be disposed of offsite at an appropriate, licensed facility that will accept ABC waste.

B. Area of Excavation: For the purposes of reusing soil on-site, the *area of excavation* is considered to be the approximate area in which the soil was removed provided that area is consistent in soil strata, color, texture, geotechnical properties and has substantially similar visual and olfactory characteristics. Soil returned to the *area of excavation* shall be returned to approximately the same horizontal and vertical location from which it originated provided that it is not placed in an area that differs substantially in physical or chemical characteristics as can be observed and measured during excavation. Soil returned to the area of excavation shall be placed and compacted as specified in the Contract Specifications.

C. Authorized Excavation: Earth Excavation or "Excavation" consists of removal of materials encountered to the elevations and widths indicated in the Contract Drawings, Specifications, or as directed by the Engineer.

D. Background: (see Section 1.3.W.1)

E. Bill of Lading (BOL): A document signed by a waste transporter or the transporter's representative and issued to a waste generator that evidences the receipt of waste to a specified disposal facility or location. BOL is typically utilized as accompanying documentation during transport of Regulated soils. Soils subject to management under 310 CMR 40.0035.

F. Competent Person: for purposes of this Specification, the term shall mean one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them [29 CFR 1926.32(f)].

G. Containerized Waste (as defined in 310 CMR 40.0000) means discarded oil and/or hazardous material at a site in drums, tanks, engineered impoundments, or other fabricated containers, including, without limitation:

1. discarded oil and/or hazardous material that was generated at a site as a results of manufacturing industrial, commercial or other process-related activities, and

2. discarded oil and/or hazardous material discovered, managed, generated, or accumulated as part of a response action.

H. Contaminated Media:

1. Contaminated Debris (as defined in 310 CMR 40.0000) means any debris that contains oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.

2. Contaminated Groundwater (as defined in 310 CMR 40.0000) means groundwater containing oil and/or hazardous material at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600.

3. Contaminated Sediments (as defined in 310 CMR 40.0000) means sediments containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.

4. Contaminated Soil (as defined in 310 CMR 40.0000) means soil containing oil and/or hazardous material associated with a release for which notification is required by 310 CMR 40.0300 and 40.1600.

5. Contaminated Surface Water (as defined in 310 CMR 40.0000) means surface water containing oil and/or hazardous material associated with a release for which notification is required under 310 CMR 40.0300 and 40.1600.

I. Debris (as defined in 310 CMR 40.0000) means solid material that is a manufactured object, plant or animal matter that is intended for disposal or is otherwise no longer serving its intended use. The term shall include demolition and construction waste, hay, vegetation, and other organic and inorganic absorbent materials used to contain or absorb releases of oil and/or hazardous material. The term shall not include:

1. any material for which a specific treatment standard is provided in 40 CFR Part 268, Subpart D; or
2. process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges or air emission residues.

J. Demolition and Construction Waste (as defined in 310 CMR 40.0000) means any waste materials and rubble resulting from the construction, remodeling, repair or demolition of buildings, pavement, roads or other structures. Demolition and construction waste includes, but is not limited to, concrete, bricks, lumber, masonry, road paving materials, rebar and plaster.

K. Disposal shall mean safe and legal reuse, recycling, or disposal off the site in a manner as required to comply with all applicable statutes and regulations.

L. Hazardous Material as defined 310 CMR 40.0006.

M. Hazardous Waste:

1. Hazardous waste as defined 310 CMR 40.0006; or
2. Hazardous waste as defined in 40 CFR 261.3.
3. A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:
    a. Cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or
    b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

N. Licensed Site Professional and LSP (as defined in 310 CMR 40.0006) each means a hazardous waste site cleanup professional, as defined in M.G.L. c.21A, §19, holding a valid license issued by the Board of Registration of Hazardous Waste Site Cleanup Professionals pursuant to M.G.L. c.21A, §§19 through 19J.

O. Liquid Waste: materials generated onsite due to work performed and are waste or excess including but not limited to collected groundwater, collected stormwater, non-aqueous phase liquids, Contractor-supplied fuels and fluids, and drummed liquids.

P. Material Shipping Record (MSR): A document signed by a waste transporter or the transporter's representative and issued to an acceptance facility that evidences that

receipt of unregulated soils or waste to a specified disposal facility or location. For the shipment of contaminated soil, urban fill, and dredge materials not subject to management under 310 CMR 40.0035.

Q. Massachusetts Contingency Plan or MCP: 310 CMR 40.0000

R. Natural Soils: Natural soil is defined for the purposes of the Contract as unconsolidated sand, gravel, silt and clay, and the organic material which has become part of the unconsolidated soil matrix. For this section only, soil may include broken and fragmented rock.

S. Peat: A substance of vegetable origin, consisting of roots and fibers, moss, etc., in various stages of decomposition, and found, as a kind of turf or bog. Peat shall be considered natural soil when it is encountered in small amounts (layers 1-foot (304.8 mm) or less in thickness) and when it is impractical to separate the peat from the natural soil or urban fill strata. Otherwise, peat shall be considered a distinctive stratum.

T. Regulated Soil: Soils requiring management in accordance with 310 CMR 40.0000, and require BOL to document transport. (see Section 1.3.W.3)

U. Remediation Waste: as defined in 310 CMR 40.0006 means any Uncontainerized Waste, Contaminated Media, and/or Contaminated Debris that is managed pursuant to 10 CMR 40.0030. Remediation Waste does not include Containerized Waste.

V. Solid Waste (Waste): materials generated on site due to work performed and are waste or excess, including but not limited to asphalt, brick and concrete (ABC) waste, demolition waste, decontamination waste, dredging spoils (dewatered), metal waste, plaster/drywall, plastic waste, rock, rubber waste, sediment, tar waste, trash, vegetation debris, wood waste.

W. Soil Classification Categories: Unless specifically stated otherwise, terms used in this specification are as defined in the Massachusetts Contingency Plan (MCP), 310 CMR 40.0006. The following definitions and soil classifications apply to these specifications:

1. Background or Unregulated Soil: Any fill or natural soil material which meets the regulatory definition of "background" as defined in 310 CMR 40.0006 may be reused as common fill/ordinary borrow provided it also meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Suitable soil which does not have any evidence of contamination may be reused within the area of excavation without first performing laboratory analyses. For record keeping purposes soil/fill that meet the definition of background, shall be transported under a Material Shipping Record (MSR). Background means those levels of oil and hazardous material that would exist in the absence of an MCP Disposal Site, including both Natural Background and Anthropogenic Background.

   Background soil may also be re-used off-site without restriction provided it is reused in an area where background concentrations are equal to or greater than

the site-specific background determined at the off-site location in accordance with DEP Policy WSC#13-500 Similar Soils Provision Guidance (or most recent update). The Contractor is responsible for determining the background levels at the point of excavation. It is also the Contractor's responsibility to identify one or more disposal facilities/locations with background levels appropriate to receive the material to be disposed or reused. It is the Contractor's responsibility to determine these background levels in advance so as to comply with 310 CMR 40.0032(3)(b) and so as not to delay or adversely affect construction operations.

2. Impacted: Any soil or fill material which contains oil or hazardous materials (OHM) at concentrations greater than background levels but less than release notification thresholds established by 310 CMR 40.0300 and 40.1600. Impacted soil may be reused in the area of excavation or as fill provided it is reused in an area of equal or greater contamination and meets the physical requirements as specified herein and as specified in Section 02210 - Earth Excavation, Backfill, Fill and Grading. Impacted soils requiring off-site transportation and disposal/reuse shall be transported using a Material Shipping Record (MSR).

3. Contaminated or Regulated Soils: Any soil or fill material which contains oil or hazardous materials at concentrations equal to or greater than a release notification threshold established by 310 CMR 40.0300 and 40.1600, except where the presence of the material is consistent with the regulatory definition of "background" as defined in 310 CMR 40.0006.

   Any soils which contain either petroleum or chemical odor or visual indications of oil or hazardous materials shall be handled as potentially contaminated soils. Soil/fill that may be contaminated shall be set aside by the Contractor for assessment by the Contractor's environmental professional (LSP) in a secure manner to prevent exposure to humans and the environment and in accordance with 310 CMR 40.0036. Soil/fill that is staged and characterized can be reused within the area of excavation or elsewhere on site provided the material has been tested and has equal or less contamination than the point where it is to be reused and it is not reused beneath a permanent structure such as a building foundation. Any excavated soil/fill material not reused within the area of excavation must be characterized prior to off-site reuse/disposal. After analytical results are available, soil/fill shall be handled in accordance with the type and degree of contamination (if any) present in the soil/fill, and recommendations of the Contractor's LSP.

   Contaminated soil that cannot be reused on site shall be reused off-site, recycled, or disposed as a solid waste at an appropriately permitted facility unless it also meets the regulatory definition of hazardous waste as defined in 40 CFR Part 261 or contains detectable asbestos. Contaminated soils requiring off-site transportation and reuse/disposal or recycling shall be transported using a Material Shipping Record (MSR) or Bill of Lading (BOL), as appropriate. Subcategories of Contaminated soil are defined as follows:

   a. Unlined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site

reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state unlined landfills. Note: per COMM 97-001, sediments may not be re-used as Unlined Landfill Material.

b. Lined Landfill Material: Soils that meet all applicable criteria (i.e., COMM 97-001 and/or facility-specific permit requirements) for off-site reuse as daily cover, intermediate cover, or pre-cap contouring material at in-state lined landfills.

c. Asphalt Batch Plant Material: Soils that meet all applicable criteria for recycling at an asphalt batching plant and/or the specific licensing requirements for the proposed recycling facility. Soil that does not meet the applicable COMM 97-001 criteria for Unlined or Lined Landfill Material that is characterized by the following: TPH concentrations in excess of 5,000 milligrams per kilogram (mg/kg), or total SVOC concentrations in excess of 100 mg/kg, or total non-chlorinated VOC concentrations in excess of 10 mg/kg, and total lead concentrations below 3,000 mg/kg and TCLP metal concentrations below applicable hazardous levels. Material classified as Asphalt Batch Plant Material shall be excavated and transported to an asphalt batch plant for recycling. This material cannot be used as daily cover at or disposed of at a Massachusetts Unlined or Lined Landfill.

d. Out-of-State Non-Hazardous: Soilsthat contain concentrations of contaminants that exceed in-state lined and unlined landfill reuse criteria as well as asphalt batch plant acceptance criteria, but meet the criteria for regional thermal treatment facilities or out-of-state recycling facilities, and are not classified as a Resource Conservation and Recovery Act (RCRA) Hazardous Waste.

4. Hazardous Waste: A waste, or combination of wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause or significantly contribute to an increase in mortality or cause or significantly contribute to an increase in a serious irreversible or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Also included within the definition of hazardous waste is hazardous waste as defined 310 CMR 40.0006 and 40.CFR 261.3. Hazardous waste as defined in 40 CFR 261.3 is a solid waste that exhibits any of the characteristics of hazardous waste in excess of regulation levels presented in 40 CFR 261, subpart C and/or that is listed in 40 CFR 261, subpart D; that is a mixture of solid and hazardous waste; or that is derived from a listed waste. Subcategories of Class C soils shall be as follows:

   a. Post-treatment Non-Hazardous: Soils classified as hazardous waste that have been treated on-site to reduce the toxicity characteristic (e.g., for TCLP lead).

   b. Hazardous: Material determined to contain "listed" or "characteristic" hazardous waste constituents which cannot be readily treated on-site. This material must be transported to an out-of-state approved RCRA Subtitle C

hazardous waste disposal or treatment facility under a Uniform Hazardous Waste Manifest.

X. Special Waste: Any waste that is determined not to be a hazardous waste pursuant to 310 CMR 30.000 and that exists in such quantity or in such chemical or physical state, or any combination thereof, so that particular management controls are required to prevent an adverse impact from the collection, transport, transfer, storage, processing, treatment or disposal of the waste. Asbestos and PCB-contaminated soils/fill are examples of special waste categories.

Y. Transportation Documentation or Shipping documentation means the document used to identify and accompany soil or waste during transport such as a Material Shipping Record (MSR), Bill of Lading (BOL), or Uniform Hazardous Waste Manifest. Also referred to as a shipping record.

Z. Unauthorized Over Excavation: Consists of removal of materials beyond indicated elevations and width limits indicated in the Contract Documents without direction of the Engineer. Over-excavation material handling, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Over-excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer

AA. Unauthorized Excavation: Consists of removal of materials beyond indicated sub-grade elevations or Contract-defined limits as shown in the Contract documents without specific direction of the Engineer. Unauthorized excavation, handling material, transportation and disposal, backfilling and compaction shall be at the Contractor's expense. Unauthorized excavations shall be backfilled and compacted as specified for excavations of the same class, unless otherwise directed by the Engineer.

BB. Unknown Materials: Any material, that is not readily identifiable as nonhazardous waste, and which has not been previously characterized or encountered during site investigation activities. The Unknown Material classification is to be used in the event that an unexpected, unusual material is encountered for which special handling procedures shall be required in order to handle the material safely. Such wastes include but are not limited to:

1. Unlabelled drums or containers containing material which is not readily identifiable as a non-hazardous substance.
2. Any material, which varies significantly from material previously observed on site and which cannot be readily identified as a nonhazardous.
3. Waste material of unusual color or odor or material with indications of hazardous levels (e.g. exceeding OSHA permissible exposure limits) of contaminants as evidenced on an organic vapor monitor or other similar instrument.

The Owner reserves the right to apply generator knowledge to classify and profile the material as a previously encountered waste or as a known waste. In the event that

a material is encountered which the Contractor is uncertain as to its nature, the Owner or their representative shall assess the material with the Contractor and inform the Contractor as to the nature of the material (known or unknown).

CC. Unregulated Soil: (see Section 1.3.W.1)

DD. Urban Fill: Fill, also known as urban, or miscellaneous fill, is defined as a mixture of soil and other materials which have been located in the area through man-made processes primarily for the purpose of grading, backfilling or filling in low areas. Material commonly associated with urban fill includes, but are not limited to; coal, glass, brick, ash, wood fragments and other similar granular materials. Urban fill shall not include boulders, ledge, consolidated rock, asphalt, concrete, railroad timbers, rail, cobblestones or any other abandoned building materials.

EE. Waste Manifests: the hazardous waste shipping/transportation documentation required to ship all hazardous waste and subject to provisions in 49 CFR 172 Subpart C.

1.4 DESCRIPTION OF WORK

A. General

1. This Section includes furnishing all labor, equipment, materials, and incidentals required to perform all operations in connection with the handling and disposition, stockpiling, transport, in-project reuse and/or off-site reuse or disposal of excess excavated materials resulting from the construction operations as specified. In-project reuse shall be defined as material that is reused within the Project, such as approved use of excavated soils as backfill into the excavation trench after installation of new utilities.

2. This Section includes proper handling and management of waste materials, including, but not limited to, construction debris, building demolition, municipal waste, boulders, regulated and unregulated soils, ash, rubble, asphalt, brick and concrete (ABC), asbestos containing material, asbestos cement pipe (Section 02076), hazardous materials and empty or crushed drums and/or drum parts.

3. Coordinate work with that of all other trades or contracts affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

4. All work shall be conducted in compliance with Contractor-prepared plans as specified in Paragraph 1.7 Submittals of this Section.

5. Implementation of the submitted HASP and other applicable includes establishing work zones (e.g., support zone, contamination reduction zone, exclusion zone), preparing a decontamination pad(s) and staging area(s), performing the appropriate environmental monitoring, training and medical monitoring of personnel, coordinating waste disposal and waste characterization as needed, etc.

6. The Contractor shall develop, implement, maintain, supervise, and be responsible for all soil management practices during the course of this contract. An OSHA Competent Person, with demonstrated experience in clean and contaminated soil and hazardous waste handling (e.g. L.S.P.), shall be present during all excavation, backfilling, field screening, segregating, handling, and characterization of all soils excavated in the course of completing this contract to ensure that soil is managed in accordance with applicable laws, regulations, and this Section.

7. Demobilizing the site, including, but not limited to, removing and disposing of excess or waste soils, rock, solid waste, demolition waste, construction-related equipment and materials used for personnel and equipment decontamination and related waste such as personal protective equipment (PPE), decontamination water/solids, temporary covers, and wash-water storage tanks; disconnection of temporary utilities; and final clean-up to pre-construction conditions.

8. The Contractor is responsible for being aware of potential hazards at the site and reviewing all existing information which provides evidence of contamination within the limit of the work.

B. Soil and Waste Management

1. This Section describes the general parameters and requirements for testing (including field screening and laboratory chemical analysis), excavation, handling, storage, tracking, transport, and in-project reuse or off-site reuse/disposal of soils.

2. In the course of the work, it may be necessary to excavate and handle potentially contaminated soil or hazardous material. The soil or hazardous materials management practices specified herein apply to all soil and/or hazardous materials excavated during the course of this Contract. Contaminated soils and hazardous materials/hazardous waste shall be managed in accordance with 310 CMR 40.0000 and 310 CMR 30.000.

3. The Contractor shall segregate soils during excavation and stockpiling to avoid mixing soils (i.e. topsoil, fill and natural soils shall be segregated, in addition to regulated, unregulated soils, etc.).

4. Characterization of soil, and unknown material for disposal/off-site reuse purposes; field screening and soil management/segregation; temporary storage/staging; and characterization (as may be necessary for unknown materials and/or for compliance with receiving facility requirements); and disposal and/or off-site reuse of excavated soil and waste material. All laboratory chemical analyses conducted shall utilize currently accepted U.S. EPA and applicable state agency analytical protocols and procedures.

5. The Contractor shall characterize all excavated and stockpiled soil and fill material prior to off-site reuse or disposal. Characterization requirements may vary depending on the source/location of the excavated soil/fill, the site selected to receive soil suitable for off-site reuse, or the disposal facility permits and policies. The Contractor is responsible for final waste characterization and shall

determine if any additional waste characterization is required at no additional cost to the Owner.

6. Providing and constructing a secure soil staging area sized to adequately segregate soils in accordance with the conditions specified without impeding construction-related activities. The Contractor is to use existing information and obtain additional information as may be needed to minimize the need for a staging area. If a staging area is required to characterize unknown or excess material for any reason, the Contractor is responsible for locating, selecting, preparing and securing the area.

7. Excavated soil/fill that is contaminated or may be suspected as contaminated or containing hazardous materials shall be stockpiled and covered prior to characterization and off-site reuse or disposal. Since individual disposal facilities will have different permit conditions and specific pre-characterization data requirements the Contractor is responsible for final soil characterization prior to transport and disposal. The Contractor is hereby made aware that for the purposes of disposal, final soil characterization is the responsibility of the Contractor and costs for securing a staging area and conducting waste characterization shall be incorporated into the Contractor's bid price for construction.

8. During construction activities, excavated soil/fill waste shall be field-screened by the Contractor and either loaded directly for off-site disposal (provided the excavated material is consistent with previously conducted investigations) or stockpiled in a soil/fill waste staging area located by the Contractor and approved by the Owner and Engineer. Stockpiles of soils shall be minimized to reduce the amount of waste material stored onsite. Stockpiled materials that are to be disposed of shall remain onsite for only as long as it would reasonably take to characterize (if not done in advance), load and transport offsite to an approved disposal facility. Soils that are to be re-used as fill material shall be stockpiled and maintained per Section 3.4 Staging Areas.

9. Soil suspected of having the characteristics of a hazardous waste or of containing a listed hazardous waste shall not be removed from the excavation except at the direction of the Engineer.

10. Soil/fill waste shall not be staged within 100 feet (30.5 meters) of a reservoir, wetland or Area of Critical Environmental Concern or in a 100-year floodplain. Soil/fill waste shall not be staged in the work area over night. Contaminated material requiring additional waste characterization due to waste disposal facility requirements or in order to assess unknown materials, shall be staged securely pending analytical sampling and characterization by the Contractor.

11. The Contractor shall reuse excavated soil at the point of origin to the maximum degree possible. Soil/fill which cannot be reused immediately at the point of origin shall either have been pre-characterized for off-site reuse or disposal by the Contractor and directly loaded for off-site transport (provided the excavated soil/fill is consistent in visual, olfactory and field screening characteristics with subsurface investigation conducted prior to construction pursuant to the MCP)

or it shall be staged at a location determined and secured by the Contractor pending analytical characterization.

12. Excavating soil, fill and waste containing potential asbestos-containing material (e.g., transite board) shall conform to SECTION 02076 ASBESTOS CEMENT PIPE REMOVAL. No off-site staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.

13. Removing characterized on-site materials for off-site re-use or disposal.

14. Placing and grading of certified clean fill (including fill from on-site which is determined to be suitable for re-use). The Contractor is to maximize the in-project reuse of on-site materials by using soil suitable for such reuse prior to importing material on site.

15. In the event that a previously uncharacterized, unknown material is encountered the Contractor shall manage the material separately and will temporarily stage the material pending characterization as specified herein.

16. All Investigation Derived Wastes are the property and responsibility of the Contractor and are to be disposed of by the Contractor under a Uniform Hazardous Waste Manifest, Material Shipping Record or by a Bill of Lading, as appropriate. The parties understand and agree that any consultant or sub-consultant (at any tier) is not, and has no responsibility as, a generator, treater, storer, transporter, or disposer of hazardous or toxic substances found or identified at the project site, and that the Contractor agrees to assume responsibility for and indemnify and hold any consultant or sub-consultant (at any tier) harmless from the foregoing.

C. Groundwater Management

1. Management of contaminated groundwater: If groundwater potentially impacted by oil and/or hazardous material (OHM), based on visual or olfactory evidence, is encountered in the course of the work, construction dewatering and discharge permits and groundwater treatment may be necessary depending upon the discharge method(s) and/or location(s) utilized by the Contractor. The Owner and Engineer shall be notified by the Contactor if groundwater potentially impacted by OHM is identified. REFER TO SECTION 02140 DEWATERING.

1.5 RELATED WORK

A. Section 01024 - Measurement and Payment

B. Section 02076 – Asbestos Cement Pipe Removal

C. Section 02140 – Dewatering

D. Section 02210 - Earth Excavation, Backfill, Fill and Grading

1.6 REFERENCES

A. All work at the site must be performed in accordance with all applicable federal, state, and local regulations, permits and licenses. Comply with applicable requirements of the following standards and those referenced in this Section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

B. OSHA regulations (including, but not limited to, 29 CFR 1910.1000, 29 CFR 1926, and CFR 1910.120), 40-hour Occupational Safety and Health Administration (OSHA) training (plus 8-hour refresher training) and all other applicable state and federal regulations regarding health and safety requirements;

C. The applicable parts of the Code of Federal Regulation (CFR) Title 40: Protection of Environment, pertaining to the Comprehensive Environmental Response and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA), RCRA, and the National Emission Standards for Hazardous Air Pollutants (NESHAPS) as regulated by the U.S. Environmental Protection Agency (U.S. EPA);

D. Massachusetts Site Assignment Regulations for Solid Waste Facility Regulations 310 CMR 16.000.

E. Massachusetts Solid Waste Management Facility Regulations 310 CMR 19.00.

F. State regulations specified in the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000), and Massachusetts General Law 21E - Massachusetts Oil and Hazardous Materials Release Prevention and Response Act, and applicable Massachusetts Department of Environmental Protection (MassDEP) guidelines and policies;

1. Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup Policy No. WSC-94-400 entitled "Interim Remediation Waste Management Policy for Petroleum Contaminated Soils," dated April 21, 1994.
2. Massachusetts Department of Environmental Protection Bureau of Waste Prevention Policy No. COMM-97-001 entitled "Reuse and Disposal of Contaminated Soils at Massachusetts Landfills," dated August 15, 1997.
3. Massachusetts Department of Environmental Protection, Bureau of Waste Prevention Policy No. WSC#-13-500 "Similar Soils Provision Guidance," dated September 4, 2013.
4. Massachusetts Department of Environmental Protection, Policy #COMM-15-01 "Interim Policy on the Re-Use of Soil for Large Reclamation Projects," dated August 28, 2015.
5. MassDEP Technical Update. Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil (2002);

G. Department of Transportation (DOT) regulations 49 CFR, and state transportation licenses and permits;

H. NIOSH/OSHA/USCG/EPA: “Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities” October 1985, DHHS (NIOSH). Publ. No. 85-1 15;

I. Department of Transportation training;

J. U.S. Army Corps of Engineers 404 permit;

K. General Contractor's license;

L. National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) to discharge and associated general permits;

M. Massachusetts Water Resources Authority pretreatment and construction dewatering requirements and permits;

N. Excavation and/or grading permits;

O. Special use permits;

P. Special waste haulers certificate;

Q. Massachusetts Wetlands Protection Act and associated Order of Conditions;

R. City of Framingham wetland regulations and bylaws; and The Contractor's Soil and Waste Management Plan (SWMP) and Health and Safety Plan to protect the workers and the public.

1.7 SUBMITTALS

A. The Contractor shall prepare a Work Plan that generally describes the work to be performed under 02080 Part 3 (Execution). The work plan shall include, but not be limited to detailing the submittal and implementation of the following:

1. Soil and Waste Management Plan;
    a. Dust, Vapor and Odor Control Plan;
    b. Air Monitoring Plan;
    c. Equipment and Personnel Decontamination Plan
2. Site-Specific Health and Safety Plan (See Section 01108);
3. Dewatering Plan (See Section 02140);
4. Stormwater Handling Plan;
5. Spill and Discharge Control Plan;
6. Asbestos Management Plan (See Section 02076); and
7. MCP required reports as necessary (RAM, URAM, status reports, closure reports).

The Soil and Waste Management Plan (S/WMP) shall be submitted at least three weeks prior to the beginning of any intrusive work at the site. All other required plans shall be submitted to the Owner or Engineer and/or their representative for review and approval at least two weeks prior to beginning any intrusive work at the site. Plans shall be consolidated provided the requirements of each plan are fully incorporated therein.

B. Soil and Waste Management Plan (S/WMP): The S/WMP shall outline measures for sampling, field screening, laboratory analysis, and disposal/ off-site reuse of soils and wastes generated at the Project site. At a minimum, this plan shall address the following:

1. Methods, procedures, and equipment used for excavating, characterizing, segregating, reusing/backfilling, loading, and transporting contaminated soil/solid waste materials encountered during excavation operations;

2. A list of all transporters and receiving facilities, complete with license numbers, permit numbers (as appropriate), contact person, and address and telephone number that the Contractor utilizes for soil management and waste disposal. In addition, a copy of a memorandum of understanding between the Contractor and each disposal facility shall be attached to the Soil and Waste Management Plan. The memorandum of understanding shall detail that the disposal facility agrees to accept a specified quantity of waste as characterized in the contract specifications and detail what if any restrictions may apply. The Contractor shall provide copies of the permits held by each disposal facility which the Contractor plans to use to dispose of non-hazardous solid waste, hazardous waste, PCB-impacted waste and asbestos-containing waste. The transporters shall have adequate financial insurance and liability insurance mechanisms to handle any accidents, and associated third-party compensation;

3. A summary of the history of compliance actions for each receiving facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. The Owner reserves the right to reject any facility on the basis of poor compliance history;

4. If hazardous wastes are to be transported, Contractor shall have or obtain a valid EPA identification number to transport hazardous materials and any other permits or licenses as required by federal, state and local laws, regulations, ordinances and procedures.

5. Procedures for securing the staging area, controlling dust and soil/solid waste migration, preventing damage to uncontaminated areas via contaminant migration and for decontaminating vehicles and personnel exiting the staging area;

6. The means and methods for decontaminating all equipment and personnel, including provisions for installing an equipment decontamination pad if required or specified.

7. Means, methods and equipment for locating and protecting stockpiles.

8. Methods and procedures for identifying stockpiled material (e.g., labeling, marking containers) and procedures for identification and tracking;

9. Methods, procedures, and equipment used for obtaining the necessary information needed to satisfy the off-site reuse/disposal facility requirements specified herein and/or by the facility;

10. Methods, procedures, and equipment proposed for assessing and handling Unknown Materials. The S/WMP shall indicate which laboratory(ies) the Contractor shall utilize for chemical analysis of soil, groundwater and unknown materials.

    a. An Unknown Materials information sheet shall be developed as part of the Contractor's S/WMP, upon which the Contractor shall record information such as container type, size, and condition; and, any identifying characteristics of the unknown material. The format of the information sheet shall be as accepted by the Owner and/or its representatives;

    b. The Contractor's plan for notifying the Owner and Engineer in the event that an unknown material as defined in this specification is encountered. The plan shall include the phone numbers and names of the Owner's representative(s) that the Contractor would contact in such an event.

11. Provisions for separation of incompatible materials and segregation of different class of soil;

12. Procedures for consolidating (i.e., bulking) compatible materials for disposal.

13. Procedures for dewatering as well as handling, characterization, storing, treating and disposing of groundwater due to dewatering. Refer to Section 02140 – Dewatering.

14. Procedures for diverting and handling site stormwater. This would include handling, treatment and discharge of storm water.

15. Provisions, procedures and equipment used for control of dust, vapor and odor; including measures to control objectionable dust, vapors, and odors originating from the site (Section 3.7). This shall describe procedures to minimize the creation of dust, and the control of objectionable vapors and odors originating from the site.

16. Provisions, procedures and equipment used to monitor air at the site (Section 3.6). This shall include site specific monitoring for potential hazards in the air; including the proposed instrument(s) to be used, the expected hazards (e.g., dust, VOCs), the monitoring frequency, the monitoring locations, and the reporting procedures.

C. Soil Management/Tracking Documentation:

Prior to off-site disposal or reuse, the Contractor shall provide to the Engineer a letter from the disposal facility indicating that the facility has reviewed the available data relative to the soil/solid waste to be delivered and agrees that the soil/solid waste

meets their acceptance criteria. The letter shall be signed by a duly authorized representative of the receiving facility.

Within the time constraints established in state and/or Federal laws and regulations, the Contractor shall submit to appropriate authority(ies) and the Owner, as applicable, Uniform Hazardous Waste Manifests, Material Shipping Records, and/or Bills of Lading (collectively referred to as transportation documentation) for all soils, rock, ACB, asbestos pipe, asbestos containing materials (ACM), hazardous waste and waste disposed or reused of off-site utilizing such documents. Copies of all transportation documentation and all other documents used to track and/or permit off-site transportation of soils or wastes shall be submitted to the Owner and Engineer within ten (10) days of shipment. All transportation documentation shall be signed by the transporter and receiving/disposal facility. The Contractor is responsible for preparation of all transportation documentation, manifests, Bills of Lading, Material Shipping Records, and all other related documents completely and accurately prior to submitting them to the Owner and/or its representative for generator and LSP signatures. The Contractor shall be responsible for submitting to the Owner's LSP all information necessary for preparation of LSP opinion letters to disposal facilities and coordinating disposal documentation with all parties. The Owner's LSP and the Owner shall the sign any MassDEP Bill of Lading forms where required only after the Contractor has provided the information required for preparation of electronic MassDEP forms. The Contractor shall be responsible for paying for any and all fines associated with inaccurate, incorrect, or improperly completed transportation documentation and all other related documents, including fines resulting from late or untimely submittals.

D. Stormwater Handling Plan

The Stormwater handling plan shall provide provisions to ensure compliance with Section 3.10, other portions of the Contract Documents, and all applicable local, state and federal permits.

E. Quality Control Plan

The Contractor shall prepare a Quality Control plan for the development, implementation, and maintenance of a quality control system to ensure that the specified quality is achieved for all materials and work performed.

F. Spill and Discharge Control Plan (SDCP): The SDCP shall provide contingency measures and reporting responsibilities for potential uncontrolled spills and discharges of contaminated and/or hazardous materials, including, but not limited to: fuels, oils, contaminated groundwater, granular solid waste, leachate, decontamination water, sewage, and other on-site waste materials. In addition to the above listed items, the SDCP shall specifically contain: procedures for containing dry and liquid spills; absorbent material available on site; storage of spilled materials; governmental reporting (i.e., notification) procedures; decontamination

procedures; discharges of sanitary or combined sewers into storm drains either by flow handling/bypassing or accidental or unintentional discharge; and procedures for protecting wetlands and surrounding public and private property.

The Spill and Discharge Plan shall indicate the location and quantity of the materials to be staged on site and the basis for the quantities (i.e. indicate the vessel which will be on site containing the greatest volume of oil or hazardous materials). No fuel or oil tanks or drums may be temporarily staged on site unless they are stored within a secondary containment system. Fuel deliveries shall be performed in a designated area which has either secondary spill containment or an impervious surface with absorbent berms located around the point of fuel delivery. The Spill and Discharge Plan shall indicate the location of the fueling area and the nature of secondary containment which the Contractor intends on utilizing.

1. Notification Procedures: The Contractor shall prepare in advance of work activities a notification list, complete with phone numbers, addresses, and contact names for all parties to be notified in the event of a spill. This list shall be posted on-site at all times and shall include:
    a. Owner's designated representatives;
    b. Owner;
    c. Fire Department;
    d. Engineer;
    e. Massachusetts Department of Environmental Protection (as required per 310 CMR 40.0000). The Owner shall be notified immediately of an uncontrolled spill or discharge. If human health or the environment are potentially threatened, the Contractor shall take immediate action to abate the conditions and notify emergency personnel;
    f. Appropriate emergency personnel.
2. Spill Incident Report(s): In the event of an uncontrolled spill or discharge, a written report detailing each uncontrolled spill or discharge shall include, at a minimum, the cause and resolution of incident, outside agencies involved, and date and time of occurrence. The report shall be submitted to the Owner within 48 hours of the incident. The Contractor shall document all spills on the as-built Drawings and submit the Drawings to the Owner at project completion. The Contractor shall be responsible for remediating any spills or releases of oil or hazardous materials as a result of the Contractor's activities. The site shall be remediated to pre-release conditions at no additional cost to the Owner.

G. Medical surveillance records, OSHA 40-hour training forms, accident forms, and all other documentation requirements of the Contractor's safety and health program for personnel working on the site (who are subject to exposure to potentially contaminated soil) shall be up-to-date and kept on file at the site. The Contractor shall provide documentation of employee status upon request of the Engineer and/or their representative.

PART 2 - PRODUCTS

2.1 DUST CONTROL

A. Dust suppression may be achieved by applying controlled amounts of water or dust suppression chemicals to the project site, and through covering of soil stockpiles, etc. Dust suppression shall be carried out in accordance with the approved SWMP.

2.2 SPILL CONTROL

A. At a minimum, the Contractor shall maintain on-site absorbent pads, booms and absorbent materials in sufficient quantity to address a release of fuel oil, hydraulic oil or other OHM that the Contractor intends to use or store on site, including fuel oil and hydraulic oil that is used within earth moving equipment. The quantity of spill containment materials maintained on site shall be sufficient to respond to a catastrophic release from the vessel containing the greatest quantity of oil or hazardous material on-site.

2.3 SOIL MANAGEMENT/TRACKING DOCUMENTATION

A. Provide completed Bills of Lading (BOLs), Material Shipping Records (MSRs), manifests, certificates of disposal, weight slips and all other documentation relative to disposal, reuse, treatment, recycling or other means of off-site use of soil and waste materials.

B. Provide appropriate equipment and materials to protect and delineate stockpiles as necessary.

PART 3 - EXECUTION

3.1 GENERAL

A. All work in this section will be performed in accordance with the Contractor's Work Plan, S/WMP, Site-Specific HASP and any other site specific plans/reports that have been approved by the Owner and Engineer.

B. The primary concern of the Contractor in the excavating, handling, sampling, bulking, and on-site storage of soil/solid waste and/or drummed material (if encountered) will be to protect the health and safety of the site workers, the public, and the environment.

C. The Contractor shall keep a copy of the Health and Safety Plan (HASP) on site during all operations and shall conduct daily health and safety meetings. Failure to keep a copy of the HASP on-site, or any other breach of the Contractor's Plan, may be cause for stopping work at the cost of the Contractor. Delays caused by the Contractor's failure to comply with the health and safety regulations or any health and safety plan shall not entitle the Contractor to recover any additional costs or

time lost. The Contractor shall not be allowed to resume activities until corrective measures are accepted by the Engineer and/or their representative and implemented.

D. The Contractor shall reuse geotechnically suitable excavated material prior to using imported backfill to reduce the volume of material to be reused/disposed off-site. Imported backfill shall be used only as accepted by the Engineer. Urban fill soils and roadway base/subbase shall be re-used to the maximum extent before reusing naturally occurring soils. If off-site disposal is required, natural soils shall be preferentially disposed or reused. Contamination shall not be exacerbated as a result work activities.

3.2 SOIL/FILL WASTE CHARACTERIZATION

Soil and fill material shall be classified based on the criteria established in the accepted SWMP.

A. Initial Characterization of Soil/Fill Waste Material: A summary of existing conditions and investigation findings performed by the Engineer during design, including a summary of analytical results, shall be available to the Contractor.

B. The Contractor shall review all the existing conditions information supplied by others. The Contractor shall use the information and shall either perform independent sampling and characterization of soil/fill waste strata to be encountered during construction in advance of excavation such that excavated soil or wastes can be segregated and directly transported to an appropriate facility or the Contractor shall make the necessary arrangements to secure a staging area(s) suitable for storing soil stockpiles or wastes pending analyses, at no additional cost to the Owner. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner. The Contractor shall identify known or suspected areas where hazardous materials may be encountered, including but not limited to asbestos, PCB, lead-based paint.

C. Soil shall be preliminarily segregated based on the Soil Classification Categories detailed in Section 1., except as indicated below.

1. Potential Asbestos Containing Material (PACM). If soil/fill waste suspected of containing asbestos is encountered during excavation, the Contractor shall immediately contact the Engineer to discuss the nature and extent of the PACM and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the PACM, MassDEP shall be contacted for approval. Discovery and management of PACM shall be documented in the S/WMP. Evidence of PACM includes but is not limited to the presence of suspect asbestos-containing building debris such as cementitious (transite) piping, vinyl floor tiling, roofing paper or paper-like insulation materials or any other suspect asbestos containing material observed in the soil/fill waste. Following MassDEP approval, such soil/fill waste shall be segregated and stockpiled pending confirmatory analysis to determine appropriate disposal requirements.

2. Unknown Material. If unknown material is encountered during excavation, the Contractor shall immediately contact the Owner and Owner's representative to discuss the nature and extent of the unknown material and to assess potential hazards and appropriate handling procedures. Prior to handling and removing the unknown material from the excavation area, the Contractor and Owner and/or its representatives, shall visually assess the material and its potential hazards. Drums shall be assessed to determine whether they are leaking, corroded, pitted, bulging (evidence of reactive waste), crushed, empty, filled-in-place. Crushed, empty, and/or skeletal parts of drums shall be handled as solid waste, as specified. Note any evidence of staining or olfactory indications of contamination. The Contractor shall record any identification or markings on the drummed material(s). Discovery and management of unknown materials shall be documented as required in the SWMP.

D. Final Waste Characterization: Final waste characterization shall be the responsibility of the Contractor. The Contractor shall be responsible for determining the characterization requirements of each disposal facility in advance to facilitate timely off-site removal and to adequately estimate the disposal costs. The Contractor shall perform additional segregation based on disposal requirements. Disposal or off-site reuse of the material shall depend on sampling and characterization analytical results. At the request of the Engineer or Owner, the Contractor shall provide a split sample. The Contractor shall perform or observe all sampling and shall provide notice in advance to the Engineer so that the Engineer may observe the sampling procedure.

Stockpiles within the staging area shall be sampled and characterized within a timely manner so as not to impede construction activities or preclude the reuse of soil/fill on site. If soil/fill cannot be reused on site due to the Contractor's delay in sampling material, the Contractor shall dispose of the soil/fill at no additional cost to the Owner including the additional cost of imported fill material used in its place to meet project requirements.

3.3 SOIL/SOLIDS WASTE MANAGEMENT

A. The Contractor shall reuse, recycle or dispose of all excess soil and wastes resulting from excavation activities in accordance with federal, state and local regulations and these specifications, as well as all other state laws through which the waste material is being transported.

B. The Contractor shall obtain receipts of disposal for disposed wastes as applicable.

C. The Contractor shall be responsible for preparing and keeping in proper order all waste manifests, BOLs, MSRs, and shall designate one person who shall be made available to sign all transportation documentation. The Contractor shall be responsible for obtaining the generator's signature and all other signatures required for the proper completion of the transportation documentation. The Contractor shall allow a minimum of five (5) working days from the date of the submittal for any documents requiring the signature of the Owner and/or the LSP. The transportation

documentation shall document the handling of the excess excavated soil or waste from the time it is generated until the time it is properly reused or disposed.

D. The Contractor shall be responsible for obtaining all federal, state, and local permits and variances to allow transport of materials and wastes on public roadways.

E. Transportation of wastes shall be in compliance with any relevant federal, state and local requirements, and such as to assure that waste material is not released during transit.

F. Soil and fill material that is managed under a Utility-Related Abatement Measure (URAM) Plan pursuant to the MCP, and which is staged off-site may be re-used within fourteen (14) calendar days of excavation. Any material which is suitable for re-use as ordinary borrow, based on analytical results and could have been placed on site, but was not, due to Contractor delay (i.e. analytical results were not available within 10 days following excavation) will be disposed in accordance with the applicable regulations by the Contractor at no cost to the Owner.

G. Soil and fill material that is managed under a URAM Plan pursuant to the MCP, which is staged off-site and which is determined at the staging area to be characteristically hazardous may be treated (stabilized) within the "Area of Contamination" only and must be reused with 14 days or disposed of within ninety (90) calendar days of excavation. No treatment may occur at the staging area. Pursuant to the MCP and RCRA, hazardous Remediation Waste (e.g., Hazardous soils) shall be removed from the site within 90 days. All other Remediation Waste (e.g., Contaminated soils) shall be removed within 120 days unless exceptions identified at 310 CMR 40.0031(7) apply.

H. Contaminated and Hazardous excavated soils shall be completely covered and secured in accordance with this. Soils exhibiting evidence of potential contamination including but not limited to odors and/or staining shall be covered prior to characterization and off-site reuse or disposal.

I. The Contractor shall be responsible to inform the Owner if hazardous waste disposal will not be performed within 90 days of hazardous waste characterization. This notification shall take place a minimum of 30 days prior to the 90-day deadline. No hazardous waste stockpiled at the site shall remain on site more than 90 days after it is characterized. In accordance with 310 CMR 40.0031, all other Remediation Waste shall not remain on site or temporary off-site storage location more than 120 days from initial date of generation.

J. Transporters of solid wastes that include, but are not limited to, contaminated soil/fill (including OHM-contaminated soil), construction and demolition debris non-hazardous laboratory wastes, bottles, tires, metal parts, tree stumps, brush, and grass cuttings will utilize trucks or dumpsters specifically designed to ensure that material, dust, or liquid is not released in transit. No truck shall be allowed to exit the site until all free liquids are drained from soil being transported off-site. Moisture content of the soil/waste shall be reduced by the Contractor, to or below

the maximum acceptance limits required by the disposal facility. Material shall be covered at all times. The vehicle in which the waste is transported shall be driven directly to the intended destination without any stops or detours in between, except those necessary in response to road conditions, vehicle service needs, or emergencies. Discharge or release of material during transport shall be immediately reported to the Owner. Transporters shall clean up any discharge that occurs in transit, at the Contractor's expense.

K. Manifesting of solid waste shall be required and shall include at a minimum: vehicle identification; date of loading and disposal; tonnage, as measured at the disposal site; and signature of the Owner and/or its representative, transporter, and disposal facility's representative. Transportation of the wastes shall be accompanied by the appropriate manifests such as a MassDEP Bill of Lading, as required in the Code of Massachusetts Regulations (CMR) 310 CMR 40.0030, a Material Shipping Record or by a Uniform Hazardous Waste Manifest. The original shall be returned to the Owner, and/or their representative, within ten (10) working days of disposal.

3.4 STAGING AREAS AND STOCKPILING

A. Prior to disposal, the Contractor shall maintain segregated excess excavated soil and waste stockpiles in conformance with all applicable federal, state and local waste disposal regulations. No staging of asbestos materials or asbestos containing soils shall be allowed except at the direction of the Owner.

B. The Contractor's staging area shall be large enough to store equipment, materials and all stockpiled soils. The Contractor shall protect the staging area from contamination due to excavating, handling, storing and disposing of hazardous materials.

C. Stockpiled soils determined to be Contaminated or Hazardous, as described herein, shall be securely covered at the close of each day and continuously when not being added to or otherwise being handled by the Contractor. Stockpiles shall also be covered at times as directed by the Engineer.

D. Stockpiles of soils that are known or suspected to be hazardous within the soil staging areas shall be placed on a 20-mil HDPE liner/filter fabric and bermed to minimize the potential for contamination release. Each soil category shall be staged in separate areas with barriers to keep different soil types from mixing. Waste characterized as RCRA hazardous waste or other Hazardous soils shall not be stored on site for a period greater than ninety (90) days. All other waste, including Unregulated or Contaminated soils, must be disposed of off-site within 120 days of excavation. At the end of each working day, contaminated soils will be covered with 10-mil polyethylene to minimize the potential for release of contaminants.

E. Covers on stockpiles of soils that are known or suspected to be hazardous shall be secured with tires, ropes, anchors or equivalent material. The cover system shall be capable of resisting actual wind gusts at the site, with a minimum wind capacity of 40 miles per hour. The stockpile covers shall be installed and secured at the end of

each working day and at all times when earthwork is not taking place on site. Stockpile covers shall be immediately re-covered should wind forces expose any of the excavated materials. Failure to adequately protect the stockpiles may result in non-payment.

F. Stockpiles are to be segregated based on visual, olfactory, and field screening results. Similar material may be stockpiled together. Each stockpile must be clearly separated from adjacent stockpiles.

G. Stockpiles will be clearly designated by a sign post or marker which can be cross-referenced with samples collected from the pile for characterization purposes. The signs/markers are not to be moved, except by authorized personnel and not until the soil is ready to be either reused on site or loaded for off-site disposal.

H. Unknown, potentially hazardous soils/debris and drummed materials encountered during the project shall be located in a separate bermed location. The Contractor's Soil and Waste Management Plan shall provide construction details of the dimensions and protective measures proposed for the staging area(s). The construction details and protective measures are subject to the approval of the Owner and/or its representatives. The Contractor shall select the area to facilitate handling of the material and to minimize interference with other ongoing construction activities. The Owner or Engineer must agree with the location prior to construction. In the event that excavation is conducted near storm water drainage basins or inlet manholes, the Contractor must protect the drainage structures with filter fabric or provide similar protection to prevent sediment loading and migration of contaminated soils and sediments.

I. If the soil storage area consists of an unimproved or otherwise pervious surface, and soil to be stockpiled is known or suspected to be contaminated, the Contractor shall install a lining of 6-mil (or greater) polyethylene, to protect the soil from the potential of intermixing with existing subsurface soils.

J. Stockpiles shall be no greater than 250 cubic yards in volume. If space constraints, etc. make it infeasible to maintain separate stockpiles of soils to 250 cubic yards, the Waste Management Plan shall include a map with the locations of the composite samples for each stockpile shall be provided to the Resident Engineer prior to the submittal of the samples to the off-site analytical laboratory. This will allow any portion of the stockpile, which came back as contaminated soil to be properly segregated and managed separately

K. Stockpiles shall be established and maintained as per EPA requirements under the Construction General Permit Section 2.1.2.4. Requirements include the following.

   a. Locate the piles outside of any natural buffers and physically separated from other storm water controls;

   b. Protect from contact with storm water (including run-on) using a temporary perimeter sediment barrier;

c. For all soils, provide cover or appropriate temporary stabilization to minimize sediment discharge and to contain and securely protect from wind; nevertheless, the Contractor shall provide cover for any stockpiles containing contaminated soils as specified herein;

d. Do not hose down or sweep soil or sediment accumulated on pavement or other impervious surfaces into any storm water conveyance (unless connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water; and

e. Unless infeasible, contain and securely protect from wind.

3.5 HAZARDOUS WASTES

A. Transporters of hazardous wastes shall be in conformance with Code of Federal Regulations (CFR) 40 CFR, Part 171, all other federal laws and regulations and 310 CMR 30.400, and all other state laws through whose boundaries the waste material is being transported. The transporter shall provide copies of its EPA identification number, Massachusetts transporter's license, and proof of driver training in transporting hazardous waste.

B. The disposal site shall be in conformance with 40 CFR, Part 264 and relevant laws of the state in which the facility is located. The Contractor shall provide copies of the disposal facility’s EPA and state treatment and disposal permit.

C. Manifesting of hazardous wastes shall be in conformance with 40 CFR, Part 264, Subpart E, 310 CMR 30.310 and 310 CMR 30.405.

D. Actual quantities which are subject to unit rates shall be tabulated by the Contractor and verified by the Engineer on a daily basis. The Contractor shall not be reimbursed for unit rate work performed without the prior approval of quantities by the Engineer.

3.6 EQUIPMENT AND PERSONNEL DECONTAMINATION

A. Equipment and personnel decontamination facilities shall be provided by the Contractor when hazardous materials are expected to be encountered and handled onsite. Equipment and personnel decontamination area(s), conforming with the Contractor's HASP and these Specifications, will be constructed in such a manner to protect existing site surfaces, materials, and structures from contamination. The equipment decontamination area(s) will be sized adequately to provide for the decontamination of the largest piece of equipment to be decontaminated. Filter fabric will be placed over an impermeable liner to protect the liner from rips, punctures, or tears from traffic and heavy equipment.

B. The Contractor shall establish a site-specific decontamination protocol and decontamination areas for personnel and equipment utilized at the subject site. Personnel and equipment decontamination shall be conducted in compliance with the HASP.

C. The decontamination protocol shall include (i) the means, methods, and materials for the proposed decontamination procedures; (ii) the procedures employed to contain and store the wash or rinse liquids/sludges; (iii) procedures used to sample, analyze, and characterize the contaminated wash or rinse liquids/sludges; (iv) procedures to contain or clean contaminated equipment and PPE; and (v) the procedures for handling and disposing of solid wastes generated from site decontamination activities. All sample analysis shall be completed by a certified laboratory. The Contractor shall be responsible for the cost of this analytical work. The Contractor shall submit a copy of the analytical results and laboratory certifications to the Owner for review prior to proceeding with disposal. The Contractor shall be responsible to properly manifest and dispose of all residual wastes generated from on-site activities in conformance with federal, state, and local environmental and transportation regulations. The Contractor shall be responsible for the manifests and procedures to be used to package and dispose of contaminated solid wastes, wash, or rinse liquids at an EPA or state-approved treatment or disposal facility. The Contractor shall be responsible for any releases from site or decontamination activities due to its work, and will remediate any release for which the Contractor is responsible to pre-existing conditions at the Contractor's expense.

D. Provisions for collecting decontamination water will be incorporated into the maintenance of the decontamination pad and will include placing an impermeable liner over a sloped surface such that water is directed, if necessary, into an area for subsequent pumping to 55-gallon drums or other appropriate tankage. Following completion of the work, the wash water shall be characterized by the Contractor and disposed off-site, in accordance with federal, state, and local regulations.

3.7 ENVIRONMENTAL FIELD MONITORING / DUST CONTROL

A. The air monitoring program is to be designed to protect public health and the environment from the potential generation of dust and contaminant release during work. All personnel shall be made aware of the potential hazards and be informed of air monitoring information by the Contractor.

B. Dust control measures shall be implemented by the Contractor during all soil handling operations, loading and transport of waste material from the site in accordance with the Contractor's Dust Control Plan.

C. Air monitoring shall occur when excavating or handling soils that are known or suspected to be hazardous or contain OHM. The Contractor shall keep accurate documentation of all air monitoring, which will be made available to the Engineer or Owner upon request.

1. At a minimum, the air monitoring shall include daily monitoring and documentation of one upwind, and two downwind conditions during periods of activity on the site and when there is a potential for dust being generated on the site. The air monitoring information including air monitoring in the vicinity of all site activities shall also be utilized for establishing levels of personal protection measures in the Contractor's Site Specific Health and Safety Plan.

The Contractor shall submit his/her air quality monitoring program for review and approval prior to commencement of site activities.

2. Air monitoring shall include headspace analyses in a jar or plastic bag performed using a portable photoionization detector or other appropriate instrument for the anticipated conditions. The Contractor shall be responsible for properly calibrating the instrument each day and recording the calibration in a daily log which shall include the following information:

   a. Name of device or instrument calibrated.

   b. Date of calibration.

   c. Results of calibration.

   d. Name of person performing the calibration.

   e. Identification of the calibration gas.

3. The Contractor is responsible for providing fully charged instrument(s) at the start of each work day.

4. When applicable, field screening samples shall be taken from numerous locations within the excavation. Samples shall be taken from any area that appears to be visibly contaminated or where an odor is noted.

D. If there are indications of contamination, the frequency of air monitoring will be determined by an Industrial Hygienist or competent environmental health professional. The Contractor's Site Health and Safety Officer and Superintendent will be responsible for assuring that monitoring is conducted in an appropriate manner, and that work practices, engineering controls and/or Personal Protective Equipment are proper for the conditions.

E. Dust shall be controlled during excavation of soil/fill waste material to limit potential spread of contaminants and potential exposure of contaminants to workers and the public.

F. During construction, real-time dust monitoring shall be conducted under windy and/or excessively dry working conditions or when directed by the Engineer. The monitoring shall consist of total dust testing using MIE, INC. MINIRAM PDM-3 DUST MONITORS, or like instruments. The total dust criteria at the site shall conform to the requirements of the HASP. Should fugitive dust quantities exceed 20 percent of the ambient level or action levels indicated within the HASP, the Contractor shall perform additional measures to reduce the total dust concentrations.

G. Nuisance dust levels shall be reduced by pre-wetting the surface soils and by establishing and maintaining clean access roads. The Contractor's Dust, Vapor, and Odor Control Plan shall describe the procedures and materials to minimize dust. At a minimum, the Contractor shall provide clean water, free from salt, oil, and other deleterious materials.

H. Areas of exposed earth to be excavated shall be lightly sprayed with water before excavation if there is potential for nuisance dust generation. Additional water spray

may be utilized only when any indication of excessive dust is observed. To the extent feasible, the Contractor shall minimize the use of water within the limits of excavation.

I. Unimproved access roads shall be sprayed with water on a regular basis to minimize the generation of dust.

J. All containers temporarily storing waste material shall be covered at all times except as necessary to place waste material into the container. The Contractor shall monitor the covers daily to ensure the covers are in place and effectively eliminating the generation of dust and make appropriate notes in the site log.

3.8 VAPOR AND ODOR CONTROL

The Contractor shall provide the materials and labor to control objectionable vapors and odor in accordance with the Contractor's SWMP. The Contractor shall limit the exposure area and shall cover the exposure area with synthetic reusable covers, lime, foam suppressants, or other methods to reduce off-site odors to acceptable levels. The Contractor shall not use soil suitable for on-site reuse as cover to control vapor and odors.

3.9 BULKING

Following characterization and compatibility testing of waste material, the Contractor shall place compatible materials into common containers to reduce transport and disposal costs, when practicable and with the approval of the Engineer. In addition, materials that are improperly contained shall be transferred into the appropriate containers. Drums and containers used during this project shall meet the appropriate DOT, OSHA, and U.S. EPA regulations for the materials contained. The Contractor shall describe the bulking procedures in the Soil and Waste Management Plan.

3.10 CONTAMINATED LIQUIDS

The Contractor shall collect and properly dispose of contaminated liquids and other liquids generated or encountered on site during construction. Contaminated liquid sources include decontamination water, and drummed liquids encountered during excavation. The Contractor shall be responsible for treating and disposing of contaminated groundwater as required by applicable regulations and SECTION 02140 DEWATERING.

3.11 STORMWATER CONTROL

The Contractor shall protect all work from erosion while onsite. The Contractor shall divert all stormwater from work areas that may contain oil or hazardous materials (OHM). Stormwater that may contact OHM, polychlorinated biphenyls (PCBs), lead, asbestos or other types of impacted soil shall be collected within the immediate area of the contact, treated (as determined by sampling and testing) and disposed of in accordance with all local, state and federal regulations. Stormwater that is collected, stored onsite and sampled shall be tested and characterized for determining proper transportation, disposal and/or discharge in accordance with SECTION 02140 DEWATERING.

3.12 BACKFILLING AND COMPACTION

Excavated areas shall be backfilled with appropriate backfill material (including excavated material suitable for reuse and, when necessary, imported off-site material) as specified in SECTION 02210 - EARTH EXCAVATION, BACKFILL, FILL AND GRADING.

3.13 CLEANUP

During the course of the work, the Contractor shall keep the Site and his operations clean and neat at all times. He shall dispose of all residue resulting from the site clearing operations; and at the conclusion for the day's Work, he shall remove and haul away any surplus materials, lumber, equipment, temporary structures, and any other refuse remaining from the site clearing operations and shall leave the entire site in a neat and orderly condition.

Sample Waste Stream Disposal Summary Table

Material Type	Pre-Approval by Receiving Facility	Testing/ Analysis	Transportation Documentation	Proposed Receiving Facility/Facilities
Asbestos Containing Material (ACM)	Required	Not required	WSR	
Asbestos Cement Pipe (ACP)	Required	Not required	WSR	
Unregulated Soils	Required	Required	MSR	
Impacted/Regulated Soils	Required	Required	BOL	
Hazardous materials	Required	Required	HWSM	
Catch basin cleanings	Required	Required	WSR	
Street Sweepings	Required	Not required	WSR	
Contaminated Dewatering liquids	Required	Required	BOL	
Uncontaminated dewatering liquids	Required	Not required	Not required	
Sanitary Sewerage	Not required	Not required	Not required	
Asphalt, Brick and Concrete Material (ABC)	Not required	Not required	MSR, MassDEP notification form if crushed	
Construction Debris	Not required	Not required	Not required	
Vegetation	Not required	Not required	Not required	
Municipal Solid Waste	Not required	Not required	Not required	
Recyclable Materials	Not required	Not required	Not required	

END OF SECTION 02080

SECTION 02140

DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

1.2 RELATED WORK

A. Section 02145 – TEMPORARY WATER MANAGEMENT

1.3 DESCRIPTION

A. Dewatering consists of the removal of surface water and/or groundwater as necessary to perform the construction required by the Contract in accordance with the drawings and specifications. Furnish all labor, materials, equipment, and incidentals required to:

1. Design, furnish, operate, maintain, and remove temporary dewatering systems of sufficient scope, size and capacity to control hydrostatic pressures and to lower, control, remove and dispose of groundwater and surface water to maintain stable, undisturbed subgrades, and allow work to be performed under dry and stable conditions, and comply with all applicable permit and other regulatory requirements.

2. Work to be done as part of dewatering includes, but is not limited to:

a. The construction contractor will divert existing flows across the stream section being restored utilizing approved means and methods in accordance with the performance specifications included in the construction bid documents. Work will commence upon installation of approved erosion and sedimentation controls including siltation curtains.

Dewatering is anticipated within the contractor's work zone in-stream and will be performed in accordance with an approved dewatering plan that meets the requirements of the technical specifications.

b. Control hydrostatic pressure.

c. Prevent surface water from entering the excavation during construction.

d. Implement erosion and sedimentation control measures. Continuously monitor and maintain dewatering operations to ensure erosion control,

stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.

e. Prevent surface water from entering excavations by grading, dikes, or other means.

f. Provide system to treat/settle all water removed from excavations, except water that is infiltrated into the ground on-site in a manner that does not result in negative on- or off-site impacts.

g. Provide an Environmental Site Professional/Dewatering Specialist/Field Representative (hereinafter referred to as the Dewatering Professional) who will be responsible for dewatering, infiltration, treatment and discharge of dewatering flows as specified and in compliance with all applicable permits and regulations.

h. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.

i. Remove dewatering system when no longer required for work activities.

3. Uncontaminated groundwater or accumulated surface runoff removed from excavations shall be infiltrated to the ground if feasible, by means of a temporary infiltration trench or basin. The temporary infiltration trench or basin must be: 1) open to the surface or "open-air"; and 2) wider than it is deep. Otherwise, the Contractor must obtain an Underground Injection Control (UIC) permit from the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Resource Protection (BRP) in accordance with 310 CMR 27.00.

   Surface flow that could lead to off-site discharge is not permitted. If ground infiltration is not feasible, treated water shall be directly or indirectly discharged to a surface water in accordance with a National Pollutant Discharge Elimination System (NPDES) permit issued by the U.S. Environmental Protection Agency (EPA). If neither ground infiltration nor surface water discharge is feasible, treated water shall be discharged to the local sewer system in accordance with the appropriate permits and regulations or transported off-site to an approved facility. In no case shall dewatering flows be directly or indirectly released to surface waters or storm drains prior to settling and, if appropriate, any additional treatment. The Contractor is responsible for acquiring all proper permitting required for the chosen method of discharge.

4. If work is expected to be conducted within soil or groundwater affected by oil or hazardous materials, or if the groundwater appears to be impacted, prior to any discharge, the groundwater or accumulated surface runoff shall be sampled and tested to meet the requirements of the NPDES Remediation General Permit, or other permit requirements if an alternative discharge/disposal method (e.g., discharge to sanitary sewer, off-site disposal) is selected by the Contractor. The Contractor is responsible for coordinating the selected method of permitting and discharge or disposal with the Owner's Licensed Site

Professional (LSP) to meet the applicable requirements of the Massachusetts Contingency Plan (310 CMR 40.0000).

Upon sampling, testing and characterization of groundwater or accumulated surface runoff, proper treatment or disposal of ground water or accumulated surface runoff shall be determined. Treatment, discharge or disposal of groundwater shall be in accordance with all applicable regulations and shall be approved by the Engineer and Owner prior to final discharge or disposal.

B. Related Sections:
   a. SECTION 02210: EARTH EXCAVATION, BACKFILL, FILL, AND GRADING

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer registered in the Commonwealth of Massachusetts, using performance requirements and design criteria indicated. All costs for delegated design shall be included in the bid price for the Work of this Section.

B. Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Designer, at no additional cost to the Owner. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be continuous to protect the work and/or to maintain satisfactory progress.

C. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and storm water management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

D. The presence of groundwater in soil will not constitute a condition for which an increase in the Contract price may be made. Under no circumstances place concrete, fill lay piping or install appurtenances in excavations containing free water.

E. The Contractor shall furnish and operate pumps and related equipment, including standby equipment, and all necessary piping to keep all excavations clear of surface, rain or groundwater during the operations, the water at all times and shall be responsible for any damage to the subgrade, completed work or adjacent properties from such water. All piping exposed above surface for this use shall be properly covered to allow traffic to pass without obstruction. Prevent erosion and siltation of surrounding area.

F. The Contractor is responsible for correcting any disturbance of natural bearing soils, compacted fills or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the dewatering system as specified.

1.5 SUBMITTALS

Submit the following in accordance with SECTION 01300 –SUBMITTAL PROCEDURES:

A. Shop Drawing: For dewatering system. Show arrangement, locations, and details of filters, pumps, power units and discharge lines; means of discharge; control of sediment and disposal of water.

B. Qualifications of the both the Contractor's dewatering specialist or firm (design) and the Dewatering Professional (all other responsibilities) shall be submitted for approval prior to execution of any dewatering. The submittal shall include, but is not limited to:

1. Qualifications of firm's Registered Professional Engineer as specified in Section 1.5, B.
2. Qualifications of the Dewatering Professional who shall oversee the installation, operation and maintenance of the dewatering system.

C. Submit a Dewatering Plan including design calculations prior to start of any dewatering operation. The submittal will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy, regulatory compliance, and safety of the means, methods and sequencing of construction activities related to dewatering. The plan shall include the following items as a minimum:

1. Dewatering Plan and details stamped and signed by a Massachusetts Registered Professional Engineer that conforms to the requirements of the dewatering permit(s), the Wetlands Protection Act Order of Conditions, and all other applicable regulations and permits including, but not limited to, requirements for equipment, monitoring, sampling and reporting.
2. A list of equipment including, but not limited to, pumps, prime movers, and standby equipment.
3. A description of the proposed method of dewatering, water infiltration, containment, treatment discharge and disposal; and installation, maintenance, and system removal procedures.
4. A description of erosion/sedimentation control measures and best management practices to eliminate or minimize impacts from potential pollutants.
5. Contractor shall submit a modified Dewatering Plan **within 24 hours**, if open pumping from sumps and ditches results in boils, loss of fines, softening of the ground or other adverse impacts on or off-site.

D. Field quality control reports. Data for the required discharge reports, as applicable, shall be collected and maintained by the Contractor's Dewatering Professional. It shall consist of periodic sampling and analysis of system influents, midfluents and/or effluents and discharge quantities and other requirements of the relevant permits. The Contractor's Dewatering Professional shall also coordinate analysis of samples at an appropriately certified analytical laboratory and shall comply with all permit reporting requirements.

E. Other Informational Submittals: Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

1.6 QUALITY ASSURANCE

A. PROVIDE IN ACCORDANCE WITH SECTION 01400 AND AS SPECIFIED.

B. Employ the services of a Dewatering Professional and a Massachusetts Registered Professional Engineer having the following qualifications:

1. The Massachusetts Registered Professional Civil Engineer shall have completed the design of at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years consisting of deep wells, well points, vacuum well points, and sump pumping for heavy Civil projects of similar size, type, and complexity in developed areas with trench box or steel/timber sheeting support of excavation systems.

2. The dewatering system installer's Supervisor shall have a minimum of five (5) years of experience in installation of well points, deep wells, recharge systems, or equal systems.

3. The Dewatering Professional responsible for day to day operation of the system shall have the following minimum qualifications:

a. Completion of at least five (5) successful dewatering projects of equal size and complexity with equal systems within the last five (5) years consisting of: system operation and troubleshooting, collection of readings, maintenance of logs and other required documents, collection of samples, coordination of analysis of samples, and compliance with reporting requirements during pumping for heavy Civil projects of similar size, type, and complexity in developed areas.

b. Current certification from MassDEP to operate the proposed treatment system, as applicable.

C. If subgrade soils are disturbed or become unstable due to dewatering operation or an inadequate dewatering system, notify the Engineer, stabilize the subgrade, and modify system to perform as specified at no additional cost to the Owner.

D. If oil and/or other hazardous materials are encountered after dewatering begins, immediately notify the Engineer.

1.7 PROJECT/SITE CONDITIONS

A. Subsurface Investigations: Refer to Section 02010.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown, at least one (1) pump for every five (5) used.

B. Provide dewatering equipment, including an appropriately sized settling tank, and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the Dewatering Plan.

C. Provide temporary pipes, hoses, flumes, channels, crushed stone, geotextile fabric, sedimentation barriers, or any combination of equipment for the transport of discharge water over-ground to the discharge location.

D. Provide sampling and analysis equipment to test for turbidity.

PART 3 - EXECUTION

3.1 GENERAL

A. Execution of any earth excavation, installation of earth retention systems, and dewatering shall not commence until the related submittals have been submitted, approved by the Owner and Engineer, and the Dewatering Professional is on site and has begun the duties specified herein.

B. Furnish, install, operate, and maintain dewatering, ground infiltration, treatment and discharge systems as indicated or specified and in accordance with the Dewatering Plan. Delays due to insufficient storage capacity, inadequate Contractor Dewatering Plan, or permitting delays will be at no additional cost to the Owner. The Contractor is responsible to evaluate available data and determine the necessary dewatering system so as not to impede construction activities.

C. Carry out dewatering program in such a manner as to prevent undermining or disturbing foundations of existing structures or of previously completed or ongoing work.

D. Do not excavate below the seasonal high groundwater elevation until the dewatering system is operational.

E. Unless otherwise specified, continue dewatering uninterrupted until all structures, pipes, and appurtenances below the seasonal high groundwater level have been

completed and sufficiently backfilled and/or anchored such that they will not be floated or otherwise damaged by an increase in groundwater elevation.

F. Discontinue open pumping from sumps and ditches, if such pumping is resulting in boils, loss of fines, softening of the ground, instability of the slopes or other adverse impacts on or off-site. Modify the Dewatering Plan and submit to the Engineer at no additional cost to the Owner.

G. Where subgrade materials are disturbed or become unstable due to dewatering operations, remove and replace the materials at no additional cost to the Owner.

3.2 DEWATERING DISCHARGE

A. Groundwater or accumulated surface runoff to be infiltrated does need not be treated, unless known to be contaminated or noticeably impacted with oil or hazardous waste. Contractor shall provide infiltration as described in Section 1.2.A.3 that complies with relevant local, state and federal regulations.

B. The effluent (discharge) shall be tested for turbidity on a daily basis and shall not exceed 280 NTU, averaged over 5 consecutive days. Sufficient measures shall be employed to provide effective ways to remove turbidity, color and potential coliform organisms (from sewer work) prior to discharge

C. Transport pumped or drained water to discharge location in compliance with applicable permits and without interference to other work; damage to or contamination of pavement, other surfaces, or property; erosion; or siltation.

D. Provide separately controlled pumping lines.

E. Immediately notify the Engineer and Owner if groundwater is encountered that is suspected to be contaminated with substances other than those for which the treatment system has been designed. Do not pump water found to be contaminated with oil or other hazardous material to the discharge locations. Sampling, testing and characterization of the groundwater shall include (but not be limited to) criteria within part 1.2 of this specification section to determine the final disposal of the groundwater. Groundwater disposal shall follow all local, state and federal permits and regulations.

3.3 COMPLIANCE WITH DEWATERING AND RELATED PERMITS AND REGULATIONS

A. Discharging groundwater and allowing for natural infiltration may not be a viable option for controlling groundwater in the project area. Should dewatering activities be required where the Contractor needs to discharge groundwater to a location other than the point of origin, then the Contractor shall store, treat and discharge the water in accordance with applicable permits and regulations. Periodic sampling, as may be required to demonstrate treatment effectiveness and compliance with pretreatment standards specified in any local, state, or federal discharge permit required shall be the responsibility of the Contractor and its Dewatering Professional. If on-site

infiltration, discharge to the local sanitary sewer system or off-site disposal are not feasible options, the Contractor shall be responsible for seeking coverage under one of the following EPA NPDES permits: Construction General Permit (CGP) for projects disturbing >1 acre; Dewatering General Permit (DGP) for projects disturbing <1 acre; or Remediation General Permit (RGP) for any project with known groundwater contamination. The Contractor shall be prepared to comply with standard local permit conditions including periodic testing of the effluent and with standard NPDES permit conditions including periodic testing of the treatment system influent, midfluent and effluent. The Dewatering Plan shall include a description of procedures and information related to the collection of readings, maintenance of logs and other required documents. At a minimum, the Dewatering Plan shall describe compliance with relevant provisions of the applicable NPDES Permit or other discharge permit and the local Conservation Commission Order of Conditions. Copies of the applicable NPDES or other permit authorization to discharge shall be provided to the Owner prior to the start of dewatering activities.

B. The Contractor, through its Dewatering Professional:

1. Shall furnish all labor, equipment and materials necessary to obtain accurate representative samples of the groundwater and for analysis for the set of analytical parameters specified above and as required by local, state and federal permits and regulations.

2. Shall coordinate sampling activities with the Engineer. The Engineer reserves the right to sample treated and untreated dewatering flows at any time.

3. Shall take readings from the treatment system in accordance with the Dewatering Plan.

4. Shall collect an initial sample of untreated and treated groundwater at the beginning of dewatering activities within the construction area. Sampling and start-up shall be conducted in accordance with applicable permits.

5. Shall prepare and keep in proper order all records required by regulatory authorities and permits.

6. Shall maintain logs and other records in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan.

7. Shall coordinate analysis of samples by an appropriately certified analytical laboratory in accordance with the Specifications, regulatory agency and permit requirements, and the Dewatering Plan, and ensure that laboratory detection limits meet permit requirements.

8. Shall comply with reporting requirements in a timely manner and in the format required by the relevant permit. Reporting in compliance with permit requirements includes, but is not limited to: notification to the appropriate regulatory agencies, Owner and Engineer prior to discharge; submittal of laboratory analytical reports for each sampling event; submittal of reports for each reporting period during which no discharge occurs; notification of non-compliant discharges; notification of termination of discharge; and response to

permit-related questions posed by regulatory agencies or the Owner and Engineer.

a. If water will be discharged under a National Pollutant Discharge Elimination System (NPDES) permit, submit notifications and reports to both the Environmental Protection Agency (EPA) and the appropriate regional office of the Massachusetts Department of Environmental Protection (MassDEP) and the Engineer. Comply with pre-discharge notification, discharge reporting, notification of no discharge, and termination of discharge notification requirements; and respond to inquiries or correspondence from EPA or MassDEP regarding permit issues.

b. If water will be discharged under a local permit, submit notifications and reports as required in the permit.

c. Observe and record daily the elevation of the groundwater during the length of the dewatering operation and provide data to Engineer on daily basis. For monthly or less frequent reporting deadlines, provide the Engineer with copies of all reports fourteen (14) days prior to the reporting deadline, and submit reports to the appropriate agency(ies). Provide copies of other dewatering documents to the Engineer immediately.

9. Install and maintain erosion/sedimentation control devices at the point of discharge as indicated or specified and in accordance with the Dewatering Plan.

10. The Contractor shall obtain all federal, state, county, and local permits and variances to allow transport of materials on public roadways, should such transport be necessary.

11. The Contractor shall dispose of all wastes resulting from construction dewatering activities in accordance with local, federal and state regulations.

12. The Contractor is solely responsible for the implementation of the permit requirements, and is solely responsible for any punitive action resulting from any violation of the permit. The actual permit issued shall become part of this Contract by either addendum or by change order. If the actual permit is included by change order, no additional costs for implementing the permit will be considered by the Owner, when the actual permit is issued.

3.4 REMOVAL

A. Do not remove dewatering system without written approval from the Engineer.

B. Backfill and compact sumps or ditches with crushed stone wrapped with geotextile fabric in accordance with SECTION 02210.

C. All dewatering wells shall be abandoned upon completion of the work, and completely backfilled with cement grout.

END OF SECTION 02140

SECTION 02145

TEMPORARY WATER MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

1.2 RELATED WORK

A. Section 02140 – DEWATERING

1.3 DESCRIPTION

A. Temporary water management or stream diversion consists of the removal of surface water as necessary to perform the construction required by the Contract within Sucker Brook in accordance with the drawings and specifications. Furnish all labor, materials, equipment, and incidentals required to:

1. Design, furnish, operate, maintain, and remove temporary dewatering systems of sufficient scope, size and capacity to control hydrostatic pressures and to lower, control, remove and redirect stream flows to allow work to be performed under dry and stable conditions, and comply with all applicable permit and other regulatory requirements.

2. Work to be done as part of temporary water management includes, but is not limited to:

a. The construction contractor will divert existing flows across the stream section being restored utilizing approved means and methods in accordance with the performance specifications included in the construction bid documents. Work will commence upon installation of approved erosion and sedimentation controls including siltation curtains.

Temporary water management is anticipated within the contractor's work zone in-stream and will be performed in accordance with an approved Temporary Water Management/Brook Diversion Plan and Schedule provided by the contractor that meets the requirements of the technical specifications.

b. Control hydrostatic pressure.

c. Prevent surface water from entering the excavation during construction.

d. Implement erosion and sedimentation control measures. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.

e. Prevent surface water from entering excavations by grading, dikes, or other means.

f. Provide system to treat/settle all water removed from excavations, except water that is infiltrated into the ground on-site in a manner that does not result in negative on- or off-site impacts.

g. Provide an Environmental Site Professional/Dewatering Specialist/Field Representative (hereinafter referred to as the Dewatering Professional) who will be responsible for dewatering, infiltration, treatment and discharge of dewatering flows as specified and in compliance with all applicable permits and regulations.

h. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.

i. Remove dewatering system when no longer required for work activities.

3. Aaccumulated stream flows shall be redirected to the existing stream channel downstream of the work zone in a fashion thar does not result in erosion or scour within the stream bed at the point of discharge. The contractor shall monitor weather conditions and adjust diversion practices as necessary during periods of higher than base flow conditions.

B. Related Sections:
   a. SECTION 01024: MEASUREMENT AND PAYMENT

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design diversion system, including comprehensive engineering analysis by a qualified professional engineer registered in the Commonwealth of Massachusetts, using performance requirements and design criteria indicated. All costs for delegated design shall be included in the bid price for the Work of this Section.

B. Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Designer, at no additional cost to the Owner. The Contractor's pumping and diversion operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. Pumping shall be conducted as needed to protect the work and/or to maintain satisfactory progress.

C. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Diverted stream flows shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

D. The Contractor shall furnish and operate pumps and related equipment, including standby equipment, and all necessary piping to keep all excavations clear of surface, rain or groundwater during the operations, the water at all times and shall be responsible for any damage to the subgrade, completed work or adjacent properties from such water. All piping exposed above surface for this use shall be properly covered to allow traffic to pass without obstruction. Prevent erosion and siltation of surrounding area.

E. The Contractor is responsible for correcting any disturbance of natural bearing soils, compacted fills or structures caused by an inadequate diversion system or by interruption of the continuous operation of the diversion system as specified.

1.5 SUBMITTALS

Submit the following in accordance with SECTION 01330 –SUBMITTAL PROCEDURES:

A. Shop Drawing: For diversion system. Show arrangement, locations, and details of filters, pumps, power units and discharge lines; means of discharge; control of sediment and diversion of water.

B. Qualifications of the both the Contractor's dewatering specialist or firm (design) and the Dewatering Professional (all other responsibilities) shall be submitted for approval prior to execution of any dewatering. The submittal shall include, but is not limited to:

1. Qualifications of firm's Registered Professional Engineer as specified in Section 1.5, B.

2. Qualifications of the Dewatering Professional who shall oversee the installation, operation and maintenance of the dewatering system.

C. Submit a Temporary Water Management/Brook Diversion Plan and Schedule including design calculations prior to start of any diversion operation. The submittal will be only for the information of the Owner and third parties for an overall understanding of the project relating to access, maintenance of existing facilities and proper utilization of the site. The Contractor shall remain responsible for the adequacy, regulatory compliance, and safety of the means, methods and sequencing of construction activities related to dewatering. The plan shall include the following items as a minimum:

1. Temporary Water Management/Brook Diversion Plan and details stamped and signed by a Massachusetts Registered Professional Engineer that conforms to the requirements of the dewatering permit(s), the Wetlands Protection Act Order of Conditions, and all other applicable regulations and permits

including, but not limited to, requirements for equipment, monitoring, and reporting.

2. A list of equipment including, but not limited to, pumps, prime movers, and standby equipment.

3. A description of the proposed method of diversion, containment, discharge; and installation, maintenance, and system removal procedures.

4. A description of erosion/sedimentation control measures and best management practices to eliminate or minimize impacts from potential pollutants.

5. Contractor shall submit a modified Temporary Water Management/Brook Diversion Plan **within 24 hours**, if open diversion results in unsatisfactory conditions as determined by the engineer or other adverse impacts on or off-site.

D. Field quality control reports. Data for the required diversion reports, as applicable, shall be collected and maintained by the Contractor's Dewatering Professional. It shall consist of periodic monitoring and any other requirements of the relevant permits.

E. Other Informational Submittals: Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by diversion operations.

1.6 QUALITY ASSURANCE

A. Employ the services of a Dewatering Professional and a Massachusetts Registered Professional Engineer having the following qualifications:

1. The Massachusetts Registered Professional Civil Engineer shall have completed the design of at least five (5) successful dewatering projects of equal size and complexity and with equal systems within the last five (5) years consisting of deep wells, well points, vacuum well points, and sump pumping for heavy Civil projects of similar size, type, and complexity in developed areas with trench box or steel/timber sheeting support of excavation systems.

2. The diversion system installer's Supervisor shall have a minimum of five (5) years of experience in installation of well points, deep wells, recharge systems, or equal systems.

3. The Dewatering Professional responsible for day to day operation of the system shall have the following minimum qualifications:

a. Completion of at least five (5) successful dewatering projects of equal size and complexity with equal systems within the last five (5) years consisting of: system operation and troubleshooting, collection of readings, maintenance of logs and other required documents, collection of samples, coordination of analysis of samples, and compliance with reporting requirements during pumping for heavy Civil projects of similar size, type, and complexity in developed areas.

b. Current certification from MassDEP to operate the proposed treatment system, as applicable.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The Temporary Water Management/Brook Diversion materials is anticipated to include measures to detain and capture stream flows and divert and return the water to the stream channel downstream of the work zone.

B. Provide and store auxiliary dewatering equipment, consisting of pumps and hoses on the site in the event of breakdown.

C. Provide dewatering equipment and maintain erosion/sedimentation control devices as indicated or specified and in accordance with the Temporary Water Management/Brook Diversion Plan.

PART 3 - EXECUTION

3.1 GENERAL

A. Execution of any dewatering shall not commence until the related submittals have been submitted, approved by the Owner and Engineer, and the Dewatering Professional is on site and has begun the duties specified herein.

B. Furnish, install, operate, and maintain system in accordance with the approved Temporary Water Management/Brook Diversion Plan. Delays due to insufficient storage capacity, inadequate Contractor Temporary Water Management/Brook Diversion Plan, or permitting delays will be at no additional cost to the Owner. The Contractor is responsible to evaluate available data and determine the necessary dewatering system so as not to impede construction activities.

C. Carry out diversion program in such a manner as to allow ongoing work to be free of surface water from stream flows.

3.2 REMOVAL

A. Do not remove diversion system without written approval from the Engineer.

B. All diversion material shall be removed upon completion of the work, and completely backfilled with cement grout.

END OF SECTION 02140

SECTION 02230

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The Contractor shall do all required clearing and grubbing as indicated on the drawings or herein specified in the area required for construction operations on the Owner's land or in the Owner's permanent or temporary easements and shall remove all debris resulting therefrom.

B. Unless otherwise noted, all areas to be cleared shall also be grubbed.

C. The Contractor shall not clear and grub outside of the area required for construction operations.

1.02 RELATED WORK:

Any trees and shrubs specifically designated by the Owner not to be cut, removed, destroyed, or trimmed shall be saved from harm and injury in accordance with Section 01570, ENVIRONMENTAL PROTECTION.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 - EXECUTION

3.01 CLEARING:

A. Unless otherwise indicated, the Contractor shall cut or otherwise remove all trees, saplings, brush and vines, windfalls, logs and trees lying on the ground, dead trees and stubs more than 1-foot high above the ground surface (but not their stumps), trees which have been partially uprooted by natural or other causes (including their stumps), and other vegetable matter such as shags, sawdust, bark, refuse, and similar materials.

B. The Contractor shall not remove mature trees (4-inches or greater DBH) in the Owner's temporary easements.

C. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and stubs to be cleared shall be cut as close to the ground as practicable but not more than 6-inches above the ground surface in the case of small trees, and 12-inches in the case of large trees. Saplings, brush and vines shall be cut close to the ground.

3.02 GRUBBING:

A. Unless otherwise indicated, the Contractor shall completely remove all stumps and roots to a depth of 18-inches, or if the Contractor elects to grind the stumps, they shall be ground to a minimum depth of 6-inches.

B. Any depression remaining from the removal of a stump and not filled in by backfilling shall be filled with gravel borrow and/or loam, whichever is appropriate to the proposed ground surface at no additional cost to the Owner.

3.03 DISPOSAL:

All material collected in the course of the clearing and grubbing, which is not to remain, shall be disposed of in a satisfactory manner away from the site or as otherwise approved. Such disposal shall be carried on as promptly as possible and shall not be left until the final clean-up period.

END OF SECTION

SECTION 02252

SUPPORT OF EXCAVATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This section of the specification covers wood sheeting and bracing for support of excavations. The requirements of this section shall also apply, as appropriate, to other methods of excavation support and underpinning which the Contractor elects to use to complete the work.

B. The Contractor shall furnish and place timber sheeting of the kinds and dimensions required, complying with these specifications, where indicated on the drawings or required by the Engineer.

1.02 RELATED WORK:

A. Section 02140, DEWATERING.

B. Section 02300, EARTHWORK.

1.03 QUALITY ASSURANCE:

A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the Massachusetts Department of Safety and Department of Labor, Division of Occupational Safety "Excavation & Trench Safety Regulation (520 CMR 14.00)" and "Rules and Regulations for the Prevention of Accidents in Construction Operations (454 CMR 10.0 et seq.)." Contractors shall be familiar with the requirements of these regulations.

B. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which it will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Timber sheeting shall be sound spruce, pine, or hemlock, planed on one side and either tongue and grooved or splined. Timber sheeting shall not be less than nominal 2-inches thick.

B. Timber and steel used for bracing shall be of such size and strength as required in the excavation support design. Timber or steel used for bracing shall be new or undamaged used material which does not contain splices, cutouts, patches, or other alterations which would impair its integrity or strength.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Work shall not be started until all materials and equipment necessary for their construction are either on the site of the work or satisfactorily available for immediate use as required.

B. The sheeting shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation, as required in Section 02140, DEWATERING.

C. The sheeting shall be driven by approved means to the design elevation. No sheeting may be left so as to create a possible hazard to safety of the public or a hindrance to traffic of any kind.

D. If boulders or very dense soils are encountered, making it impractical to drive a section to the desired depth, the section shall, as required, be cut off.

E. The sheeting shall be left in place where indicated on the drawings or required by the Engineer in writing. At all other locations, the sheeting may be left in place or salvaged at the option of the Contractor. Steel or wood sheeting permanently left in place shall be cut off at a depth of not less than two feet below finish grade unless otherwise required.

F. All cut-off will become the property of the Contractor and shall be removed by him from the site.

G. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at his expense.

H. The Contractor shall be solely responsible for repairing all damage associated with installation, performance, and removal of the excavation support system.

I. The Contractor shall use a trench box, sheeting or bracing to support the excavation in areas designated as wetlands.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall make excavations of normal depth in earth for trenches and structures, shall backfill and compact such excavations to the extent necessary, shall furnish the necessary material and construct embankments and fills, and shall make miscellaneous earth excavations and do miscellaneous grading.

1.02 RELATED WORK:

A. Section 00890, PERMITS

B. Section 01110, CONTROL OF WORK AND MATERIALS

C. Section 01570, ENVIRONMENTAL PROTECTION

D. Section 02071, GEOTEXTILE FABRICS

E. Section 02230, CLEARING AND GRUBBING

F. Section 02140, DEWATERING

G. Section 02252, SUPPORT OF EXCAVATION

H. Section 02920, LOAMING AND SEEDING

1.03 REFERENCES:

American Society for Testing and Materials (ASTM)

ASTM	C131	Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
ASTM	C136	Method for Sieve Analysis of Fine and Coarse Aggregates.
ASTM	C330	Specification for Lightweight Aggregate for Structural Concrete.
ASTM	D1556	Test Method for Density of Soil in Place by the Sand Cone Method.

ASTM D1557 Test Methods for Moisture-density Relations of Soils and Soil Aggregate Mixtures Using Ten-pound (10 Lb.) Hammer and Eighteen-inch (18") Drop.

ASTM D2922 Test Methods for Density of Soil and Soil-aggregate in Place by Nuclear Methods (Shallow Depth).

Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.

Code of Massachusetts Regulations (CMR) 310.40.0032 Contaminated Media and Contaminated Debris

Code of Massachusetts Regulations (CMR) 520 CMR 14.00 Excavation & Trench Safety Regulation

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Samples of all materials proposed for the project shall be submitted to the Engineer for review. Size of the samples shall be as approved by the Engineer.

1.05 PROTECTION OF EXISTING PROPERTY:

A. The work shall be executed in such manner as to prevent any damage to facilities at the site and adjacent property and existing improvements, such as but not limited to streets, curbs, paving, service utility lines, structures, monuments, bench marks, observation wells, and other public or private property. Protect existing improvements from damage caused by settlement, lateral movements, undermining, washout and other hazards created by earthwork operations.

B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at its own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing roads, sidewalks, and curbs damaged during the project work shall be repaired or replaced to at least the condition that existed at the start of operations. The Contractor shall replace, at his own cost, existing benchmarks, observation wells, monuments, and other reference points, which are disturbed or destroyed.

C. Buried drainage structures and pipes, observation wells and piezometers, including those which project less than eighteen inches (18") above grade, which are subject to damage from construction equipment shall be clearly marked to indicate the hazard. Markers shall indicate limits of danger areas, by means which will be clearly visible to operators of trucks and other construction equipment, and shall be maintained at all times until completion of project.

1.06 DRAINAGE:

A. The Contractor shall provide, at its own expense, adequate drainage facilities to complete all work items in an acceptable manner. Drainage shall be done in a manner so that runoff will not adversely affect construction procedures or cause excessive disturbance of underlying natural ground or abutting properties.

1.07 FROST PROTECTION AND SNOW REMOVAL:

A. The Contractor shall, at its own expense, keep earthwork operations clear and free of accumulations of snow as required to carry out the work.

B. The Contractor shall protect the subgrade beneath new structures and pipes from frost penetration when freezing temperatures are expected.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. GRAVEL BORROW:

Gravel Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.03.0, Type b.

B. CRUSHED STONE:

Crushed stone shall satisfy the requirements listed in MassDOT Specification SectionM2.01.

C. SAND BORROW:

Sand Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.04.0.

D. PEASTONE:

Peastone shall be smooth, hard, naturally occurring, rounded stone meeting the following gradation requirements:

Passing 5/8 inch square sieve opening	-	100%
Passing No. 8 sieve opening	-	0%

E. BACKFILL MATERIALS:

1. Class B Backfill:

   Class B backfill shall be granular, well graded friable soil; free of rubbish, ice, snow, tree stumps, roots, clay and organic matter; with 30 percent or less passing the No. 200 sieve; no stone greater than two-third (2/3) loose lift thickness, or six inches, whichever is smaller.

2. Select Backfill:

   Select backfill shall be granular, well graded friable soil, free of rubbish, ice, snow, tree stumps, roots, clay and organic matter, and other deleterious or organic material; graded within the following limits:

Sieve Size	Percent Finer by Weight
3-inch	100
No. 10	30-95
No. 40	10-70
No. 200	0-10

G. LIGHTWEIGHT FILL:

1. Lightweight Fill shall be rotary kiln expanded shale meeting all the requirements of ASTM C330. Particles shall be tough, durable, non-corrosive and have the following properties:

   Delivered Gradation:

Sieve Size	% Retained
1-inch	0
¾-inch	0 to 20
#4	85 to 100

   b. The dry loose unit weight shall be less than 55 PCF.

   c. The Contractor shall submit verification of a compacted density of less than 70 PCF. Density shall be verified by testing in accordance with Standard AASHTO Test Designation T99.

   d. The maximum soundness loss when tested with five cycles of magnesium sulphate shall be ten percent in accordance with ASTM C131.

   e. Moisture content shall be determined by the Engineer.

f. Provide manufacturer's certificate stating materials provided comply with the standards specified.

I. PROCESSED GRAVEL:

1. Processed gravel shall satisfy the requirements listed in MassDOT Specification Section M1.03.1.

2. Processed gravel shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

3. The gradation shall meet the following requirements:

Sieve Designation	Percentage Passing
3-in.	100
1 ½-in.	70-100
¾-in.	50-85
No. 4	30-60
No. 200	0-10

4. The approved source of bank-run gravel material shall be processed by mechanical means. The equipment for producing crushed gravel shall be of adequate size with sufficient adjustments to produce the desired materials. The processed material shall be stockpiled in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

J. STONE FILL FOR GABIONS:

1. The stone for gabions shall be hard, angular to round, durable and of such quality that they will not disintegrate on exposure to water or weathering during the life of the structure. Gabion rocks shall range between 4-inches and 8-inches. The range in sizes may allow for a variation of 5 percent oversize and/or 5 percent undersize rock, provided it is not placed on the gabion-exposed surface. The size shall be such that a minimum of two layers of rock must be achieved then filling the gabion.

PART 3 - EXECUTION

3.01 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION:

A. Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations, including restricting the use of certain types of

construction equipment and their movement over sensitive or unstable materials, dewatering and other acceptable control measures.

B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with a minimum 12-inch layer of compacted crushed stone wrapped all around in non-woven filter fabric. Costs of removal and replacement shall be borne by the Contractor.

C. The Contractor shall place a minimum of 12-inch layer of special bedding materials and crushed stone wrapped in filter fabric over the natural underlying soil to stabilize areas which may become disturbed as a result of rain, surface water runoff or groundwater seepage pressures, all at no additional cost to the Owner. The Contractor also has the option of drying materials in-place and compacting to specified densities.

3.02 EXCAVATION:

A. GENERAL:

1. The Contractor shall perform all work of any nature and description required to accomplish the work as shown on the Drawings and as specified.

2. Excavations, unless otherwise required by the Engineer, shall be carried only to the depths and limits shown on the Drawings. If unauthorized excavation is carried out below required subgrade and/or beyond minimum lateral limits shown on Drawings, it shall be backfilled with gravel borrow and compacted at the Contractor's expense as specified below, except as otherwise indicated. Excavations shall be kept in dry and good conditions at all times, and all voids shall be filled to the satisfaction of the Engineer.

3. In all excavation areas, the Contractor shall strip the surficial topsoil layer and underlying subsoil layer separate from underlying soils. In paved areas, the Contractor shall first cut pavement as specified in paragraph 3.02 B.1 of this specification, strip pavement and pavement subbase separately from underlying soils. All excavated materials shall be stockpiled separately from each other within the limits of work.

4. The Contractor shall follow a construction procedure, which permits visual identification of stable natural ground. Where groundwater is encountered, the size of the open excavation shall be limited to that which can be handled by the Contractor's chosen method of dewatering and which will allow visual observation of the bottom and backfill in the dry.

5. The Contractor shall excavate unsuitable materials to stable natural ground where encountered at proposed excavation subgrade, as required by the Engineer. Unsuitable material includes topsoil, loam, peat, other organic materials, snow, ice, and trash. Unless specified elsewhere or otherwise required by the Engineer, areas

where unsuitable materials have been excavated to stable ground shall be backfilled with compacted special bedding materials or crushed stone wrapped all around in non-woven filter fabric.

B. TRENCHES:

1. Prior to excavation, trenches in pavement shall have the traveled way surface cut in a straight line by a concrete saw or equivalent method, to the full depth of pavement. Excavation shall only be between these cuts. Excavation support shall be provided as required to avoid undermining of pavement. Cutting operations shall not be done by ripping equipment.

2. The Contractor shall satisfy all dewatering requirements specified in Section 02140 DEWATERING, before performing trench excavations.

3. Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes, and depths of cover indicated on the Drawings. Trench widths shall be as shown on the Drawings or as specified.

4. Where pipe is to be laid in bedding material, the trench may be excavated by machinery to, or just below, the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.

5. If pipe is to be laid in embankments or other recently filled areas, the fill material shall first be placed to a height of at least 12-inches above the top of the pipe before excavation.

6. Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed.

7. If, in the opinion of the Engineer, the subgrade, during trench excavation, has been disturbed as a result of rain, surface water runoff or groundwater seepage pressures, the Contractor shall remove such disturbed subgrade to a minimum of 12-inches and replace with crushed stone wrapped in filter fabric. Cost of removal and replacement shall be borne by the Contractor.

8. The Contractor shall obtain a trench permit from the municipality where the trench is located prior to making any excavations of trenches (any subsurface excavation greater than three (3) feet in depth and fifteen (15) feet or less between soil walls as measured from the bottom).

9. All trenches required to be permitted must be attended, covered, barricaded, or backfilled. Covers must be road plates at least ¾-inch thick or equivalent, barricades must be fences at least 6-feet high with no openings greater than 4-inches between vertical supports and all horizontal supports required to be located on the trench-side of the fencing.

C. BUILDING AND FOUNDATION EXCAVATION:

1. Excavations shall not be wider than required to set, brace, and remove forms for concrete, or perform other necessary work.

2. After the excavation has been made, and before forms are set for footings, mats, slabs, or other structures, and before reinforcing is placed, all loose or disturbed material shall be removed from the subgrade. The bearing surface shall then be compacted to meet the requirements of this specification.

3. If, in the opinion of the Engineer, the existing material at subgrade elevation is unsuitable for structural support, the Contractor shall excavate and dispose of the unsuitable material to the required width and depth as required by the Engineer. If, in the opinion of the Engineer, filter fabric is required; the Contractor shall place filter fabric, approved by the Engineer, as per manufacturer's recommendations. Crushed stone shall then be placed in lifts and compacted to required densities. Backfill shall be placed to the bottom of the proposed excavation.

D. EXCAVATION NEAR EXISTING STRUCTURES:

1. Attention is directed to the fact that there are pipes, manholes, drains, and other utilities in certain locations. An attempt has been made to locate all utilities on the drawings, but the completeness or accuracy of the given information is not guaranteed.

2. As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and excavation shall be done by means of hand tools, as required. Such manual excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.

3. Where determination of the exact location of a pipe or other underground structure is necessary for properly performing the work, the Contractor shall excavate test pits to determine the locations.

3.03 BACKFILL PLACEMENT AND COMPACTION:

A. GENERAL:

1. Prior to backfilling, the Contractor shall compact the exposed natural subgrade to the densities as specified herein.

2. After approval of subgrade by the Engineer, the Contractor shall backfill areas to required contours and elevations with specified materials.

3. The Contractor shall place and compact materials to the specified density in continuous horizontal layers, not to exceed nine (9) inches in uncompacted lifts. The degree of compaction shall be based on maximum dry density as determined by ASTM Test D1557, Method C. The minimum degree of compaction for fill placed shall be as follows:

Location	Percent of Maximum Density
Below pipe centerline	95
Above pipe centerline	92
Below pavement (upper 3 ft.)	95
Embankments	95
Below pipe in embankments	95
Adjacent to structures	92
Below structures	95

4. The Engineer reserves the right to test backfill for conformance to the specifications and Contractor shall assist as required to obtain the information. Compaction testing will be performed by the Engineer or by an inspection laboratory designated by the Engineer, engaged and paid for by the Owner. If test results indicate work does not conform to specification requirements, the Contractor shall remove or correct the defective Work by recompacting where appropriate or replacing as necessary and approved by the Engineer, to bring the work into compliance, at no additional cost to the Owner. All backfilled materials under structures and buildings shall be field tested for compliance with the requirements of this specification.

5. Where horizontal layers meet a rising slope, the Contractor shall key each layer by benching into the slope.

6. If the material removed from the excavation is suitable for backfill with the exception that it contains stones larger than permitted, the Contractor has the option to remove the oversized stones and use the material for backfill or to provide replacement backfill at no additional cost to the Owner.

7. The Contractor shall remove loam and topsoil, loose vegetation, stumps, large roots, etc., from areas upon which embankments will be built or areas where material will be placed for grading. The subgrade shall be shaped as indicated on the Drawings and shall be prepared by forking, furrowing, or plowing so that the first layer of the fill material placed on the subgrade will be well bonded to the subgrade.

8. Where called for on the Drawings, Lightweight Fill shall be placed and compacted as recommended by the manufacturer. The exact number of passes shall be approved by the Engineer to insure stability of the layer. As soon as the compaction of each layer has been completed, the next layer shall then be placed. The Contractor shall take all necessary precautions during construction activities in operations on or adjacent to the Lightweight Fill to insure that the material is not over-compacted.

Construction equipment, other than for compaction, shall not operate on the exposed Lightweight Fill. The top surface of the Lightweight Fill lying directly below the gravel course shall be chinked by additional rolling of the Lightweight Fill to prevent infiltration of fines.

9. In areas where noted on the Drawings, the Contractor shall surcharge the organic layers to control post construction consolidation settlement. The Contractor shall apply the surcharge loads in a manner and for a duration acceptable to the Engineer. The lateral extent of surcharge load should be as narrow as practical to provide stable slopes and within the restriction of the project permits. The surcharge load in these areas shall remain for a minimum of 6 months or as required by the Engineer. After approval by the Engineer, remove the surcharge load and grade to the proposed elevation. During surcharge loading in this location, the Contractor shall provide survey results of settlement on the top of the berm. The frequency of the survey data shall be as follows:

    1 survey per day during 1st week
    2 surveys per week during 2nd & 3rd week
    1 survey per week for 2 months thereafter
    1 survey per month for the remaining period

    The periodic surveys for settlement monitoring shall be taken at the same locations, not more than 100 feet apart.

B. TRENCHES:

1. Bedding as detailed and specified shall be furnished and installed beneath the pipeline prior to placement of the pipeline. A minimum bedding thickness shall be maintained between the pipe and undisturbed material, as shown on the Drawings.

2. As soon as practicable after pipes have been laid, backfilling shall be started.

3. Unless otherwise indicated on the Drawings, select backfill shall be placed by hand shovel in 6-inch thick lifts up to a minimum level of 12-inches above the top of pipe. This area of backfill is considered the zone around the pipe and shall be thoroughly compacted before the remainder of the trench is backfilled. Compaction of each lift in the zone around the pipe shall be done by use of power-driven tampers weighing at least 20 pounds or by vibratory compactors. Care shall be taken that material close to the bank, as well as in all other portions of the trench, is thoroughly compacted to densities required.

4. Class B backfill shall be placed from the top of the select backfill to the specified material at grade (loam, pavement subbase, etc.). Fill compaction shall meet the density requirements of this specification.

5. Water Jetting:

a. Water jetting may be used when the backfill material contains less than 10 percent passing the number 200 sieve, but shall be used only if approved by the Engineer.

b. Contractor shall submit a detailed plan describing the procedures he intends to use for water jetting to the Engineer for approval prior to any water jetting taking place.

c. Compaction of backfill placed by water jetting shall conform to the requirements of this specification.

6. If the materials above the trench bottom are unsuitable for backfill, the Contractor shall furnish and place backfill materials meeting the requirements for trench backfill, as shown on the drawings or specified herein.

7. Should the Engineer order crushed stone for utility supports or for other purposes, the Contractor shall furnish and install the crushed stone as directed.

8. In shoulders of streets and road, the top 12-inch layer of trench backfill shall consist of processed gravel for sub-base, satisfying the requirements listed in MassDOT standard specification M1.03.1.

C. BACKFILLING UNDER BUILDINGS AND FOUNDATIONS:

Material to be used as structural fill under structures shall be special bedding material or gravel borrow, as shown on the Drawings or as required by the Engineer. Where gravel borrow fill is required to support proposed footings, walls, slabs, and other structures, the material shall be placed in a manner accepted by the Engineer. Compaction of each lift shall meet the density requirements of this specification.

D. BACKFILLING ADJACENT TO STRUCTURES:

1. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads to which they will be subjected. Excavated material approved by the Engineer may be used in backfilling around structures. Backfill material shall be thoroughly compacted to meet the requirements of this specification.

2. Contractor shall use extra care when compacting adjacent to pipes and drainage structures. Backfill and compaction shall proceed along sides of drainage structures so that the difference in top of fill level on any side of the structure shall not exceed two feet (2') at any stage of construction.

3. Where backfill is to be placed on only one side of a structural wall, only hand-operated roller or plate compactors shall be used within a lateral distance of five feet

(5') of the wall for walls less than fifteen feet (15') high and within ten feet (10') of the wall for walls more than fifteen feet (15') high.

3.04 DISPOSAL OF SURPLUS MATERIALS:

A. Surplus excavated materials, which are acceptable to the Engineer, shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill. Upon written approval of the Engineer, surplus excavated materials shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes as indicated by the Owner, within its jurisdictional limits; all at no additional cost to the Owner.

B. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by him. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.

C. No excavated material shall be removed from the site of the work or disposed of by the Contractor unless approved by the Engineer.

D. The Contractor shall comply with Massachusetts regulations (310 CMR 40.0032) that govern the removal and disposal of surplus excavated materials. Materials, including contaminated soils, having concentrations of oil or hazardous materials less than an otherwise Reportable Concentration and that are not a hazardous waste, may not be disposed of at locations where concentrations of oil and/or hazardous material at the receiving site are significantly lower than the levels of those oil and /or hazardous materials present in the soil being disposed or reused.

END OF SECTION

SECTION 02371

RIPRAP

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section covers riprap for slope protection, drainage swales and pipe ends, complete.

B. Grading and compaction of earth slopes and other slope preparation for the riprap are included under other sections of the specification.

1.02 RELATED WORK:

A. Section 02300, EARTHWORK.

B. Section 02071, GEOTEXTILE FABRICS.

1.03 REFERENCES:

A. The following standard forms a part of these specifications and indicates minimum standards required:

Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. SLOPE PROTECTION:

Stone for slope protection shall be angular and shall be in accordance with MassDOT Specification Section M2.02.2, Dumped Riprap.

B. PIPE ENDS:

Stone for pipe ends shall be angular and shall be in accordance with MassDOT Specification Section M2.02.3, Stone for Pipe Ends.

C. DRAINAGE SWALES:

Stone for drainage swale ends shall conform to MassDOT Specification Section M2.02.3, and shall be not weigh less than 50 pounds or more than 125 pounds and least 75% of the volume shall consist of stones not less than 75 pounds each. The stones shall be so graded that when placed with larger stones, the entire mass will be compact.

D. GEOTEXTILE FABRIC:

Geotextile fabric shall be Erosion Control Fabric "A" as specified in Section 02071, GEOTEXTILE FABRICS.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Geotextile fabric shall be installed where shown on the drawings, prior to placing the riprap.

B. Riprap for slope protection and pipe ends shall be placed on the prepared slope or area in a manner which will produce a reasonably well-graded mass of stone with the minimum practicable percentage of voids and a maximum void of 12-inches.

C. Riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap in layers or by dumping into chutes or by other similar methods likely to cause segregation will not be permitted.

D. Riprap stones shall be placed and distributed such that there will be no large accumulation of either the larger or smaller stones in any given area.

E. It is the intent of these specifications to produce compact riprap protection in which all required sizes of stone are placed in the proper proportions. Hand placing or rearranging of individual stones by mechanical equipment shall be utilized to the extent necessary to secure the desired results.

END OF SECTION

SECTION 02456

HELICAL STEEL FOUNDATION SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section includes all labor, materials, equipment, appliances, transportation, services, and other items necessary to furnish and install completely all steel helical foundation piers and related work for the entire project as shown on the plans and specified herein, including:

1. Furnishing and installing helical steel foundation piers including splicing, to the required bearing stratum and/or installation resistance to provide support for the required loads. All components of the foundation system shall be as manufactured by A.B. Chance, of Houston, Texas, or approved equal.

2. Establishing lines and grades, including layout of piers in the field.

3. Providing temporary benchmarks at selected locations for the use of the Engineer during and after pier installations.

4. Cutting off all piers at the proper elevation as shown on the drawings.

5. Furnishing and installing brackets for support of the boardwalk as indicated on the drawings and as specified here.

B. The Contractor is responsible for designing helical piles that fully extend through the existing fill, organics, loose sand, very soft silt soils and to a minimum of 5 feet into the underlying medium dense (or denser) sand.

C. The Contractor shall design and install helical piles that will develop the loads capacities indicated on the project plans fully within the suitable native soils. The helical pile load capacities shall be verified by load testing as required by this Section. The Contractor shall conduct at least one static verification load test.

1.02 RELATED WORK:

A. Section 00320, SUBSURFACE DATA

B. Section 02300, EARTHWORK.

C. Section 02457, PILE LOAD TESTS.

1.04 SUBSURFACE SOIL DATA AND SITE CONDITIONS:

A. SOIL DATA:

1. It is the obligation of the Contractor to examine the site, to verify all dimensions in the field, and to review logs of borings, jar soil samples, records of construction and existing lines, and other pertinent data, and to employ all other means at his disposal to familiarize himself completely with conditions existing at the site. At their own expense, the Contractor may take whatever additional borings or explorations they deems necessary.

2. Logs of borings are appended to the Construction Documents. Jar soil samples may be examined upon request to the Engineer.

3. The aforementioned data is for general information only. It is the Contractor's sole responsibility to make interpretations and draw conclusions with respect to the character of the materials to be encountered and their impact upon the work, based on their knowledge of the area and of pier installation techniques. Neither the Owner nor the Engineer assumes responsibility for the accuracy of the data other than the particular locations and at the time the subsurface explorations were made.

B. UTILITIES:

The Contractor shall visit the premises to familiarize themself thoroughly with all details of the work and of working conditions, to verify all dimensions in the field, and to advise the Engineer in writing of any discrepancy before performing any work. The Contractor shall consult official records of existing utilities, both surface and subsurface, and their connections, and shall fully inform himself of all existing conditions and limitations as they apply to his work and of the extent and character of the work required under this section and its relation to all other related construction work.

C. UTILITIES LEFT IN PLACE:

Existing utilities found on the project site which are to remain shall not be disturbed or damaged. Provisions for protection of same shall be made in accordance with the requirements of authorities having jurisdiction over same.

1.05 QUALIFICATION REQUIREMENT:

The Contractor providing this work shall submit evidence of suitable experience in this type of installation and of the competence and experience of the person in charge of the site. As a minimum, the Contractor shall provide evidence of having successfully completed at least three projects of a scope comparable to this project in similar soil conditions. Approval of the Contractor's experience by the Engineer shall in no way imply acceptance of responsibility by the Engineer for the Contractor's ability to perform the work.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. DESIGN:

1. The Helical Pile Contractor shall engage a Professional Engineer registered in the Commonwealth of Massachusetts to design the helical piles, load test setup and instrumentation, and prepare the submittals referenced herein. The Professional Engineer shall have a minimum of 5 years of experience in helical pile design, load test set-up and installation, and analysis.

2. At least 10 days prior to the start of helical pile installation, the Helical Pile Contractor shall prepare and submit a design package to the Engineer for their review which includes all design calculations (including buckling) and working drawings for the proposed helical piles. The submittal shall include a description of all materials, mill certificates, installation equipment, test pile location, load testing procedures, and a helical pile layout drawing. The submittal shall be prepared by, signed and sealed by a Professional Engineer registered in the Commonwealth of Massachusetts.

B. PIERS:

Mill certificates for all steel pier and appurtenant devices (tips, splice plates, etc.) shall be provided to the Engineer five (5) days prior to delivery of piers to the site. Certificates shall state chemical composition, yield point, and ultimate strength of steel proposed for use.

C. INSTALLATION EQUIPMENT:

1. Submit manufacturer’s data on pier-installation equipment.

2. Submit drawing showing details of installation equipment and drive head assembly.

D. PIER SPLICING:

Submit technical details of method for splicing pier segments.

E. AS-INSTALLED LOCATION DATA:

1. Weekly drawings of as-installed pier locations.

2. Final as-installed pier location plan certified by a Registered Land Surveyor or a Registered Professional Engineer.

1.07 STANDARDS:

All work performed under this section shall conform to manufacturer standards and specifications and shall be of highest quality workmanlike construction, acceptable to the Engineer.

PART 2 - MATERIALS

2.01 STEEL PIERS:

Helical steel piers shall be grade-A50 hot-dip galvanized steel. The piers shall be of new material, straight and free from dents and subject to the approval of the Engineer.

2.02 SPLICES:

A. Piers shall be spliced in a manner which will develop one hundred percent(100%) of the section strength, both in direct stress and in bending. The two (2) spliced sections shall be kept in alignment in both directions throughout the splicing operation and when splicing is complete. Contractor shall submit to the Engineer his proposed method of splicing.

B. Alternative methods of splicing different from manufacturer's recommendations may be submitted to the Engineer for approval, with appropriate back-up material, provided that the alternative splice will develop one hundred percent (100%) of the strength in direct stress and in bending and will maintain alignment.

2.03 HEAVY DUTY BRACKETS:

Heavy duty brackets for support of manholes shall be as manufactured by A.B. Chance Col, No. C150-0147, or approved equal. Brackets should be of the type that is compatible with the size of pier used for support.

PART 3 - EXECUTION

3.01 LAYOUT AND RECORDS:

A. Piers shall be located and staked by the Contractor, and the Contractor shall maintain all location stakes, establish all elevations required, and be responsible for the correct locations of all piers.

B. Full-time observation and logging of all pier installation operation shall be provided by the manufacturer or their representative. In addition, the Owner will provide an authorized representative to observe all pier installations. No piers shall be installed except in the presence of the Engineer and the manufacturer's representative.

C. The Contractor shall employ a licensed Registered Land Surveyor or a Registered Civil Engineer, familiar with this type of work, who shall establish lines and levels and the

accurate locations of all piers after installation. The Contractor shall be responsible for the correct locations of piers.

D. The Contractor shall keep a record of all pertinent data relative to the installation of piers. The record shall be available for the Engineer's review, and shall include for each pier:

1. Date and time of installation.

2. Total penetration as shown by point elevation.

3. Cutoff elevation.

4. Location of each pier as prepared by the Contractor's Surveyor or engineer.

3.02 INSTALLATION EQUIPMENT:

A. INSTALLING UNITS:

1. Installation unit shall consist of a rotary type, torque motor with forward and reverse capabilities. The units shall be either electrically or hydraulically powered.

2. The units shall be capable of developing the maximum torque required to install piers that will provide the ultimate loads of 100 kips specified.

3. The units shall be capable of positioning the helical pier at the proper installation angle, which varies between 0 (vertical) to 5 degrees, depending upon the location of the piers.

4. The units shall be in good working condition and capable of being operated in a safe manner.

B. INSTALLATION TOOLING:

1. Adapters approved by the Engineer, shall be employed to safely connect the installation units to the helical piers and extensions.

2. The adapters shall have a torque capacity rating at least equal to the maximum torque rating to develop the helical piers ultimate capacity as specified.

3. The adapters shall be securely connected to the helical pier during installation so as to prevent accidental separation.

C. TORQUE MONITORING DEVICES:

1. The torque applied by the installing units shall be monitored throughout the installation process.

2. Torque monitoring devices shall be either a part of the installing unit or an independent device in-line with the installing unit. Calibration data for either unit shall be available for review by the Engineer.

D. The proposed pier installation equipment shall be subject to the approval of the Engineer. Approval shall be obtained in writing before pier installation starts. The same equipment shall be used for all production piers and test piers. Approval by the Engineer of the Contractor's equipment shall merely signify that the Contractor may make an initial trial installation with the proposed equipment. Approval will not relieve the Contractor of their responsibility for providing and installing piers capable of supporting the design loads by whatever means necessary, including changing the equipment and procedures from those used in the initial trial.

3.03 INSTALLATION:

A. GENERAL:

1. All piers in any one group shall be driven before moving to other locations. Pier installation shall be continuous, without interruption, for the final one foot of penetration.

2. No pier shall be installed unless the installation is observed by the Manufacturer's representative and Engineer.

3. The Contractor shall mark off each foot of the pier and log installation effort per foot for the final six feet.

4. Piers shall be installed so that all helical bearing plates fully extend through fill, peat, organics, loose sands, very soft silt and into the bearing stratum and develop the full capacity required by contract.

5. Central shafts shall be hot-dipped galvanized steel, with a minimum diameter of 4½ inches. The piers shall be filled with a cementitious grout following installation.

B. CRITERIA:

1. The Contractor is responsible for installing piers to the minimum tip elevations provided herein and the capacity requirements provided on the Drawings. At least the final six feet of the pier installation shall meet or exceed the minimum required torque resistance per the Contractor's design, pending completion of load tests.

2. The Contractor will be permitted the use of an installation device of a type and size which they have found to be adequate to install the piers.

3. Any pier that has been stopped short of the minimum depth criterial provided herein and has taken up by regaining soil shear strength or freeze because of a delay in continuous installation shall be started and installed to grade in a manner which will

not be damaging to the pier. Any pier which cannot be safely started or which is damaged in the process shall be deemed defective and shall be replaced at no cost to the Owner.

C. PIER HEAVE:

1. In locations in which the installation of piers may cause the points of previously installed piers to heave, special consideration shall be given to the sequence of pier installation.

2. Where pier point heave is indicated, redrive of the piers will be required in sufficient pattern to establish that all piers have the required specified final resistance.

D. TOLERANCES:

1. All piers shall be located within three inches (3") of the design position in plan, except as noted below.

2. All piers within a group shall be located in a final position such that the centroid of the group is not more than two inches (2") from the design position in plan.

3. Where a pier is found to exceed the tolerance in Item D.1 above, prior to completing all piers within that group, the Engineer may issue revised locations for remaining piers as to attempt compliance with Item D.2 above.

4. Where piers as installed exceed the specified tolerance, the Engineer shall determine the total loads on individual piers based upon as-installed locations and the need for corrective measure. If the load on any pier exceeds the specified load capacity, correction shall be made by installing additional piers or by other methods of load distribution as approved by the Engineer, at no additional cost to the Owner.

5. The installation of replacement piers and other corrective measures shall, in all cases, be subject to Engineer approval and shall be performed by the Contractor at no additional cost to the Owner.

6. Whenever misalignment of piers necessitates structural redesign, the cost of such redesign shall be deducted from sums due to the Contractor under the Contract.

7. All piers shall be cut off within one-half inch (2") of the elevations indicated on the Drawings.

8. Any pier damage or location tolerance excesses or excessive installation force resulting from the use of equipment not suited for the work shall be corrected by the Contractor as required by the Engineer at no cost to the Owner.

3.04 REJECTED PIERS:

A. OBSTRUCTIONS:

1. Where obstructions make it impossible to install certain piers at locations shown on the Drawings and/or to the proper depths, the Contractor shall resort to all usual methods for the installation of piers. Excavating to a depth of ten feet (10') below cutoff elevation and removing obstructions up to one cubic yard in volume shall be considered a usual method and shall be at the Contractor's expense. If, after resorting to the usual method, the Engineer orders that an additional pier or piers be installed or that other remedial action be taken, the Contractor will be paid in accordance with the unit prices established in this contract. Any pier abandoned because of obstructions encountered before reaching an anticipated depth shall be cut at cutoff elevation or pulled out, and the open hole filled with concrete at the discretion of the Engineer, at no cost to the Owner.

2. If the Engineer determines that obstructions more than ten feet below cutoff elevation or greater than one cubic yard in volume should be removed by excavation, the Contractor will be reimbursed for the additional work of removing obstructions and backfilling beyond that included in the usual methods on a time and materials basis. No payment for removal of any obstruction will be made unless such work, including agreement for extra compensation, has been approved in writing by the Engineer in advance of execution of the work.

3. Piers abandoned because of obstructions encountered shall be cut off or pulled out at the discretion of the Engineer. In either case, the Contractor will be paid on the basis of the pier length driven for those piers which cannot be driven to the required depth by the usual method.

A. DEFECTIVE PIERS:

A. Defective piers shall be replaced either by extracting the defective piers or by enlarging the group and installing additional piers, as the Engineer may approve. Such replacement or addition shall be solely at the expense of the Contractor.

2. A pier exhibiting any one of the following conditions will be deemed to be defective:

A. Piers exceeding any one of the conditions in Section 3.03D.

b. Piers exceeding the three-inch (3") placement tolerance, unless otherwise specifically accepted by the Engineer. Piers exceeding this location tolerance will be corrected by installing one or more additional piers, as required by the Engineer, after a structural analysis of the pier group as driven.

c. Any pier which shows signs of buckling.

d. Any pier which cannot be properly installed (except as described in 3.04A).

3.05 OBSERVATION AND TESTING:

A. OBSERVATION:

All work performed under this Contract shall be subject to observation and testing by the Engineer. The Contractor shall cooperate with the Engineer and shall furnish all materials and facilities as may be required and shall provide convenient access to all parts of the Work so that the Engineer may observe and check for compliance with the plans and specifications. No pier shall be installed except in the presence of the Engineer.

B. ACCESS:

The Contractor shall provide the Engineer free and safe access to the Work at all times. The Contractor shall also provide and employ safety equipment as required by OSHA, at no extra cost.

C. LENGTH MARKINGS:

Each Pier shall be marked in readily visible markings showing length from the tip in at least one-foot (1') intervals. Provide a rule marked in inches close to each installed pier location to permit observation of final penetration resistance.

a. LOAD TEST

Perform a load test on a sacrificial pier in accordance with Section 02457, PILE LOAD TESTS.

END OF SECTION

SECTION 02457

PILE LOAD TESTS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Preparation of work area.

B. Pile load testing of a sacrificial helical pile with documented results.

C. Dismantling and removal of equipment and load.

1.02 RELATED WORK:

A. Section 02300, EARTHWORK

B. Section 02456, HELICAL STEEL FOUNDATION SYSTEM

1.03 APPLICABLE STANDARDS:

A. ASTM D1143, Testing Piles Under Static Axial Compressive Load.

B. Massachusetts State Building Code

1.04 QUALITY ASSURANCE:

A. Provide evidence of having successfully completed at least ten pile load tests of the scope and magnitude required for this project. The person in charge of pile load testing at the site shall have at least the same experience in such testing.

B. Maintain sufficient protection and heating, if necessary, to limit wind and temperature differences which could affect readings.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Submit shop drawings outlining procedures to be used.

B. Provide detailed information and sketches on test method, type and layout of measuring equipment, reaction type and layout, protective covering, safety devices, and calibration equipment.

C. Provide within the load test setup a load cell and associated steel shims for monitoring of applied loads. Provide a calibration record for the load cell used for this test. The load cell

shall have been calibrated within 12 months of this project by an approved testing laboratory.

D. Provide a calibration record for the hydraulic jack to be used for the test. The jack, including the complete assembly of pumps, gages, and ram to be used in the tests, shall be calibrated within 12 months of this project by an approved testing laboratory. A minimum of three calibration runs shall be performed at ram extensions of 1-inch, mid-range, and 1-inch less than full range.

E. Submit test reports upon completion of testing.

F. Document the test equipment and layout used, method of calibrating and recording, reference points, test results, recommendation or modification of piling method used.

PART 2 - PRODUCTS

2.01 MATERIALS:

Equipment type, reaction system, load instrumentation: conform to ASTM D1143.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Verify site conditions will support cribbing and load for testing purposes.

B. Establish working elevation for test equipment.

C. Verify that the Engineer has accepted the type of test equipment and layout before starting the test.

3.02 TESTING:

A. Perform load tests on Piles and document test procedures and results in accordance with ASTM D1143.

1. Apply load to pile by hydraulic jack acting against a reaction frame. Reaction frame shall be designed to resist at least 125 percent of the maximum test load.

2. Measure movements of Pile butt by at least three independent methods specified in ASTM D1143. One of the three methods shall be by three dial gages accurate to 0.001-inch. Space dial gages at 120 degrees around the Pile at equal distance from the center of the Pile.

3. Apply loads per the Massachusetts Building Code Section 1810.3.3.1.2.

B. Wait at least 96 hours after pile is in place before loading.

C. If tested pile does not conform to requirements, it will not be accepted as the pile load test. Perform additional testing of other piles at no additional cost to the Owner.

D. Acceptance of pile load test will be based on the criteria in Massachusetts Building Code Section 1810.3.3.1.3. Tests terminated due to failure of loading or measurement equipment supplied by the Contractor or due to Contractor's work will not be accepted. Acceptance of tests terminated due to failure of the tested pile to achieve the required load due to inadequate soil bearing will be at the discretion of the Engineer.

E. After completion of initial load test and evaluation by the Engineer, the Engineer will decide whether further tests are required. Upon request by the Engineer, conduct additional compression load tests and/or test pier installation. Installation criteria will be specified by the Engineer following evaluation of the first load tests.

3.03 OBSERVATIONS BY ENGINEER:

A. The Engineer will observe and record all load-settlement or deflection data during the load tests. The Contractor shall provide personnel at the site 24 hours per day, as required during testing, to operate all equipment necessary for application and maintenance of all load increments on test piles.

B. Provide the Engineer free and safe access to the work and sufficient lighting to take readings at all times.

END OF SECTION

SECTION 02570

PROCESSED GRAVEL ROADWAY

PART 1 – GENERAL

1.01 WORK INCLUDED:

Placement of processed gravel upon a sub-grade as required in accordance with these specifications and in the locations indicated on the contract drawings.

1.02 RELATED WORK:

Section 02300 EARTHWORK

1.03 REFERENCES:

The following standard forms part of these specifications:

Massachusetts Department of Transportation (MassDOT)
Standard Specifications for Highways and Bridges

1.04 DESCRIPTION OF WORK:

The processed gravel shall be furnished and placed to the depth as indicated in the standard detail for Gravel Road Detail on the contract drawings.

PART 2 – PRODUCTS

2.01 PROCESSED GRAVEL:

Processed Gravel shall be in accordance with MassDOT, subsection of Division III, Materials M1.03.1.

PART 3 – EXECUTION

3.01 PLACEMENT AND COMPACTION:

A. The process gravel shall be spread in layers upon the prepared sub-grade from self-spreading vehicles or with power graders of approved types or by hand methods.

B. Processed Gravel shall be spread in layers not more than 6-inches thick, compacted measure. The processed gravel shall be compacted in accordance with the requirements of Section 02300.

END OF SECTION

SECTION 02643

PRECAST CONCRETE CULVERTS AND HEADWALLS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This section covers design, furnishing and installation of precast culvert sections and headwalls complete, including coatings, joints and gaskets, as shown on the drawings and as specified herein.

B. The Contractor shall furnish all labor, materials, tools and equipment and shall do all work to satisfactorily install the precast concrete culverts and headwalls. The work shall include excavation and removal of old culvert and unwanted backfill (if applicable), dewatering, flow diversion, construction of culvert foundation and bedding, installation and assembling of the precast reinforced concrete box culvert sections and headwalls, backfill, compaction, sheeting as required, clean-up and all necessary labor to complete the installation.

1.02 RELATED WORK:

A. Section 02300, EARTHWORK

B. Section 02371, RIPRAP

1.03 QUALITY ASSURANCE:

A. The culverts and headwalls shall be manufactured by an established manufacturer of good reputation in the industry and in a permanent plant adapted to meet all design requirements of the precast culvert and headwall sections.

B. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Inspection may be made at the place of manufacture, on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if they fail to meet any of the specification requirements. Any sections which are rejected shall be immediately removed from the job site by the Contractor.

1.04 REFERENCES:

A. The following standards form a part of this specification, as referenced:

American Society for Testing and Materials (ASTM)

ASTM	A615	Deformed Billet Steel Bars for Concrete Reinforcement

American Concrete Institute (ACI)

ACI 318 Building Code Requirements for Reinforced Concrete

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Manufacturer's literature and shop drawings of the materials of this section. Before fabrication of the box culvert sections is begun, the Contractor shall submit shop drawings for review of the overall concept showing the size, wall thicknesses, connection and joint details, material, finish, and all other details of the culvert sections, in complete accordance with the requirements given on the drawings and in the specifications. The Contractor and his supplier are responsible for the structural integrity of the Precast box sections, headwalls and wingwalls. The design shall be prepared and stamped by a professional structural or civil engineer registered in the state where the project is located.

B. A detailed written description of the method Contractor proposes to use to accomplish the culvert installation, with sketches showing details at the interface of the headwall/wingwall structures and the precast culvert sections.

C. Test reports as required by the Engineer.

1.06 DELIVERY AND STORAGE:

Storage of culvert sections shall be restricted to approved areas, not over newly laid pipe or other pipelines which might be damaged by the superimposed load.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

A. Precast sections and headwalls shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings or as required by the Engineer.

B. Precast sections shall be designed to withstand earth loads due to soil cover on top of the culverts plus live loads due to vehicular traffic (HS20 loading). Design and construction of each section shall meet the requirements of ACI 318 and the AASHTO Load Factor.

2.02 PRECAST CONCRETE SECTIONS AND HEADWALLS:

A. All precast concrete sections shall conform to the following requirements:

1. The length of each precast culvert section shall be 8 feet minimum. Roof, sidewalls and floor thickness shall be a minimum of 8-inches. The internal dimensions shall be as shown on the drawings.

B. All precast concrete headwalls, whether straight or wingwalls, shall comply with the dimensions shown on the drawings and shall be a minimum of 12-inches thick.

C. Type I cement shall be used except as otherwise approved.

D. Minimum compressive strength of concrete shall be 5,000 psi at 28 days.

E. Sections shall be joined using fitted gasketed shiplap joints. Each section shall have a male and a female end, with not less than a 1-1/2-inch concrete overlap. Each section shall have one preplaced 1-inch diameter neoprene gasket.

F. Each section shall be supplied with four lifting fixtures for handling of each unit according to manufacturer's recommendations.

G. The exterior surfaces of all precast culvert sections shall be given one shop coat of bituminous Super Service Black as manufactured by Koppers Company, or an approved equal.

H. The inside surfaces shall be smooth so as not to restrict flow through the completed installation, with 45 degree fillets in all four inside corners of culverts.

I. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each section.

J. Steel reinforcement shall be Grade 60 and conform to ASTM A615 with a minimum of 1½-inches of concrete cover over steel.

K. Unless otherwise indicated, end sections shall be fabricated so that the exposed faces are flush with the headwalls.

L. The Engineer reserves the right to reject any precast section and the rejected unit shall be tagged and removed from the job site immediately. The Engineer may also require testing of the concrete, with the Contractor bearing all testing costs.

PART 3 - EXECUTION

3.01 GENERAL:

All precautions for water courses outlined in Section 01570 ENVIRONMENTAL PROTECTION must be strictly adhered to. By-pass pumping and silt control methods may be necessary, as required by the Engineer.

3.02 PRECAST SECTIONS AND HEADWALLS:

A. All precast sections shall be installed in strict accordance with the shop drawings and the manufacturer's recommendations. The sections shall be carefully lowered into the

excavation and placed on the prepared bedding in such manner and by such means as is required to properly control the final positioning.

B. The culvert shall be installed to the lines and grades indicated on the drawings. The sections shall be installed and assembled and shall form a closed joint with adjoining sections. The invert shall be brought continuously to the required grade.

C. The precast reinforced concrete sections and headwalls shall be set so as to be in true vertical and horizontal alignment.

D. A neoprene joint sealant shall be installed between all concrete sections.

E. The Contractor shall take all necessary precautions to prevent flotation of the box sections in the excavation. Where so indicated on the drawings, the culvert sections shall be supported by compacted crushed stone, a concrete cradle or envelope. When each box section has been properly bedded and the sections drawn together and joints made, enough of the backfill material shall be placed and compacted between the culvert sections and the sides of the excavation to hold the culvert in correct alignment.

F. All holes left in place for handling the sections shall be plugged with grout. The grout shall be one part cement to two parts sand, mixed slightly with water. The grout shall be placed into the holes until it is dense and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.

END OF SECTION

SECTION 02730

STABILIZED STONE DUST PAVEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The work to be done under this Section shall be the furnishing, placement and compaction of stabilized stone dust surfacing as shown on the drawings and as specified herein. The Contractor shall be responsible for supplying the material, labor, equipment and transportation necessary to do the work.

1.02 RELATED WORK:

A. Section 01330, SUBMITTALS

B. Section 02300, EARTHWORK

1.03 SAMPLES:

A. Prior to ordering and delivering materials to the site, (1) representative samples of stone dust shall be sent to the Engineer for approval. The material shall be analyzed by a certified testing laboratory and certified by the supplier as a byproduct of a stone quarry operation.

B. The color shall be medium to dark gray when wet and consistent throughout. Samples must match that product which is to be installed.

PART 2 - PRODUCTS

2.01 STONE DUST:

A. Stone dust shall be the product of a stone crusher and shall consist of inert materials that are hard, durable stone, free from surface coatings and deleterious materials.

B. Gradation requirements shall be as follows:

U.S. Sieve No.	Percent Passing by Weight
# 4	100
# 8	96
# 16	68
# 30	43

# 50	29
# 100	17
# 200	11

2.02 STABILIZER:

A. Non-toxic, non-staining water-activated soil stabilizer.

B. "STABILIZER" by Stabilizing Solutions, Inc. Phoenix, AX 1-800-336-2468 or approved equal.

PART 3 - EXECUTION

3.01 PLACING AND COMPACTING:

A. The stone dust shall be placed over a previously approved and installed compacted base of gravel or concrete slab as detailed and as specified under Section 02300 of these Specifications.

B. The stone dust shall be placed to the line and grades shown on the plans and shall consist of a minimum of the detailed thickness after watering and compacting to ninety-five percent (95%) of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T99 compaction test Method C at optimum moisture content as determined by the Engineer.

C. Compaction shall continue until the surface is even and true to the proposed lines and grades within a tolerance of three-eighths (3/8) inch above or below the required cross sectional elevations and to a maximum irregularity not exceeding three-eighths (3/8) inch under a ten (10) foot line longitudinally. Any specific area of material sub-base which, after being rolled, does not form a satisfactory, solid, stable foundation shall be removed, replaced and recompacted by the Contractor without extra compensation.

3.02 SOIL STABILIZER BLENDING:

A. The soil stabilizer shall be carefully measured and shall be subsequently blended with the stonedust at the manufacturers recommended rate for three (3) inch compacted stabilized stonedust pathways. (If 'STABILIZER' brand stabilizer is used the blending ratio shall be as follows: One (1) pound of 'STABILIZER' powder per one and one-quarter (1 ¼) cubic feet of stonedust OR as otherwise stated; one (1) pound of 'STABILIZER' powder per five (5) square feet of surface area for three (3) inch compacted depth stone dust.)

END OF SECTION

SECTION 02746

BITUMINOUS CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. Under this Section, the Contractor shall furnish all necessary labor, materials, equipment, and transportation necessary to construct the following:

1. The bituminous concrete pavement for walks shall be composed of materials as specified herein and shall be constructed on a prepared base course to the depth, grade and cross-section shown on the plans, as specified herein and as required by the Engineer.

2. Unless otherwise specified in the Contract Drawings, bituminous concrete pavement shall be composed of a one and a half (1.5) inch bituminous concrete binder course, and a one and a half (1.5) inch bituminous concrete dense mix course.

3. Where an overlay is proposed, the depth of the bituminous concrete dense mix shall be typically one and one-half (1 ½) inches except that it shall be of greater depth in places to eliminate puddling. Tack coat shall be applied utilizing Type SS-1 asphalt emulsion.

4. Crack repair of existing bituminous concrete pavements prior to installation of overlay pavement.

1.02 RELATED WORK:

A. Section 01330, SUBMITTALS

1.03 REFERENCE STANDARDS AND SPECIFICATIONS:

A. Reference to the standards, specifications and tests of technical societies, organizations and governmental bodies are made in the Contract Documents.

1. AASHTO - American Association of State Highway and Transportation Officials (tests or specifications).

2. ASTM - American Society for Testing and Materials.

3. MassDOT Standard Specs. - Latest edition of the Standard Specifications for Highways and Bridges, Massachusetts Department of Transportation, hereinafter

referred to as the "Massachusetts Standard Specifications."

1.04 SUBMITTALS:

A. Asphalt emulsion Type SS-1 product and application specification.

B. Submit catalog cuts and manufacturer's specifications for Airport Grade Asphalt Emulsion Mix and Aggregate.

C. Compaction tests are required on all bituminous concrete base surfaces on a 5 foot grid interval or per Owner's direction. At the Contractor's expense, an independent testing agency must perform the work and submit the results directly to the Engineer.

1.05 GUARANTEE/WARRANTY:

A. The pavement and coatings shall be guaranteed against defects in workmanship or quality for a period of one (1) year after final acceptance. The Contractor shall replace, repair, recoat or otherwise make satisfactory to the Owner any unacceptable pavement and or coating at no additional cost to the Owner

PART 2 - PRODUCTS

2.01 BITUMINOUS CONCRETE PAVEMENT:

A. Bituminous Concrete Pavement shall consist of binder mix and dense mix courses constructed to the thicknesses shown on the plans and shall conform to the relevant provisions of Sections 460 and (M3.11.03) of the Massachusetts Standard Specifications, unless specified otherwise hereinafter.

B. Base/Binder Courses

1. Base/Binder Courses shall be Bituminous Concrete Pavement, Dense Finish Course Type I-1.

C. Leveling/Overlay Courses

1. Leveling/Overlay Courses may conform to "Surface Treatment" mix, Table A, Section M3.11.03 of the MassDOT Standard Specifications, comprised of Class I Dense Bituminous Concrete, Type ST or Dense Mix Type I-1, at the Contractor's option.

2. The general composition of the bituminous concrete mixture (the proportion of

asphalt cement to mineral aggregate) shall be in accordance with MassDOT requirements.

3. The mineral aggregate composition for Type ST shall be as follows:

TYPE ST SIEVE ANALYSIS U.S. Standard Sieve No.	MINERAL AGGREGATE Percent Passing by Weight (per ASTM C-136)	
Size	Minimum	Maximum
3/8	100	-
4	96	100
8	85	100
16	55	85
30	25	60
50	15	40
100	3	15
200	2	7

2.02 ASPHALT EMULSION:

A. Asphalt emulsion tack coat shall be Type SS-1 or SS-1H as specified by the Asphalt Institute.

2.03 TROWELABLE ASPHALT FILLER/PATCH:

A. Airport grade asphalt emulsion mix and aggregate shall be used to repair gouges or cracks which can then be brought to grade to receive an overlay or color sealcoat.

2.04

PART 3 - EXECUTION

3.01 BITUMINOUS CONCRETE PAVEMENT:

A. Bituminous concrete pavements shall be constructed on a prepared foundation of gravel in accordance with the Massachusetts Standard Specifications, Section 405, except where overlayment is over existing pavement.

B. The bituminous mixtures shall be placed on the approved base only when, in the opinion of the Engineer, the course is sufficiently dry and weather conditions are suitable.

C. Where walls, curbing, or other suitable permanent supports are not present, the Contractor shall secure proper alignment and adequate compaction of the binder and surface courses as shown on the Contract Drawings and finish all edges with a neat tamped edge.

D. The mixture shall be placed in two (2) courses as shown on the Contract Drawings. Each course shall be spread and finished as required in the Massachusetts Highway Department, Standard Specifications for Highways and Bridges, Section 460.63, latest edition.

E. Prior to completion of bituminous concrete overlay, the Contractor shall have the existing patched surfaces tack coated and leveled to eliminate all "birdbaths" or extreme lows which may create ponding or drainage problems. Leveling course (surface treatment) bituminous concrete applied as necessary, shall be raked and feathered and be properly rolled and compacted. The Contractor shall apply "level" lines, screeds, or use other measures to achieve the proper leveling surface suitable for overlay.

F. All adhesive fabric shall be in place and approved prior to completing this work.

G. After completion, the bituminous concrete courses shall conform to the thickness shown on the Contract Drawings, smooth and even and of a dense and uniform structure. When tested with a sixteen (16) foot straight edge placed parallel to the centerline of the pavement, there shall be no deviation from a true surface in excess of one-quarter (1/4) inch.

3.02 ASPHALT EMULSION TACK COAT:

A. Apply a single very thin (0.05 to 0.15 gallons per square yard) application of diluted asphalt emulsion (Type SS-1) to all existing surfaces to be paved against or overlaid to cover the entire surface of existing pavement.

B. Essential qualities of coverage are (1) it must be very thin and (2) uniformly cover entire surface of existing pavement.

C. Place only that amount of tack coat which can be overlaid with new pavement by the end of each day, and; IF RAIN IS ANTICIPATED DO NOT APPLY TACK COAT.

END OF SECTION

SECTION 02779

REHABILITATION OF EXISTING DRAINAGE SWALES

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall do all work to rehabilitate or rebuild existing drainage swales, including clearing, grubbing and removal of debris, excavation, backfill and grading necessary to make swales conform to proposed sections; loaming, seeding and fertilizing, furnishing and installation of erosion control and revegetation mat, and rip rap, and all other miscellaneous work necessary to bring swales into proper condition to suit their intended purpose, as shown on the drawings or as required by the Engineer.

1.02 RELATED WORK:

A. Section 01570, ENVIRONMENTAL PROTECTION

B. Section 02230, CLEARING AND GRUBBING

C. Section 02300, EARTHWORK

D. Section 02371, RIP RAP

E. Section 02920, LOAMING AND SEEDING

1.03 SYSTEM DESCRIPTION:

A. The program of rehabilitating the existing drainage swales shall be carried out in such a manner as to prevent disturbing existing structures or work previously completed under this Contract or under other Contracts.

B. Any areas disturbed beyond the limits of the drainage swale shall be restored to their original condition, or better, including any additional work such as loaming and seeding as may be necessary, at no expense to the Owner.

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Shop drawings or working drawings and material specifications. General installation practices and installation schedules shall be included.

B. One (1) material sample shall be included in submittal of shop drawings for erosion

control and revegetation mat.

PART 2 - PRODUCTS

2.01 RIP RAP:

Rip rap shall be as specified in Section 02371, RIP RAP.

2.02 EROSION CONTROL AND REVEGETATION MAT:

A. All components shall be the best quality proven design and construction and shall be entirely suited in every respect for the intended purpose.

B. Erosion control and revegetation mat shall be Miramat Erosion Control and Revegetation Mat as manufactured by Mirafi, Inc., Charlotte, NC, or approved equal.

C. Erosion control and revegetation mat shall be a flexible mat of polyvinylchloride monofilaments bonded together into a three-dimensional web designed exclusively to serve as an erosion control and revegetation mat. The mat shall be engineered with the optimum balance of web density, porosity, flexibility, and weight to provide effective armor cover while allowing a naturally vegetated ground surface to establish. The mat shall be of a natural green color.

D. Erosion control and revegetation mats shall meet the following property values:

Property	Test Method	Value
Porosity	Calculated	85%-90%
Stiffness	ASTM D-1288-64	2000 mg-cm maximum
Weight	ASTM D-3776-79	24 oz/s.y. minimum
Thickness	ASTM D01777	0.25 inches maximum
Tensile Strength	ASTM D-1682-64 (2-inch strip)	
	Lengthwise	18 pound minimum
	Widthwise	6 pound minimum
Elongation	ASTM D-1682-64 (2-inch strip)	
	Lengthwise	150%
	Widthwise	100%

PART 3 - EXCAVATION

3.01 EARTHWORK:

A. The Contractor shall remove and dispose of any existing debris within the limits of

the proposed work, and shall perform any necessary clearing and grubbing in order to allow rehabilitation work to be completed.

B. The Contractor shall do all excavation, backfilling and grading required to make the existing drainage swales meet the proposed cross sections detailed on the drawings, and to make them conform to a generally true line and grade, as shown on the drawings and as required by the Engineer.

C. The Contractor shall furnish and place a minimum of 6 inches compacted thickness of loam as specified in Section 02920, LOAMING AND SEEDING. Seeding and fertilizing may be performed prior to or after placement of the erosion control and revegetation mat, and shall conform of Section, 02920, LOAMING and SEEDING.

3.02 EROSION CONTROL AND REVEGETATION MAT:

A. The erosion control and revegetation mat shall be placed over the final graded prepared surface as detailed on the drawings and as required by the Engineer.

B. The erosion control and revegetation mat shall be installed according to the manufacturer's written recommendations, or as required by the Engineer. The mat shall be secured to the ground surface using solid wood stakes cut to a triangular shape from 1-inch by 3-inch stock and a minimum of 18-inches long. Edges of the mat shall be secured in anchor trenches at the top of the drainage channel side slopes. Terminal ends of the mat, at rip-rapped transitions, shall be secured by burial in transverse trenches. The mat shall be secured at 25 foot intervals in transverse check slots.

3.03 RIP RAP TRANSITIONS:

Where existing drainage pipes enter or leave the swale, the Contractor shall install rip rap within a distance of 5 feet from the pipe end. The drainage swale shall be made to conform to cross section, line and grade, with the rip rap being installed in place of the loam, seed, and erosion control and revegetation mat.

3.04 FINAL INSPECTION AND ACCEPTANCE:

A. The Contractor shall, at his expense, have a manufacturer's representative present to inspect the work at the completion of the installation of the erosion control and revegetation mat. Any work found by the manufacturer's representative to be unsatisfactory shall be corrected at the Contractor's expense.

B. The Engineer reserves the right to have a manufacturer's representative inspect the installation process at any time during construction, at the Contractor's expense.

END OF SECTION

SECTION 02795

POROUS ASPHALT PAVING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Under this Section, the Contractor shall furnish all necessary labor, materials, equipment, and transportation necessary to construct the following:

1. The porous asphalt paving for the pedestrian pathway shall be composed of materials as specified herein and shall be constructed on a prepared base course to the depth, grade and cross-section shown on the plans, as specified herein and as directed by the Engineer.

2. Unless otherwise specified in the Contract Drawings, porous asphalt paving shall be composed of a porous asphalt top course, a choker course, a base layer of open graded crushed stone, an open-graded crushed stone subbase layer. A demarcation geotextile forms the base of this profile. Thickness of each material varies depending on the application (pedestrian or vehicular) as referenced in the Contract drawings.

3. Refer to the Contract drawings for porous asphalt paving.

1.02 REFERENCE STANDARDS AND SPECIFICATIONS

A. Reference to the standards, specifications and tests of technical societies, organizations and governmental bodies are made in the Contract Documents.

1. AASHTO - American Association of State Highway and Transportation Officials (tests or specifications)

2. ASTM - American Society for Testing and Materials

3. MassDOT. Standard Specifications - Latest edition of the Standard Specifications for Highways, Bridges and Waterways, The Commonwealth of Massachusetts Department of Transportation, 1988 edition.

4. UNHSC Design Specifications for Porous Asphalt Pavement and Infiltration Beds

1.03 SUBMITTALS

A. Porosity test are required, as described in this specification section.

B. Submit a list of materials proposed for work under this Section including the

name and address of the materials producers and the locations from which the materials are to be obtained.

C. Compaction tests are required on all porous asphalt paving base surfaces on a 25' grid interval or per Owner's direction. At the Contractor's expense, an independent testing agency must perform the work and submit the results directly to the Engineer.

D. A Quality Control (QC) plan must be submitted for placement operations only. The QC plan must conform to "UNHSC Design Specifications for Porous Asphalt Pavement and Infiltration Beds."

PART 2 - MATERIALS

2.01 POROUS ASPHALT PAVING

A. Porous Asphalt Mix

1. Mix Materials

   Mix materials consist of modified performance grade asphalt binder (PGAB), coarse and fine aggregates, and optional additives such as silicone, fibers, mineral fillers, fatty amines, and hydrated lime. Materials shall meet the requirements of the NAPA's Design, Construction, and Maintenance of Open-Graded Friction Courses, Information Series 115 (2002), except where noted otherwise below or approved in writing by the Engineer.

2. Polymer Modified PGAB and Mix Designs

   The asphalt binder shall be a polymer and/or fiber modified Performance Graded asphalt binder (PGAB) used in the production of Superpave Hot Mix Asphalt (HMA) mixtures. Ideally for maximum durability, the PGAB shall be two grades stiffer than that required for dense mix asphalt (DMA) parking lot installations, which is often achieved by adding a polymer and/or fiber. Mix designs will meet or exceed criteria listed in table below, "Porous Asphalt Mix Design Criteria".

   The PGAB polymer modifiers are to be styrene butadiene rubber (SBR). The quantity of rubber solids in the SBR shall typically be 1.5-3% by weight of the bitumen content of the mix. The dosage of fiber additives shall be either 0.3 percent cellulose fibers or 0.4 percent mineral fibers by total mixture mass. The binder shall meet the requirements of AASHTO M320. The PGAB shall be pre-blended. The PG 64-28 with 5 pounds of fibers per ton of asphalt mix shall be used.

3. Anti-Stripping Mix Additives

   The mix shall be tested for moisture susceptibility and asphalt stripping from the aggregate by AASHTO T283. If the retained tensile strength (TSR) < 80% upon testing, a heat stable additive shall be furnished to improve the anti-stripping properties of the asphalt binder. Test with one freeze-thaw cycle

(rather than five recommended in NAPA IS 115). The amount and type of additive (e.g. fatty amines or hydrated lime) to be used shall be based on the manufacturer's recommendations, the mix design test results, and shall be approved by the Engineer.

Silicone shall be added to the binder at the rate of 1.5 mL/m3 (1 oz. per 5000 gal).

Fibers may be added per manufacturer and NAPA IS 115 recommendations if the drain down requirement cannot be met (<0.3% via ASTM D6390) provided that the air void content requirement is met (>18%, or >16% as tested with CoreLok device).

Additives should be added per the relevant DOT specification and NAPA IS 115.

4. Coarse Aggregate
   Coarse aggregate shall be that part of the aggregate retained on the No. 8 sieve; it shall consist of clean, tough, durable fragments of crushed stone, or crushed gravel of uniform quality throughout. Coarse aggregate shall be crushed stone or crushed gravel and shall have a percentage of wear as determined by AASHTO T96 of not more than 40 percent. In the mixture, at least 75 percent, by mass (weight), of the material coarser than the 4.75 mm (No. 4) sieve shall have at least two fractured faces, and 90 percent shall have one or more fractured faces (ASTM D5821). Coarse aggregate shall be free from clay balls, organic matter, deleterious substances, and a not more than 8.0% of flat or elongated pieces (>3:1) as specified in ASTM D4791.

5. Fine Aggregate
   The fine aggregate shall be that part of the aggregate mixture passing the No. 8 sieve and shall consist of sand, screenings, or combination thereof with uniform quality throughout. Fine aggregate shall consist of durable particles, free from injurious foreign matter. Screenings shall be of the same or similar materials as specified for coarse aggregate. The plasticity index of that part of the fine aggregate passing the No. 40 sieve shall be not more than 6 when tested in accordance with AASHTO T90. Fine aggregate from the total mixture shall meet plasticity requirements.

6. Porous Asphalt Mix Design Criteria
   The Contractor shall submit a mix design at least 10 working days prior to the beginning of production. The Contractor shall make available samples of coarse aggregate, fine aggregate, mineral filler, fibers and a sample of the PGAB that will be used in the design of the mixture. A certificate of analysis (COA) of the PGAB will be submitted with the mix design. The COA will be certified by a laboratory meeting the requirements of AASHTO R18. The Laboratory will be certified by the state DOT, regional equivalent, and/or qualified under ASTM D3666. Technicians will be certified by the regional certification agency in the discipline of HMA Plant Technician.

Bulk specific gravity (SG) used in air void content calculations shall not be determined and results will not be accepted using AASHTO T166 (saturated surface dry), since it is not intended for open graded specimens (>10% AV). Bulk SG shall be calculated using AASHTO T275 (paraffin wax) or ASTM D6752 (automatic vacuum sealing, e.g. CoreLok). Air void content shall be calculated from the bulk SG and maximum theoretical SG (AASHTO T209) using ASTM D3203.

The materials shall be combined and graded to meet the composition limits by mass (weight) as shown in the table below.

Porous Asphalt Mix Design Criteria

Sieve Size (inch/mm)	Percent Passing (%)
0.75/19	100
0.50/12.5	85-100
0.375/9.5	55-75
No.4/4.75	10-25
No.8/2.36	5-10
No.200/0.075 (#200)	2-4
Binder Content (AASHTO T164)	6 - 6.5%
Fiber Content by Total Mixture Mass	1.3% cellulose or 1.4% mineral
Rubber Solids (SBR) Content by Weight of the Bitumen	1.5-3% or TBD
Air Void Content (ASTM D6752/AASHTO	16.0-22.0%
Draindown (ASTM D6390)*	$\leq$ 0.3 %
Retained Tensile Strength (AASHTO	$\geq$ 80 %
Cantabro abrasion test on unaged samples (ASTM D7064-	$\leq$ 20%
Cantabro abrasion test on 7 day aged	$\leq$ 30%
% Compaction	16 – 19%

*Cellulose or mineral fibers may be used to reduce draindown.

**If the TSR (retained tensile strength) values fall below 80% when tested per NAPA IS 131 (with a single freeze thaw cycle rather than 5), then in Step 4, the contractor shall employ an antistrip additive, such as hydrated lime (ASTM C977) or a fatty amine, to raise the TSR value above 80%.

2.02 CHOKER COURSE

Crushed stone for the choker course shall meet the following:

- Maximum Wash Loss of 0.5%
- Minimum Durability Index of 35

- Maximum Abrasion Loss of 10% for 100 revolutions, and maximum of 50% for 500 revolutions.

Material for the choker course shall have the AASHTO No. 57 gradation. AASHTO no. 3 is also suitable for the choker course upon Engineer approval.

US Standard Sieve Size (Inches/mm)	Percent Passing (%)	
	Choker Course (AASHTO No. 57)	Choker Course Alternative (AASHTO No. 3)
6/150	-	-
2½/63	-	100
2 /50	-	90 – 100
1½/37.5	100	35 – 70
1/25	95 - 100	0 – 15
¾/19	-	-
½/12.5	25 - 60	0 - 5
3/8/9.5	-	-
#4/4.75	0 - 10	-
#8/2.36	0 - 5	-
#200/0.075		
% Compaction ASTM D698 / AASHTO T99	95 maximum	95 maximum

2.03 BASE MATERIAL

Open graded crushed stone shall be ASTM No. 57.

2.04 SUBBASE MATERIAL

Open graded crushed stone shall be ASTM No. 2.

2.04 DEMARCATION GEOTEXTILE:

Demarcation geotextile shall be as specified in Specification Section 02071 – GEOTEXTILE FABRIC.

PART 3 - EXECUTION

3.01 POROUS ASPHALT PAVING

A. Equipment for porous asphalt paving operations shall be in accordance with 409. Fuel oil, kerosene, or other solvents shall not be transported in open containers on any equipment at any time. Cleaning of equipment and tools shall not be accomplished on the pavement or paved shoulder areas.

B. Mix the aggregate and asphalt binder material within the established temperature

range until all the materials are coated. Segregation, flushing or bleeding of porous asphalt paving mixtures will not be permitted. Corrective action shall be taken to prevent the continuation of these conditions. All areas showing an obvious excess or deficiency of asphalt materials shall be removed and replaced. All mixture that becomes loose and broken, mixed with dirt, or is in any way obviously defective shall be removed and replaced.

C. Surfaces on which a porous asphalt paving mixture is to be placed shall be open graded free draining aggregate and free from objectionable or foreign materials at the time of placement. Contact surfaces of curbing, gutters, manholes, and other structures shall be tack coated in accordance with 406. Protect the mixture at all times from contamination by soil or other fine material during placement. Erosion controls and maintenance will be by others.

D. Porous asphalt paving shall not be placed between November 15 and March 15, or when the ambient air temperature at the pavement site in the shade away from artificial heat is below 16 °C (60 °F) or when the actual ground temperature is below 10 °C (50 °F). Only the Engineer may adjust the air temperature requirement or extend the dates of the pavement season. The Contractor shall not pave on days when rain is forecast for the day, unless a change in the weather results in favorable conditions as determined by the Engineer.

E. The porous asphalt paving layers will be placed in lifts with a minimum of 2 inches and a maximum of 4 inches. The mixture shall be placed upon an approved surface by means of a suitable asphalt paver. If hand work is required keep it to a minimum. Spread the mixture in a method that produces a smooth, uniform layer before compacting. Do not haul over the mixture.

F. Longitudinal joints on roads and streets shall be offset from lane lines a distance of 6 inches whenever possible. Transverse joints shall be constructed by exposing a near vertical full depth face of the previous course.

G. The porous asphalt paving mixture shall be compacted with equipment in accordance with 409.03(d) immediately after the mixture has been spread and finished. Rollers shall not cause undue displacement, cracking, or shoving.

H. Compact the mixture using a minimum of two (2) passes with a 10 ton static tandem steal wheel roller (do not use the roller in a vibratory mode), completely seating the aggregate particles. Do not over compact resulting in crushed or broken aggregate. Complete rolling before mix temperatures has dropped below 250 degrees F.

I. Traffic should be restricted for 24 hours after rolling.

J. Thickness Tolerance; Ensure the placed porous asphalt paving conforms to the specified thickness by randomly checking the thickness during construction. Surface Tolerance; Ensure that the finished surface is uniform and varies no more then +or- 1/2 inch from a 10-foot straight edge applied longitudinally to the

asphalt mat.

K. Porosity Test will be performed by conducting a water hose test with five gallons per minute minimum. There should be immediate infiltration with no puddles.

L. Mixing plants shall meet the requirements of hot mix asphalt plants as specified in the MassDOT Specifications unless otherwise approved by the Engineer.

M. The asphalt material shall be heated to the temperature specified in the MassDOT Specifications in a manner that will avoid local overheating. A continuous supply of asphalt material shall be furnished to the mixer at a uniform temperature.

N. The aggregate for the mixture shall be dried and heated at the mixing plant before being placed in the mixer. Flames used for drying and heating shall be properly adjusted to avoid damaging the aggregate and depositing soot or unburned fuel on the aggregate. Mineral filler if required to meet the grading requirements, shall be in a manner approved by the Engineer after the aggregates have passed through the dryer.

O. Mix Preparation: The above preparation of aggregates does not apply for drum-mix plants. The dried aggregate shall be combined in the mixer in the amount of each fraction of aggregate required to meet the job-mix formula and thoroughly mixed prior to adding the asphalt material. The dried aggregates shall be combined with the asphalt material in such a manner as to produce a mixture that when discharged from the pugmill is at a target temperature in the range that corresponds to an asphalt binder viscosity of 700 to 900 centistokes and within a tolerance of ± 11 °C (± 20 °F). The asphalt material shall be measured or gauged and introduced into the mixer in the quantity determined by the Engineer for the particular material being used and at the temperature specified in the relevant specification. After the required quantity of aggregate and asphalt material has been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the asphalt material throughout the aggregate is secured. The mixing time will be regulated by the Engineer. All plants shall have a positive means of eliminating oversized and foreign material from being incorporated into the mixer.

P. Should the porous asphalt mix not meet the tolerances specified within this section upon repeat testing, the Engineer may reject further loads of mix. Mix that is loaded into trucks during the time that the plant is changing operations to comply with a failed test shall not be accepted, and should be recycled at the plant.

3.02 BASE AND SUBBASE MATERIAL

A. Execution of the base material shall adhere to Part 3, Execution, of Specification Section 02300 – EARTHWORK.

PART 4 - GUARANTEE/WARRANTY

4.01 The pavement and coatings shall be guaranteed against defects in workmanship or quality for a period of one (1) year after final acceptance. The Contractor shall replace, repair, recoat or otherwise make satisfactory to the Owner any unacceptable pavement and or coating at no additional cost to the Owner.

END OF SECTION

SECTION 02801

SITE FURNISHINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 WORK INCLUDED:

A. Provide site improvements in the locations shown or as described herein, complete with anchorages and associated site work.

1.03 RELATED WORK:

A. Section 02300, EARTHWORK

B. Section 03300, CAST-IN-PLACE CONCRETE, for anchorages.

1.04 SUBMITTALS:

A. Contractor shall submit catalog information on site improvements for review by Engineer.

1.05 SCOPE:

A. The work of this Section consists of all Sports Equipment Site Improvements work and related items as indicated on the Drawings and/or specified herein and includes, but is not limited to, the following:

1. Interpretative signage (1’6” W-2’-8” L), includes Braille Panels
2. Interpretative signage (2’ W x 3’6” L)
3. Entry signage
4. Removable bollards and ground sleeves
5. Benches

PART 2 - PRODUCTS

2.01 INTERPRETIVE SIGNAGE (1’6” W-2’-8” L), INCLUDES BRAILLE PANELS

A. Braille Panel shall be: Round Railing Pedestal, 45 angled panel, The signs shall be 1’-6” W x 2’-8’L. by Fossil Industries (www.fossilgraphics.com) 44 Jefryn Boulevard Deer Park, NY 11729 Phone: 631.254.9200, or approved equal.

B. Each of the Braille Panel shall be mounted on two (2) mounting plate: 12”x12” black powder coated aluminum flat railing pedestal, surface mounted with a 45-degree viewing angle and a height of 44.5” +_ at the mounting point. Pedestal shall be Fossil Industries or

approved equal.

C. Signs shall be of solid, composite panels to be fire retardant, impervious to moisture, UV radiation, scratching, impact, and graffiti. UV inhibitor shall have a 10-year min. warranty for outdoor applications.

D. Laminate shall be manufactured with a smooth sub-surface image printed with 12-color high-definition printing technology and bonded with a ¾" total panel thickness.

E. Laminate shall be a Custom High Pressure Decorative Laminate consisting of decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.

F. Finish shall be semi-gloss with a reflectivity of 30 +- 5 units.

G. Owner shall supply all signage graphics in digital format as required by manufacturer to Contractor during construction.

H. Contractor shall supply mock-ups and digital representations of all signage for review and approval prior to manufacture.

2.02 INTERPRETATIVE SIGNAGE (2' W X 3'6" L)

A. One (1) Interpretative signed, upright double post pedestal, in ground even mounting, black powder coated aluminum, size 2' W x 3'6" by Fossil Industries (www.fossilgraphics.com) 44 Jefryn Boulevard Deer Park, NY 11729 Phone: 631.254.9200, or approved equal.

B. Signs shall be of solid, composite panels to be fire retardant, impervious to moisture, UV radiation, scratching, impact, and graffiti. UV inhibitor shall have a 10-year min. warranty for outdoor applications.

C. Laminate shall be manufactured with a smooth sub-surface image printed with 12-color high-definition printing technology and bonded with a ¾" total panel thickness.

D. Laminate shall be a Custom High Pressure Decorative Laminate consisting of decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.

E. Finish shall be semi-gloss with a reflectivity of 30 +- 5 units.

F. Owner shall supply all signage graphics in digital format as required by manufacturer to Contractor during construction.

G. Contractor shall supply mock-ups and digital representations of all signage for review and approval prior to manufacture.

2.03 ENTRY SIGNAGE

A. One (1) carved and painted foam sign using 1”x 1” powered coated square tube frame welded to match plate and bolted to 6” x 6” granite posts. Signs shall match detail drawings. Signs to be manufactured by Sunshine Sign, 508-839-5588, or approved equal.

B. Owner shall supply all signage graphics in digital format as required by manufacturer to Contractor during construction.

C. Contractor shall supply mock-ups and digital representations of all signage for review and approval prior to manufacture.

2.04 REMOVABLE BOLLARDS AND GROUND SLEEVES

A. Model RPL4- 4.5” OD, 36” height, with locking system by TrafficGuard, Inc. (PO Box 201 – Geneva, IL 60134 Phone: 877-727-7347 Fax: 800-814-7194 Web: www.traffiguard.net or approved equal.

B. Color shall be black unless otherwise decided by the owner during the submittal process.

C. Bollards supplied should be free from surface blemishes and defects where exposed to view in the finished installation.

D. Steel Tube: ASTM A513 Type 1, ASTM A513, Type 5, Stainless Steel Plate: ASTM A240

E. All surfaces are primed with rust & corrosion resistant, zinc rich primer w/ 5,000-hour salt spray performance. 2.4.2 Standard finish, TGIC Polyester outdoor finish RAL1028 Yellow. TGIC Polyester powder definition; meets decorative and functional requirements for gloss retention, physical properties, chemical resistance and weatherability.

F. Installation shall comply with manufacturer provided instructions and drawings. Flush mount when post removed.

G. Ground sleeves shall be installed with the top of the sleeve set flush with the finished surface.

2.05 BENCHES

A. Model #58-60 as manufactured by DuMor or approved equal as manufactured by Natural Structures or Custom Fabricators, Inc.

B. Benches shall be furnished with the surface mount footing option, such that each bench is expansion bolted to the concrete pad in conformance with manufacturer’s recommendations. Color shall be black unless otherwise decided by the owner during the submittal process.

C. Mounting hardware shall be vandal-resistant.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Any site improvement materials which are constructed of steel and not galvanized, or factory coated with a finish system shall be painted in the field in accordance with Division 9 Specification "Painting and Finishes". Colors by Landscape Architect.

3.02 CLEANING, REPAIR AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.

B. Provide temporary protection to ensure that the work will be without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protections and clean as necessary immediately before final acceptance.

C. Upon completion of the work and before acceptance, the Contractor shall remove and dispose of in an approved manner all surplus materials, rubbish, etc. which the Contractor may have accumulated during the course of the work and shall leave the site in a clean and orderly condition. The Contractor shall not abandon any material at or near the site regardless of whether or not it has any value.

END OF SECTION

SECTION 02821

TEMPORARY CHAIN LINK FENCE

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The Contractor shall provide all labor, materials and appurtenances necessary for the installation, maintenance and dismantling of 8-foot temporary fencing.

B. The Contractor shall be responsible for securing the site from trespassers. Existing fencing exists on portions of the site as shown on the Contract Drawings; it will be at the discretion of the Contractor to determine whether the existing fence is suitable for site safety and security. The Contractor shall install temporary fencing across lengths of damaged/unsuitable fencing to secure the site and prevent trespassers.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Manufacturer’s literature of the materials specified herein.

B. Shop drawings of the temporary fence and gates.

1. Shop drawings shall indicate layout of temporary fencing, location and size of gates, existing pavement and roads, and other site-specific conditions. Prepare drawing after site observation and verification of existing conditions.

PART 2 - PRODUCTS

2.01 TEMPORARY CHAIN LINK FENCING:

A. Unless otherwise indicated, type of 8-foot temporary chain link fencing shall be Contractor's option. Following types are acceptable:

1. New materials or previously used salvaged chain link fencing in good condition.

2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.

3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.

B. Gates: Provide gates of the quantity and size indicated on the Contract Drawings or required for functional access to Site.

1. Fabricate of same material as used for fencing.

2. Vehicle gates:

    a. Minimum width: 20 feet to allow access for emergency vehicles.
    b. Capable of manual operation by one person.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. The fence and gates shall be erected by skilled mechanics in accordance with the recommendations of the manufacturer and these specifications. These specifications shall take precedence over the recommendations of the manufacturer if any discrepancy exists between them.

B. Posts

    1. Maximum post spacing shall be 10-feet. Post spacing shall be uniform and posts shall be plumb.

    2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.

    3. For soft and unstable ground conditions, cast concrete plug around post.

    4. Posts over pavement: Use steel post plates or precast concrete blocks.

    5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

    6. Temporary terminal posts shall be securely connected to existing fence posts to prevent site access/trespassing.

C. Securely attach wire fabric to posts. Maximum area of unbraced fence fabric shall not exceed 1,500 square feet.

D. Install with required hardware.

E. Fabric shall be stretched taut, with the bottom edge following the existing grade, and shall be a continuous mesh between terminal posts. Each span of fabric shall be attached independently at terminal posts. Where terminal posts do not have provisions for weaving fabric to posts, stretcher bars shall be placed through the end weave of the fabric and secured to the post with bar bands spaced not more than 15-inches apart on the post. Temporary terminal posts shall be secured to existing fence posts to prevent Site access/trespassing.

F. Fabric shall be attached with ties to line posts at intervals of not more than 14-inches (and to the top railing and braces at intervals not exceeding 24-inches).

G. The bottom tension wire shall be interlaced in the weave of the fabric, pulled taut and fastened to terminal posts.

3.02 MAINTENANCE AND REMOVAL:

A. Maintain fencing in good condition. If damaged, immediately repair.

B. Remove temporary fencing upon completion of Work or when no longer required for security or control. Backfill holes and compact. Holes in pavement shall be surfaced to match existing paving. Repair damage caused by installation of temporary fencing.

END OF SECTION

SECTION 02843

REMOVE AND RESET GUARD RAILS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the removal and replacement of highway guard rails, including, but not limited to, dismantling, removal and storage of guard rail sections, resetting, joining and recoating the guard rail, and the replacement of guard rail parts damaged by the contractor's operations.

1.02 RELATED WORK:

A. SECTION 02300, EARTHWORK

B. SECTION 01550, SIGNAGE (TRAFFIC CONTROL)

1.03 REFERENCES:

A. The following standard form a part of these specifications and indicate the minimum standards required:

Massachusetts Department of Transportation (MassDOT)
Standard Specifications for Highways and Bridges

Section 630 MAINTENANCE OF HIGHWAY GUARD

PART 2 - PRODUCTS

2.01 GENERAL:

A. Splices and end connections shall be of the type and design shown on the Drawings and shall be of such strength as to develop the full design strength of the rail elements.

B. All fittings, bolts, washers, and other accessories shall be galvanized in accordance with the requirements of AASHTO M111 and AASHTO M232.

PART 3 - EXECUTION

3.01 GENERAL:

A. The Contractor shall perform all work to dismantle, remove, store, reset, join, and recoat all guard rail sections which must be removed to permit construction of the utilities. All work shall be in strict conformance with the MassDOT Standard Specifications for Highways and Bridges as noted in paragraph. 1.03 A above.

B. The Contractor shall supply, install and maintain portable positive barriers in place of all guardrails which are removed, until the guardrails have been reinstalled. Portable barriers shall meet the requirements of Section 01550, SIGNAGE (TRAFFIC CONTROL).

C. The Contractor shall replace at his own expense all parts and materials lost or damaged during the removal and resetting process. All galvanized surfaces which have been abraded so that the base metal is exposed, and threaded portions of all fittings and fasteners and cut ends of bolts shall be cleaned and painted with two coats of approved rust resistant paint.

D. Guard rails to be reset within the limits of the trench excavation shall not be reset until at least 30 days has elapsed after backfilling of that portion of the trench.

END OF SECTION

SECTION 02871

ORNAMENTAL BOLLARD WITH SOLAR LIGHTING

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section covers furnishing and installing ornamental bollards as indicated herein or on the Drawings.

B. The Contractor shall provide all equipment, materials, tools and labor to furnish, assemble and install the furnishings and accessories.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Shop drawings, operating and maintenance instructions, and parts list of all equipment specified herein.

1.03 DESIGN CRITERIA:

A. All equipment supplied shall be the manufacturer's latest and proven design and shall meet all specifications as stated on the models specified. These specifications call attention to certain features but do not purport to cover all details entering into the design of the equipment. Final approval on all equipment shall be given by the Engineer.

PART 2 - PRODUCTS

2.01 ORNAMENTAL BOLLARD:

A. The standard of quality, design, and function required for Ornamental Bollards is based on the Annapolis model, as manufactured by Landscape Forms, Inc., 431 Lawndale Avenue, Kalamazoo, Michigan 49048.

1. Bollard shall be as follows:
   Style:
   Smart Bollard with Solar Lighting
   Size:
   6-inch Nominal Diameter
   -Outer Diameter Pipe Size: 6.625-inches.
   -Wall Thickness: 0.280-inch.
   -Height: 33-inches (from finished grade to top of bollard).
   Mounting:
   Permanently embedded

2. Bollards shall be powder coated finish, color to match steel framing members.

3. Furnish all supplemental parts necessary to complete each item whether or not such parts are shown or specified. Furnish all fastenings for securing the work required in this section.
4. All hardware shall conform to ASTM A307 requirements and shall be galvanized per ASTM A153.
5. Additional acceptable manufacturers include:
   a. Reliance Foundry Co., Tel: 888-735-5680
   b. Secure USA, Tel: 888-222-4559
   c. Or approved equal.

B. Concrete for foundations shall be 4,000 PSI 28 day compressive strength with ¾-inch aggregate in compliance with Section 03302 Field Concrete.

C. Grout as required for anchoring shall be a pourable, quick setting, non-metallic and non-shrinking hydraulic cement grout equal to Five Star Grout by U.S. Grout Corporation; Sika Grout 212 by Sika Corporation; or Harris Construction Grout by AH Harris & Sons.

D. Solar Lighting:
   a. LED output – 35 lumens
   b. Solar Collector, Storage Battery, LED's, and Circuitry: Environmentally encapsulated in borosilicate glass cap.
   c. Light turns off during daytime charge cycle.
   d. 3 White LED's (3500° - Kelvin) provide 360-degree visibility with range over 1 mile.
   e. Security pin-in-socket mate with 5/16-18 stainless steel threaded insert.
   f. Maintenance-free replaceable battery with life of approximately 3 years.

PART 3 – EXECUTION

3.01 SETTING BOLLARDS:

A. All bollards shall be set plumb and level in locations shown on the Drawings and approved Shop Drawings. All anchor bolts shall be cast integral to foundations.

END OF SECTION

SECTION 02895

GRANITE BOUNDS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section of the specification covers furnishing and installation of granite bounds as shown on the drawings and herein specified.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Shop drawings, dimensioning and detailing bounds to be furnished.

PART 2 - PRODUCTS

2.01 GRANITE BOUNDS:

A. Granite bounds shall conform to Subsection M9.04.8 of Division III, Materials, of the latest edition of the Massachusetts Department of Transportation (MassDOT) Standard Specifications for Highways and Bridges.

B. Granite bounds shall be cut to dimensions shown on the drawings. The top shall be 6 inches square and shall have a drill hole 1½ inches deep and 1/2-inch in diameter in the center, with the bottom somewhat flared.

PART 3 - EXECUTION

3.01 INSTALLATION:

Unless modified herein, installation of granite bounds shall conform to Division II, Construction Methods, Section 710 of the latest edition of the MassDOT Standard Specifications for Highways and Bridges.

END OF SECTION

SECTION 02910

SOIL PREPARATION AND SOIL MIXES

PART 1 – GENERAL

1.01 WORK INCLUDED:

A. Screening, spreading and amending native topsoil as required from on-site stockpiles.

B. Furnishing topsoil from an off-site source, screening, and spreading, if needed.

C. Seed bed preparation.

1.02 RELATED WORK:

A. SECTION 02230, CLEARING AND GRUBBING

B. SECTION 02300, EARTHWORK

C. SECTION 01570, ENVIRONMENTAL PROTECTION

1.03 REFERENCES:

A. Reference Standards: NYSDOT Specifications.

1.04 SUBMITTALS – IN ACCORDANCE WITH SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Certificates: Manufacturers' or suppliers' certification that content of materials meets specification requirements.

1. Fertilizer.
2. Lime (if required).
3. Off-site topsoil.
4. Compost.

B. Test Reports: Soil Testing Reports for topsoil to be used for turf areas.

1.05 DELIVERY, STORAGE AND HANDLING:

A. Fertilizer and lime: Deliver to site in unopened, undamaged containers.

B. Store fertilizer and lime materials so they are protected from all forms of moisture such as rain, snow, surface drainage, ground water, condensation, etc.

C. Do not use wet, mildewed or caked material.

1.06 PROJECT CONDITIONS:

A. Environmental requirements: Do not prepare or place frozen soils or soils in a muddy condition. Do not spread topsoil on frozen or muddy subsoil.

B. Protection: Protect other parts of this Contract from damage.

PART 2 – PRODUCTS

2.01 TOPSOIL:

A. Native topsoil: from on-site stockpiles.

1. General Lawn Areas: Screen topsoil to meet the following gradation:

SIEVE SIZES	PERCENT PASSING BY WEIGHT
2 inch	100
1 inch	85 to 100
1/4 inch	65 to 100
No. 200 Mesh	20 to 50

B. Off-site topsoil:

1. The surface layer of dark colored humus soil, free from refuse, any material toxic to plant growth, subsoil, woody vegetation, stumps, roots, brush, stones, clay lumps or similar objects larger in greatest dimension than specified below. Sod and herbaceous growth such as grass and weeds shall be thoroughly broken up and mixed with the soil.
2. pH: between 5.5 and 7.6.
3. Organic content: Not less than 2% or more than 8%.
4. Gradation:
   70 – 75% Sand: with 50% of content being medium or coarse.
   10 – 15% Silt
   5 – 10% Clay

2.02 LAWN FERTILIZER:

A. Available nutrients, percent by total weight.

1. 9 nitrogen-at least 50 % from organic source.
2. 23 phosphorus.
3. 14 potassium.
4. Must contain a pre-emergent crabgrass control.

2.03 LIMESTONE:

A. Ground limestone with a minimum total neutralizing value of 88% calcium carbonate equivalence, minimum 90% passing the 20-mesh sieve and minimum 60 % passing the 100-mesh sieve.

2.04 COMPOST:

A. Compost shall contain organic matter or material of a generally humus nature capable of sustaining the growth of vegetation, with no "foreign" matter (i.e., glass, plastic, etc.) or material toxic to plant growth. It shall be free from stones, lumps or similar objects larger than two inches in greatest diameter, roots, and brush. Composts that have been derived from organic wastes such as food and agriculture residues, animal manures and sewage sludge that meet the above requirements and are approved by the State Environmental Agency are acceptable compost sources.

B. Compost for USE ON TURF shall have the following properties:

Parameters	Range
pH	5.5 - 8.5
Moisture content	35% - 55%
Particle Size	<1/2-inch
C:N ratio	15 - 30:1

2.05 WATER:

A. Water used during the installation, “grow-in”, and Maintenance period shall be provided and paid for by the Contractor. The Contractor shall be responsible for appropriate water application. Water utilized shall be suitable for irrigation and free from ingredients harmful to plant life.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Examine areas to receive soil preparation to assure work of other trades has been completed.

B. Remove jute mesh, staples, hay bales and other erosion control measures in the line of work.

C. Completely disc subsoil that has become compacted and re-grade to required subgrade.

D. Verify that all subsoils are positively drained and free of ponded areas and debris.

E. Perform topsoil analysis for pH with recommendations for adjustment to specified pH limits.

F. Do not proceed with soil preparation until unsatisfactory conditions are corrected.

3.02 PREPARATION:

A. If the subsoil has become overly compacted after discing, in the opinion of the Landscape Architect/Engineer, just prior to placing the topsoil, the subsoil material shall be scarified to a minimum depth of 3-inches so as to ensure a proper bond between the subsoil material and the topsoil.

B. Screen topsoil to remove particles larger than 3/4-inch.

3.03 INSTALLATION:

A. Topsoil:

1. Spread topsoil on all disturbed areas within Contract Limit Lines to a depth of 6-inches as shown on plans.
2. Import topsoil if stockpiled topsoil is insufficient to attain specified depth.
3. Fine rake topsoil to break up lumps and remove stones, debris, and foreign material one inch or larger in any dimension, and to establish a smooth uniform surface.
4. Final grades shall not vary more than one-tenth of a foot from elevations shown on Contract Drawings.
5. No unsightly variations, bumps, ridges, or other depressions which will hold water shall be acceptable.

B. Fertilization:

1. Apply fertilizer at a rate of 500 pounds per acre, or roughly 11.5 pounds per thousand square feet to all topsoil.
2. Lightly work fertilizer into the topsoil.

C. Liming:

1. Based on laboratory analysis and recommendations. Adjust pH of all areas to be between 5.5 pH and 6.5 pH, as follows:

Existing pH, less than 4.0	170 lbs./1000 SF
4.1 - 4.5	155 lbs./1000 SF
4.6 - 5.0	125 lbs./1000 SF
5.1 - 5.5	95 lbs./1000 SF

D. Compaction:

1. Exercise extreme caution in all topsoil areas that soil is not overly compacted.
2. Soil that has become overly compacted, in the judgment of the Landscape Architect, shall be re-worked to achieve a satisfactory condition at no additional cost.
3. Topsoil on sloped areas may be lightly rolled to prevent erosion if application of seed is delayed.

3.04 CLEAN-UP:

A. Immediately clean up spills of soil and conditioners on paved and finished surface areas.

B. Remove debris and excess materials from project site.

3.05 STOCKPILES:

A. Hydroseed excess topsoil remaining in stockpiles. Do not remove excess topsoil from Owner's property. Coordinate with school on spreading out excess topsoil, prior to hydroseeding.

END OF SECTION

SECTION 02920

LOAMING AND SEEDING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers all labor, materials, and equipment necessary to do all loaming, seeding and related work as indicated on the drawings and as herein specified. All lawns disturbed by the Contractor's operations shall be repaired as herein specified.

1.02 QUALITY ASSURANCE:

A. For a particular source of loam, the Engineer may require the Contractor to send approximately 10 pounds of loam to an approved testing laboratory and have the following tests conducted:

1. Organic concentration
2. pH
3. Nitrogen concentration
4. Phosphorous concentration
5. Potash concentration

B. These tests shall be at the Contractor's expense. Test results, with soil conditioning and fertilizing recommendations, shall be forwarded to the Engineer.

1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Information detailing the seed mixes, fertilizers, mulch material, slope protection material (if required) and origin of loam.

B. Test results.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. LOAM:

1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.

2. The loam shall contain not less than 4 percent nor more than 20 percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.

B. LIME:

Lime shall be standard commercial ground limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide), and 50 percent of the material must pass through a No. 100 mesh sieve with 98 percent passing a No. 2 mesh sieve.

C. FERTILIZER:

Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing at least 40 percent of organic nitrogen. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with State and Federal Laws, relating to fertilizers.

D. MULCH:

1. Materials to be used in mulching shall conform to the following requirements:

2. Straw Mulch - Straw Mulch shall consist of stalks or stems of grain after threshing.

3. Wood Fibre Mulch - Wood Fibre Mulch shall consist of wood fibre produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

E. SEED:

1. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.

2. Grass seed for lawn areas shall conform to the following requirements:

	Proportion by Weight	Germination Purity	Purity Minimum
Chewing's Fescue	30%	70%	97%
Kentucky 31 Fescue	30%	90%	98%
Kentucky Blue Grass	20%	80%	85%
Domestic Rye Grass	20%	90%	98%

Grass seed for cross-country areas, slopes and other areas not normally mowed shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Purity Minimum
Creeping Red Fescue	50%	85%	95%
Kentucky 31	30%	85%	95%
Domestic Rye	10%	90%	98%
Red Top	5%	85%	92%
Ladino Clover	5%	85%	96%

F. TEMPORARY COVER CROP:

1. Temporary cover crop shall conform to the following requirements:

	% Weight	Germination Minimum
Winter Rye	80 min.	85%
Red Fescue (creeping)	4 min.	80%
Perennial Rye Grass	3 min.	90%
Red Clover	3 min.	90%
Other Crop Grass	0.5 max.	
Noxious Weed Seed	0.5 max.	
Inert Matter	1.0 max.	

G. SLOPE EROSION PROTECTION:

1. Erosion control blanket shall be 100% degradable plastic mesh with 100% degradable straw or straw/coconut fill. Fill shall be held together by degradable fastening. Weight shall be 0.50 lb/sq. yd. Erosion control blankets shall be applied parallel to direction of water flow. The erosion control blankets shall be by North American Green, Evansville, IN or approved equal. For slopes 2:1 or greater, Model SC150 shall be used. For slopes less than 2:1, Model S150 shall be used.

2. Six-inch wire staples shall be placed according to manufacturers recommendations to anchor the mesh material. Staples shall be designed to decompose.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

A. After approval of rough grading, loam shall be placed on areas affected by the Contractor's operations. Loam shall be at least 6-inches compacted thickness.

B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2-3 tons of lime per acre.

C. Fertilizer shall be applied according to the soil test, or without a soil test, at the rate of 1000 pounds per acre.

D. Loam shall be worked a minimum of 3-inches deep, thoroughly incorporating the lime and fertilizer into the soil. The loam shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 6-inches after completion.

3.02 SEEDING:

A. Seeding shall be done when weather conditions are approved as suitable, in the periods between April l and May 30 or August l5 to October l, unless otherwise approved.

B. If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.

C. Seed shall be sown at the approved rate, on a calm day by machine.

D. One half the seed shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of l/4-inch and rolled with a roller weighing not more than l00 pounds per linear foot of tread.

E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than 3 sq. ft., the Contractor shall reseed, roll, and water as necessary to obtain proper germination.

F. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.

G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the

Contractor or as required by the Engineer. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized and the permanent seed crop shall be sown as specified.

3.03 PLACING MULCH:

A. Straw Mulch shall be loosely spread to a uniform depth over all areas designated on the plans, at the rate of 4-1/2 tons per acre, or as otherwise required.

B. Straw Mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least 80 percent of the hay or straw in lengths of 6-inches or more, otherwise it shall be spread by hand without additional compensation.

C. Wood Fibre Mulch shall be uniformly spread over certain selected seeded areas at the minimum rate of 1,400 pounds per acre unless otherwise required. It shall be placed by spraying from an approved spraying machine having pressure sufficient to cover the entire area in one operation.

3.04 SEEDING AND MULCHING BY SPRAY MACHINE:

A. The application of lime, fertilizer, grass seed and mulch may be accomplished in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, fertilizer, grass seed and mulch shall be equal to the specified quantities.

B. A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of limestone, fertilizer, grass seed and mulch per 100 gallons of water.

C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are unsatisfactory, the Contractor will be required to abandon this method and to apply the lime, fertilizer, grass seed and mulch by other methods.

3.05 INSPECTION AND ACCEPTANCE:

At the beginning of the planting season following that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at his own expense. The seeded areas shall be watered, weeded, cut and otherwise maintained by the Contractor until the end of that planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION

SECTION 02930

TREES, SHRUBS, GROUND COVERS, AND LANDSCAPING

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section includes furnishing all labor, materials, equipment, plants, and incidental materials necessary to perform all operations related to the planting of all trees, shrubs, vines, herbaceous plants, ground covers, and for all appurtenant work, complete in place, maintained, and accepted, in accordance with the Contract Drawings and Specifications.

B. The Contractor shall bear the responsibility and cost of furnishing and applying water or any other substances, as necessary to ensure the sustainability of plant materials, as part of the work of this contract.

1.02 RELATED WORK:

A. Section 02920, LOAMING AND SEEDING

1.03 SUBMITTALS:

In accordance with requirements of Section 01330 SUBMITTALS, the Contractor shall submit the following:

A. Prior to planting, State nursery inspection certificates for all plant materials.

B. Samples and manufacturer's product data, as applicable for the following materials:

1. Limestone.

2. Fertilizer.

3. Sphagnum Peat Moss.

4. Humus.

5. Organic Compost.

6. Manure.

7. Mulch.

8. Guying and Staking Apparatus.

9. Crepe Wrapping for tree trunks.

10. Anti-transpirant/Anti-desiccant.

11. Insecticides.

12. Herbicides.

13. Fungicides.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS:

A. The Contractor shall furnish and plant all plant materials as shown on the plans and in the quantities and sizes listed thereon. No substitutions shall be permitted without the written approval of the Engineer.

B. Plants larger than those specified in the Plant List may be used if approved by the Engineer. However, use of such oversized plants shall not be considered grounds for any increase in the contract price. If the use of larger plants is approved, the required spread of roots or ball of earth shall be increased in proportion to the size of the plant and plant pits shall be increased as necessary.

C. All plants shall be certified to have passed all required Federal and State inspection laws requiring ensuring freedom from plant diseases and insect infestations. The Contractor shall obtain clearance from applicable governing agencies, as required by law, before planting any plants delivered from outside the state in which they are to be planted.

D. All plants shall be nursery-grown under climatic conditions and environmental stresses similar to those in the locality of the project. All plants shall originate from nurseries that are no more than one Hardiness Zone higher (as established by the Arnold Arboretum, Jamaica Plain, MA) than where the plant is to be installed. Plants also shall conform to the botanical names and standards of size, culture, and quality for the highest grades and standards as adopted by the American Association of Nurserymen, Inc. in the American Standard for Nursery Stock, ANSI-Z60.1, latest edition. All plants shall be legibly tagged with their proper botanical name.

E. No heeled-in plants or plants from cold storage shall be used. All plants shall be typical of their species or variety and shall have a normal habit of growth. Plants shall be sound, healthy, and vigorous, well branched and densely foliated when in leaf; shall be free of disease, insects, eggs or larvae; and shall have healthy, well-developed root systems. All parts of the plant shall be moist and shall show active green cambium when cut.

F. All nursery plants shall be balled and burlapped or container-grown and shall have been acclimatized for at least one growing season. Container-grown stock shall have been grown in a container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole, after removal from the container. No plants shall be loose in the container. Container-grown plants shall have no girdling roots and shall not be in a root-bound condition. Plants shall remain in their container until planted.

G. Care shall be exercised in digging and preparing field-grown plants for shipment and planting. Balled and burlapped materials shall have solid unbroken balls of earth of sufficient size to encompass all fibrous feeding roots necessary to ensure successful recovery and development of the plants. Balls shall be firmly wrapped in untreated biodegradable burlap and tied securely with wire cages and/or jute twine. Roots or balls of plants shall be adequately protected at all times from sun and drying winds. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during planting, or after the burlap, staves, wire cage, rope, or platform in connection with its transplanting have been removed. Soil characteristics (i.e., composition, texture, pH, etc.) of all field-grown plants shall closely match those of the soil where plant materials are to be planted.

H. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the Plant List in the Drawings. The branching height for deciduous trees installed adjacent to or within walks shall be 7 feet minimum, having been pruned to this height at least 1 year prior to transplanting. Except when a clump is designated, the trunk of each tree shall be a single trunk growing from a single, unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire, or other causes. All pruning cuts shall comply with acceptable horticultural practices. No pruning wounds having a diameter of more than 1½-inches shall be present. Any such wounds must show vigorous bark growth on all edges. Evergreen trees shall be branched to within 1 foot of the ground. No tree that has had its leader cut or die shall be accepted.

I. Caliper measurements for tree trunks shall be taken 6-inches above ground for trees up to and including 4-inch caliper size and at 12-inches above ground for larger sizes.

J. Shrubs shall meet the requirements for spread and/or height stated in the Plant List on the Drawings. The measures for height are to be taken from the crown or root flare to the average height of the top of the shrub mass (not the longest branch). The fullness of each shrub shall correspond to the trade classification "No. 1". Single stemmed or thin plants will not be accepted. The side branches must be generous, well-twigged and the plant as a whole must be well-bushed to the ground. The plants must be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.

K. Herbaceous plants, vines and groundcovers shall be of the size, age and/or condition designated in the Plant List on the Drawings.

L. Plants shall be delivered only after preparations for planting have been completed. Plants shall be handled and packed in a horticulturally approved manner and all necessary precautions shall be taken to ensure that plants arrive on-site in a healthy vigorous condition. Trucks used for transporting plants shall be equipped with covers to protect plants from windburn, desiccation, and overheating during transport. Plants that have not been thoroughly watered shall not be accepted at the planting site. Any plants delivered to the site in a dry or wilted condition shall be rejected and replaced at no expense to the Owner. All plant materials shall be protected, watered and otherwise maintained prior to, during, and upon delivery to the site.

M. Plants shall be subject to inspection and approval by the Engineer at the place of growth, or upon delivery, for conformity to specification requirements as to quality, size, variety, and condition. Inspection and selection of plants before digging shall be at the option of the Engineer. The Contractor, or his representative, shall be present, if requested by the Engineer, for inspection of plants at the Nursery. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of work, for size and condition of balls and roots, disease, insects and latent defects or injuries. Rejected plants shall be removed immediately from the site. Certificates of inspection of plant materials shall be furnished as may be required by Federal, State and other authorities to accompany shipments.

2.02 LOAM BORROW:

Loam Borrow shall be as specified in Section 02920, LOAMING & SEEDING.

2.03 SOIL ADDITIVES AND AMENDMENTS:

A. LIMESTONE:

Lime shall be an approved agricultural limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide). The material will be ground such that 50 percent of the material will pass through a No. 100 mesh sieve and 98 percent will pass a No. 2 mesh sieve. Lime shall be uniform in composition, dry and free-flowing and shall be delivered to the site in the original sealed containers, each bearing the manufacturer’s guaranteed analysis.

B. FERTILIZER:

1. Fertilizer shall be a complete, standard commercial fertilizer, homogeneous and uniform in composition, dry and free-flowing, and shall be delivered to the site in the manufacturer’s original sealed containers, each bearing the manufacturer’s guaranteed analysis and marketed in compliance with State and Federal Laws. All fertilizer shall be used in accordance with the manufacturer’s recommendations.

2. Fertilizer for tree, shrub and groundcover plantings shall contain all major plant nutrients and minor trace elements essential to sustain plant growth and shall have the following analysis:

Nitrogen (N)	Phosphorous (P)	Potassium (K)
10%	10%	10%

3. As approved by the Engineer, a slow release root contact fertilizer installed at the time of planting, may be used in place of the above, at the discretion of the Contractor.

C. Organic Compost shall be a standard commercial product comprised of fully decomposed, 100 percent plant-derived, natural organic matter. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Compost shall be free of sticks, stones, weed seeds, roots, mineral or other foreign matter and delivered air dry. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, and/or substances harmful to plant growth and viability. Organic compost shall have an acidity range of 4.5 to 7.0 pH.

D. Sphagnum Peat Moss shall be a standard commercial product. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Peat moss shall be free of sticks, stones, weeds or weed seeds, roots, mineral or other foreign matter. It shall be free from toxic substances and/or compounds harmful to plant growth and viability. It shall be delivered air dry in standard bales and shall have an acidity range of 3.5 to 5.5 pH.

E. Humus shall be natural humus, reed peat, or sedge peat. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Humus shall be free of sticks, stones, weeds, roots, mineral or other foreign matter and/or toxic substances harmful to plant growth and viability. It shall be low in wood content, free from hard lumps and excessive amounts of zinc and delivered air dry in a shredded or granular form. The acidity range for humus shall be 5.5 to 7.5 pH, and the organic matter content shall be not less than 85 percent, as determined by loss on ignition. The minimum water holding capacity shall be 200 percent by weight on an oven-dry basis.

F. Manure shall be well-rotted, leached, cow manure not less than 8 months or more than 2 years old. It shall be free of sawdust, shavings, or refuse of any kind and shall not contain more than 25 percent straw. It shall contain no substances harmful to plant growth. The Contractor shall furnish information regarding chemical disinfectants, if any, that may have been used in storage of the manure.

2.04 PLANTING MIXTURE:

Planting mix shall consist of 7 parts loam borrow and 1 part organic compost, humus, sphagnum peat moss, or manure, thoroughly blended.

2.05 WATER:

Water shall be furnished by the Contractor, unless otherwise specified, and shall be suitable for irrigation and free from ingredients harmful to plant growth and viability. The delivery and distribution equipment required for the application of water shall be furnished by the Contractor, at no additional cost to the Owner.

2.06 MULCH:

Mulch shall be fibrous pliable shredded softbark mulch, not exceeding ½-inch in width. It shall be 98 percent organic matter with a pH range between 3.5 and 4.5 and a moisture content not to exceed 35 percent. It shall be free of weeds, weed seeds, debris, and other materials harmful to plant growth and viability. Organic mulch shall be aged no longer than 2 years.

2.07 MATERIALS FOR STAKING, GUYING, AND WRAPPING:

A. Tree stakes shall be sound, untreated 2 x 3 (nominal) x 8-foot length Douglas Fir reasonably free of knots. No paint or stain shall be used in conjunction with tree stakes. Tying material shall be flexible braided nylon webbing, ¾-inch wide and have a tensile strength of 900 pounds. Webbing shall be 'ArborTie', or approved equal.

B. Drive anchors and guy wire assemblies shall be suitable for protecting trees and shall be sized in accordance with the manufacturer's recommendations. No materials shall be used for guying that will girdle, chafe, or otherwise injure trees.

C. Tree wrap shall be duplex, waterproof kraft paper crinkled to 33-1/3 percent stretch, 4- to 6-inch wide strips. Tying materials shall be jute twine, 2-ply for shrubs and trees less than 3-inch caliper; 3-ply for larger plants.

2.08 TREE PAINT:

Tree paint shall not be used.

2.09 ANTI-TRANSPIRANT/ANTI-DESICCANT:

Anti-transpirant or anti-desiccant shall be 'Wilt-Pruf', as manufactured by Nursery Specialty Products, Inc., Groton Falls, NY, or approved equal. It shall be delivered in original sealed manufacturer's containers and used in accordance with the manufacturer's instructions.

2.10 INSECTICIDES:

A. No insecticides shall be used on-site without the Contractor notifying and obtaining the prior approval of the Engineer.

B. Insecticides shall be EPA registered and approved for use in public open spaces. All insecticides shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's instructions.

C. Insecticide use shall be limited and selective, only to control specific insect infestations, as identified by the Contractor or the Owner's Representative, that may result in the disfigurement, decline, or death of plant materials.

2.11 HERBICIDES:

A. No herbicides shall be used on-site without the Contractor notifying and obtaining prior approval of the Engineer.

B. Herbicides shall be EPA registered and approved for use in public open spaces. All herbicide shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's instructions.

C. Herbicide for post-emergent application shall be glyphosate contact, 'Roundup', as manufactured by Monsanto, Inc., or approved equal.

D. Herbicide use shall be limited and selective, only to control specific weed infestations that have been identified by the Contractor or the Owner's Representative.

2.12 FUNGICIDES:

A. No fungicides shall be used on-site without the Contractor notifying and obtaining prior approval of the Engineer.

B. Fungicides shall be EPA registered and approved for use in public open spaces. All fungicides shall be handled by State licensed applicators only, delivered in the original sealed manufacturer's containers, and used in accordance with the manufacturer's instructions.

C. Fungicide use shall be limited and selective, only to control specific fungal pathogenic disease infestations, as identified by the Contractor or the Owner's Representative, that may result in the disfigurement, decline, or death of plant materials.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. All plants shall be subject to inspection and approval by the Engineer upon delivery to the site. No materials shall be planted until approval is received.

B. All work shall be performed by skilled workers with a minimum of 2 years planting experience, in accordance with accepted horticultural/nursery practices, under the full-time supervision of a Certified Nurseryman or Arborist.

C. All balled and burlapped plants that cannot be planted immediately upon delivery shall be set on the ground and the root balls shall be well protected with soil, wet moss, or other acceptable material. All foliage shall be protected and covered with perforated shade materials.

D. The planting season for evergreen trees and shrubs shall extend from the time the soil becomes workable in the spring until new growth appears, and from September 15 until November 30 in the fall. Deciduous trees and shrubs shall be planted only when dormant, either prior to bud break and/or before leaves appear in the spring, or subsequent to their leaf drop in the fall. Ground covers shall be planted only after the last frost in the spring through mid-May. Planting season periods may be extended if weather and soil conditions permit only with the written approval of the Engineer. Extended or out-of-season planting requirements shall include application of antitranspirant and extra water as needed. Plant guarantee periods shall remain as stated below. Planting shall not be permitted in frozen ground.

E. All plant locations and outlines for planting beds shall be staked out for review and potential adjustment by the Engineer before any excavation is begun. In the event that rock, underground construction work or obstructions are encountered in any proposed planting pit or bed, the Engineer may select alternate locations. Where locations cannot be changed, the obstruction shall be removed, subject to the Engineer's approval, to a depth of not less than 3 feet below grade and not less than 6-inches below the bottom of the root ball when plant is properly set at the required grade. Removal of boulders or obstructions greater than 1 cubic yard in size shall be subject to approval and will be paid for by the Owner. No ledge will be removed to create planting pits or beds

F. All planting pits shall be excavated with sloped walls, wider at the top than at the bottom, and scarified to eliminate glazing. Tree pits shall be at least 2 feet greater in diameter than the root ball of earth or root system. Shrub pits shall be at least 1 foot greater than the diameter of the root ball. Planting pits shall not be deeper than the height of the root ball.

G. When excavation occurs in areas of heavily compacted earth, stones, concrete chunks or other foreign matter, pits shall be dug at least 3 times the width of the rootball. Excavated material from plant pits shall be disposed of as required.

H. Container plants shall be removed from their growing container before planting. If roots are densely matted, the outer root mass shall be scored, sliced vertically, with a sharp knife to separate roots. All herbaceous plants and groundcovers shall be evenly spaced to produce a uniform effect and staggered in rows at intervals designated on the contract drawings.

I. Shrubs and trees shall be set in the center of planting pits, plumb and straight, and at such a level that after settlement the crown of the roots will be 1-inch above the surrounding finished grade. Root ball masses shall not be loosened, broken or damaged. When balled and burlapped plants are set, planting mixture shall be compacted around bases of balls to fill all voids. All tying materials, twine and rope shall be cut and removed. Biodegradable burlap shall be laid back or cut away from the top half of the ball. If a wire basket is present, the upper 2/3 of the basket shall be cut away and removed. Do not remove the entire basket. Roots or bare root plants shall be properly spread out and planting mixture carefully worked in among them. Broken or frayed roots shall be cleanly cut.

J. Backfill plant pits with planting mixture in layers of not more than 9-inches and firmly tamp each layer and water to sufficiently settle the backfilled soil before the next layer is put in place. When the planting pit is 2/3 backfilled, the hole shall be flooded and watered thoroughly so that the water level reaches the top of the planting pit. Allow water to soak in, then complete the backfilling operation. Immediately after planting pit is backfilled, a shallow basin 3-inches deep and slightly larger than the pit shall be formed with a ridge of soil for water retention. Form a common basin for plant materials throughout mass planting beds. After planting, lightly till the soil in planting beds between planting pits and rake smooth to eliminate compaction of soils.

K. All planting hole basins shall be flooded with water twice within the first 24 hours of planting, and watered not less than twice per week until final acceptance of the work.

L. All thin barked deciduous trees shall be wrapped after they are planted and before they are staked. Prior to wrapping, inspect trees for injury to trunks or improper pruning. Take corrective measures as necessary. Wrap trunks of all trees spirally from bottom to top with tree wrap and secure top and bottom at 2-foot intervals with jute twine. The wrapping shall overlap and entirely cover the trunk from the ground to the height of the second branches and shall be neat and snug. Overlap shall be approximately 2-inches.

M. Stake trees immediately after planting as detailed. All staking apparatus shall be adequate to hold the tree in a vertical position under severe weather conditions. All staking apparatus and tree trunk wrapping shall be removed and disposed of off-site by the Contractor at the end of one growing season.

N. Immediately after planting and staking operations are complete, all plant pit basins and plant beds shall be covered with approved mulch to the depths designated on the plans. Mulch shall not contact tree bark, cover tree root flares, or shrub crowns. No mulch shall be applied prior to the first watering.

O. The pruning of trees and shrubs shall only be permitted to remove dead or dying branch limbs and tips, sucker growth, water sprouts, crossing or rubbing branches, broken or damaged branches, diseased or insect infested limbs, and to preserve the natural character of the plant. Plant materials shall be pruned in accordance with American Nurserymen Association Standards and as required by the Engineer. Questionable weak limbs and branch removals that may disfigure the plant shall be left to the discretion of

the Engineer. The tree leader shall never be permitted to be cut. Pruning shall be done with clean, sharp tools. All large pruning cuts that are ½-inch in diameter or larger shall be made along the bark branch ridge. Pruning cuts shall not breach or otherwise interfere with the branch collar. All pruning cuts less than ¼-inch diameter shall be made with hand pruners as close to the main stem as possible without damaging the cambium or bud. Tree paint shall not be used to cover pruning cuts.

P. As the work proceeds, the Contractor shall remove all debris from the site, including but not limited to branches, rock, paper, and rubbish. All areas shall be kept clean, neat and in an orderly condition at all times. Prior to final acceptance, the Contractor shall cleanup the entire area to the satisfaction of the Engineer.

3.02 MAINTENANCE:

A. Maintenance shall begin immediately after each plant is planted and shall continue until completion of the guarantee period and final acceptance of the project. Plants shall be watered, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Tree guys and stakes shall be tightened and repaired. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.

B. Settled plants shall be reset to proper grade and position, planting pits and common basins restored, and dead materials removed and replaced. Planting beds and individual basins shall be neat in appearance, maintained to their original layout lines and kept free of weeds. Mulch shall be replaced as required to maintain proper depths.

C. Contractor shall make arrangements to provide sufficient water to maintain all trees, shrubs and plant materials until final acceptance. Plants shall be sprayed with anti-transpirant or anti-desiccant if required by seasonal conditions or as required by the Engineer.

D. Planting areas shall be protected against trespass and damage of any kind during the maintenance period. This shall include the furnishing and installation of approved temporary fencing if necessary. If any plants become damaged during the maintenance period, they shall be treated or replaced as required by the Engineer at no additional cost to the Owner.

3.03 INSPECTION AND PRELIMINARY ACCEPTANCE:

A. Contractor shall provide written notice to the Engineer not less than 10 days before the anticipated date of inspection for preliminary acceptance. The Engineer shall recommend preliminary acceptance of the work of this Section only after completion and re-inspection of all necessary repairs, renewals or replacements.

B. Inspection and acceptance of plantings may be requested and granted in part, provided the areas for which acceptance is requested are relatively substantial in size, and with clearly definable boundaries. Acceptance and use of these areas by the Owner shall not waive any other provisions of this Contract.

3.04 GUARANTEE:

A. All plant materials shall be guaranteed for a period of one year after the date of completion of the specified maintenance period and preliminary acceptance of the project by the Owner.

B. When the work is accepted in part, the guarantee period shall extend from each partial acceptance to the terminal date of the last guarantee period. All guarantee periods terminate at one time.

C. Plants shall be healthy, free of pests and disease. Plants shall exhibit vigorous growth, shall bear foliage of normal density, size and color and shall have no less than seventy-five percent (75%) of their branches alive at the end of the guarantee period. If the leader of any single-leader species is dead, the entire plant shall be considered dead.

D. Any plant required under this Contract that is dead or unsatisfactory, as determined by the Engineer, shall be removed from the site. These shall be replaced as soon as weather permits during the specified planting season, at no additional cost to the Owner, until the plants live through one year.

E. All replacements shall be plants of the same kind and size as specified on the Plant List. They shall be furnished and planted as specified above.

F. The guarantee of all replacement plants shall extend for an additional one-year period from the date of their acceptance as replacement.

G. Guarantee shall not apply to the replacement of unacceptable plants resulting from the removal, loss, or damage due to occupancy of the project in any part; vandalism or acts of neglect on the part of others; physical damage by animals, vehicles, etc.; and Acts of God, including but not limited to, catastrophic fire, hurricanes, riots, war, etc.

H. In the instance of curtailment of water by local water authorities (when supply was to be furnished by the Owner), the Contractor shall furnish all necessary water by water tanker, the cost of which will be approved and paid for by the Owner.

3.05 FINAL INSPECTION AND FINAL ACCEPTANCE:

A. At the end of the guarantee period, the Contractor shall provide written notice to the Engineer not less than 10 days before the anticipated date of final inspection for final acceptance.

B. The Engineer shall recommend final acceptance of the work of this Section only after completion and re-inspection of all necessary repairs, renewals or replacements.

END OF SECTION

SECTION 02955

WETLAND RESTORATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Wetland Restoration is required only if the Contractor infringes upon wetland areas. Wetland Restoration shall be provided at no additional cost to the Owner.

B. Furnish all labor, materials, equipment and incidentals required to install erosion control measures, place manufactured topsoils, finish grade, apply soil amendments, install plant stock, apply seed and mulch, and maintain the restoration areas as specified herein.

C. Restore all wetland areas which are temporarily altered by construction activities including excavation, clearing and trenching of wetlands during the course of construction to equal or better than that condition which existed previous to construction. If wetland areas cannot be restored as a result of the Contractor's activities, provide replication areas as approved by the Engineer. All restoration and replication work resulting from the Contractor's activities shall be at no additional cost to the Owner.

D. The work includes:

1. Supply manufactured topsoil Type I as specified in Section 02920 for wetland restoration area.

2. Excavate planting pits.

3. Furnish and plant trees, shrubs and herbaceous material.

4. Prune plant materials as specified.

5. Maintenance.

6. Final cleanup and all other work required to complete the requirements of this Section.

1.02 RELATED WORK

A. Site preparation including clearing, grubbing and stripping is included in Section 02100.

B. Earthwork, including production of topsoil is included in Section 02200.

C. Erosion and sedimentation control is included in Section 02270.

D. Topsoiling and seeding is included in Section 02930.

E. Copies of all environmental permits are included in attachment to bid documents.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, the following:

1. State Nursery Inspection Certificates and samples of material for inspection and acceptance upon Engineer's request for inspection and approval.

2. Certification by the landscaping contractor that all plant stock obtained for this work is the plant indicated and of quality as specified.

3. Documentation showing that the landscaping contractor performing the work has successfully completed at least two projects of this scope within the last two years and showing that their main business is landscaping.

4. Complete written instructions for maintenance of the materials for use by the Owner after the warranty period specified in Paragraph 1.06 furnished in this Section.

1.04 DEFINITIONS

A. Wetland Restoration occurs where construction activities will temporarily alter an existing wetland area. This requires restoration of topography, soil structure and vegetation to pre-construction conditions.

B. Installation Inspection: The Engineer shall inspect all work performed under this Section at the completion of installation, upon the written request of the Contractor received at least 10 days before the anticipated date of inspection. The Engineer shall inspect said work for compliance with the plans and specifications specifically with regard to number of plants, plant sizes, species, and location. Any and all corrective work identified during the inspection shall be performed at no additional cost to the Owner.

C. Final Inspection: The Engineer will provide a professional wetland scientist (PWS) to inspect all Work performed under this section at the completion of two complete growing seasons, approximately April 15 to approximately October 15, following Installation Inspection. The Engineer shall inspect all areas for compliance with the plans and specifications, for compliance with the Orders of Conditions, and the General Performance Standards for Bordering Vegetated Wetlands - 310 CMR 10.55 (4)(b)(1-7). Copies of the Orders of Conditions.

1.05 REFERENCE STANDARDS

A. American Standard for Nursery Stock, ANSI Z60.1.

B. Tree and Shrub Transplanting Manual by the International Society of Arboriculture (ISA).

1.06 WARRANTY

A. For a period of two years from the date of Substantial Completion, the Contractor warrants to the Owner that the wetland restoration conforms to these specifications and is free from defects in materials and workmanship. The Contractor shall provide maintenance during the warranty period in accordance with Paragraph 3.07. The Contractor shall inspect the work at the beginning and end of each growing season and shall replace, at no additional cost to the Owner, any work found to be defective within said warranty period. Such replacement shall include the cost of removal and reinstallation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Seed shall be received in the manufacturer's original unopened container bearing the date of the last germination test, which date shall be within a period of six months prior to commencement of seeding operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The wetland seed mixture for wetland restoration area shall be Type D as follows:

1. Type D Seed Mix

30% Lurid Sedge (Carex lurida)
25% Canada Manna Grass (Glyceria canadensis)
10% Fringed Sedge (Carex crinita)
10% Joe-Pye Weed (Eupatoriadelphus maculatus)
10% Broom Sedge (Carex tribuloides)
5% Woolgrass (Scirpus cyperinus)
5% Boneset (Eupatorium perfoliatum)
<5% Tussock Sedge (Carex stricta)
<5% Blue Vervain (Verbena hastata)

The seed mix shall contain none of the following:

Reed Canarygrass (Phalaris arundinacea)
Common Reed (Phragmites australis)
Purple Loosestrife (Lythrum salicaria)

B. The seed shall be furnished and delivered premixed. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted and approved.

PART 3 EXECUTION

3.01 WETLAND RESTORATION

A. Restore all existing wetland areas which are temporarily altered as the result of construction mat placement. This requires restoration of topography, soil structure to pre-construction conditions and application of wetland seed mix.

3.02 INSPECTION

A. The Engineer will provide a Professional Wetland Scientist (PWS) to inspect all work performed under this Section. END OF SECTION

PART 4 PRODUCTS

4.01 MATERIALS

A. Seed shall be received in the manufacturer's original unopened container bearing the date of the last germination test, which date shall be within a period of six months prior to commencement of seeding operations. Seed shall be from same or previous year's crop; each variety of seed shall have a purity of not less than 85 percent, a percentage of germination not less than 90 percent, shall have a weed content of not more than 1 percent and contain no noxious weeds. The wetland seed mixture for wetland restoration area shall be Type D as follows:

1. Type D Seed Mix

30% Lurid Sedge (Carex lurida)
25% Canada Manna Grass (Glyceria canadensis)
10% Fringed Sedge (Carex crinita)
10% Joe-Pye Weed (Eupatoriadelphus maculatus)
10% Broom Sedge (Carex tribuloides)
5% Woolgrass (Scirpus cyperinus)
5% Boneset (Eupatorium perfoliatum)
<5% Tussock Sedge (Carex stricta)
<5% Blue Vervain (Verbena hastata)

The seed mix shall contain none of the following:

Reed Canarygrass (Phalaris arundinacea)
Common Reed (Phragmites australis)
Purple Loosestrife (Lythrum salicaria)

B. The seed shall be furnished and delivered premixed. A manufacturer's certificate of compliance to the specified mixes shall be submitted by the manufacturer for each seed type. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed and also the net weight and date of shipment. No seed may be sown until the certificates have been submitted and approved.

PART 5 EXECUTION

5.01 WETLAND RESTORATION

A. Restore all existing wetland areas which are temporarily altered as the result of construction mat placement. This requires restoration of topography, soil structure to pre-construction conditions and application of wetland seed mix.

5.02 INSPECTION

A. The Engineer will provide a Professional Wetland Scientist (PWS) to inspect all work performed under this Section.

END OF SECTION

SECTION 02956

STREAMBED MATERIALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

Section includes general, material, and construction specifications for installation of Streambed Materials including Salvaged Streambed Material and Engineered Substrate.

1.02 RELATED WORK:

A. Section 00890 PERMITS

B. Section 01110 CONTROL OF WORK AND MATERIALS

C. Section 01570 ENVIRONMENTAL PROTECTION

D. Section 02300 EARTHWORK

E. Section 02230 CLEARING AND GRUBBING

F. Section 02140 DEWATERING

1.03 REFERENCES:

American Society for Testing and Materials (ASTM)

ASTM	C535	Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM	D5240	Standard Test Method for Evaluation of Durability of Rock for Erosion Control using Sodium Sulfate or Magnesium Sulfate
ASTM	D5519	Test Method for Particle Size Analysis of Natural and Manmade Riprap Materials
ASTM	D5873	Test Method for Determination of Rock Hardness by Rebound Hammer

American Association of State Highwater and Transportation Officials (AASHTO)

AASHTO TP61 Method of Test for Determining the Percentage of Fracture in Coarse Aggregate

AASHTO T85 Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate

AASHTO T103 Method of Test for Soundness of Aggregates by Freezing and Thawing

AASHTO T104 Standard Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

1.04 DEFINITIONS:

Stream Material: Includes Salvaged Streambed Material and Engineered Substrate intended to re-establish a nature stream bed substrate within areas scheduled for sediment and/or debris removal.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Material Source: Name, location, and contact information for proposed Material Source(s). If multiple Material Sources are proposed, clearly identify which Stream Materials are proposed to be supplied from each proposed Material Source.

B. Delivery tickets showing source, type, and weight of each load of Stream Material delivered to the Project Site.

C. Certified Test Results, as requested by Engineer if Engineer's or Owner's inspection of materials suggest that provided material may not meet the specifications provided herein.

1.05 QUALITY ASSURANCE

A. Material Source Visit: As necessary, coordinate on-site visit with Stream Restoration Specialist to Material Source for Engineer or Owner to approve Material Source as a Qualified Source.

B. Pre-installation Site Visit: Notify Engineer one week in advance of first installation of each unique Stream Material. Attend pre-installation Site Visit with Engineer to review specifications, drawings, and submittals in advance of placing Stream Materials.

C. Test Section: Install a test section of at least 100 square feet if directed by Engineer. Obtain Engineer approval before proceeding with placement of remaining Stream Materials.

PART 2 - PRODUCTS

2.01 SALVAGED STREAMBANK MATERIAL

A. Natural, suitable material free generated from on-site excavation associated with stream restoration activities.

B. Free of concrete rubble, rubbish, trash, junk, debris, and organic matter.

2.02 ENGINEERED SUBSTRATE

A. Comparable in composition to Salvaged Streambed Material but generally hard and durable granite, or other hard rock material free from laminations, fractures, bedding planes, pronounced weathering, calcite intrusions, earth, or other adherent coatings.

B. Free of concrete rubble, rubbish, trash, junk, debris, and organic matter.

C. Natural, semi-angular or rounded gravel, cobble, and/or boulders with the following gradation, subject to field-adjustment by Owner to achieve desired natural appearance:

Sieve Size	Percent Finer by Weight
42"	100
30”	85 to 95
15”	45 to 60
6”	25 to 40
3”	10 to 20
No. 200	2.5

PART 3 - EXECUTION

3.01 PREPARATION

A. Sufficiently dewater work area per Section 02140.

B. Prepare Subgrade per Section 02300 and provide smooth surface. Notify Stream Restoration Specialist if existing streambed materials encountered during excavation may be suitable for salvage and reuse.

C. Minimize segregation of Stream Materials when hauling from stockpile to installation location. Remix as necessary to correct segregation.

3.02 PLACING ENGINEERED SUBSTRATE

A. Until Stream Restoration Specialist approval of Test Section, Stream Restoration Specialist shall observe placement of Engineered Substrate.

B. Remix as necessary to correct segregation that may have occurred.

C. Avoid disturbing Prepared Subgrade or bedding materials.

D. Place Engineered Substrate in a single lift to minimum depth shown on Plans.

E. At direction of Stream Restoration Specialist, re-arrange large particles to reduce or increase protrusion above Proposed Grade.

F. Final grade elevation tolerances of 0.1 feet, excluding protruding substrate with median grain diameter in excess of 18 inches.

3.03 3.04 REJECTION OF WORK AND MATERIALS

A. Stream Materials that do not conform to this Section will be rejected by Owner, whether delivered to the Site or placed. Remove rejected Stream Materials from Site and replace with conforming Stream Materials at no additional cost to Owner.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 -GENERAL

1.01 GENERAL PROVISIONS:

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 – GENERAL REQUIREMENTS, which are hereby made part of this Section of the Specifications.

1.02 DESCRIPTION OF WORK:

A. Work Included: This Section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes for the following:

1. Footings
2. Abutment Walls
3. Retaining Walls
4. Slabs-on-Grade, Exterior Walks
5. Grout

B. Items To Be Installed Only: Not Applicable

C. Items To Be Furnished Only: Not Applicable

D. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 01450, STRUCTURAL TESTS AND INSPECTIONS
2. Section 02300, EARTHWORK; Excavation and establishment of subgrade elevations
3. Section 05120, STRUCTURAL STEEL
4. Section 06100, ROUGH CARPENTRY

1.03 SUBMITTALS:

A. Refer to Section 01330, SUBMITTALS for submittal provisions and procedures.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others if requested by the Engineer or SER.

C. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing and supports for concrete.

D. Submit shop drawings for all formwork for Architecturally Exposed Concrete (Concrete Exposed to View) showing cone tie patterns.

E. Concrete mix design for each mix specified. Supporting test data shall be submitted if requested.

1. Submit alternate mix designs when the characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
2. Indicate the amounts of mixing water to be withheld for later addition at the Project site.

F. Proposed method of curing and associated products.

G. Proposed precautions for hot weather and cold weather concreting.

H. Laboratory test reports for concrete materials and mix design test.

I. Material test reports for the following, from a qualified testing agency, indicating compliance with specification requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

J. Material certificates for each of the following, signed by the manufacturers:

1. Cementitious material.
2. Admixtures
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Non-metallic shrinkage resistant grout.
6. Curing compounds.
7. Bonding agents.
8. Adhesives.
9. Semi-rigid joint filler.
10. Joint-filler strips.
11. Repair materials.

K. Qualification Data: For Installer and Manufacturer.

1.04 QUALITY ASSURANCE:

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mix concrete products that complies with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency for Mix Design Qualifications: An independent agency, registered in the Commonwealth of Massachusetts as an approved testing agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade 1. The Testing Agency Laboratory supervisor shall be an ACI certified Concrete Laboratory Testing Technician – Grade II.

C. Source Limitations: Obtain each type of class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. ACI Publications:

1. Comply with the following unless modified by requirements in the Contract Documents:
    a. ACI 117, "Standard Specifications for Tolerances for Concrete Construction and Materials."
    b. ACI 211.1, "Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete."
    c. ACI 214, "Evaluation of Strength Test Results of Concrete."
    d. ACI 301, "Specification for Structural Concrete."
    e. ACI 304, "Guide for Measuring, Mixing, Transporting and Placing Concrete."
    f. ACI 305, "Hot Weather Concreting."
    g. ACI 306, "Cold Weather Concreting."
    h. ACI 308, "Guide to Curing Concrete."

i. ACI 309, “Guide for Consolidation of Concrete.”

j. ACI 311.1, “ACI Manual of Concrete Inspection.”

k. ACI 315, “Details and Detailing of Concrete Reinforcement.”

l. ACI 318, “Building Code Requirements for Structural Concrete and Commentary.”

m. ACI 347, “Guide for Formwork for Concrete.”

2. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract.

E. American Society for Testing and Materials (ASTM):

1. ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
2. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
3. ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."

F. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO M194 "Chemical Admixtures."

G. Pre-installation Conference: Conduct a conference at the Project site to comply with requirements in Division 1.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend including the following:
   a. Contractor’s superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete manufacturer.
   d. Concrete subcontractor.
   e. Structural Engineer.
   f. Independent testing agency responsible for field testing.
   g. Owner’s Authorized Representative.
   h. Engineer.
2. Review inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot-weather concreting procedures, curing procedures, construction contraction and

isolation joints, and joint filler strips, semi-rigid joint fillers, forms and form removal limitations, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor slab and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 -PRODUCTS

2.01 FORM-FACING MATERIALS:

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 1-inch by 1-inch, minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral earth pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

G. Furnish units that will leave no corrodible metal closer than 1-inch to the plane of exposed concrete surface.

H. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.02 STEEL REINFORCEMENT:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Plain Steel Wire: ASTM A 82, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.03 NON-METALLIC SHRINKAGE RESISTANT GROUT:

A. Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time. The minimum ultimate compressive strength of the grout shall be 5000 psi at 7 days and 7500 psi at 28 days.

2.04 REINFORCEMENT ACCESSORIES:

A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolster, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice", of greater of compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless steel bar supports.
2. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Concrete bricks may be used to support reinforcing steel where application allows.

2.05 CONCRETE MATERIALS:

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout the Project:

1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:

B. Fly Ash: ASTM C 618, Class C or F.

C. Ground Granulated Blast Furnace Slag: ASTM C 989, Grade 100 or 120.

D. Cementitious Materials: Percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash or Ground Granulated Blast Furnace Slag: 25 percent, minimum.
2. Combined Fly Ash and Pozzolan: 35 percent, maximum.
3. Ground Granulated Blast Furnace Slag: 50 percent, maximum.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 35 percent.

E. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse Aggregate Size: ¾-inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

F. Water: ASTM C 94 and potable.

2.06 ADMIXTURES:

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494, Type C.

1. Products:

2. Euclid Chemical Company; Eucon CIA.
3. Grace Construction Products, W.R. Grace & Co.; DCI.
4. BASF Admixtures, Inc.; Rheocrete CNI.
5. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products:
   a. Grace Construction Products, W.R. Grace & Co.; DCI-S.
   b. Sika Corporation; FerroGard 903
   c. Or approved equal.

2.07 CURING MATERIALS:

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. /sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, non-dissipating, certified by curing compound manufacturer to not interfere with bonding of floor coverings.

1. Products:
   a. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; High Seal.
   b. Dayton Superior Corporation; Safe Cure and Seal (J-19).
   c. Euclid Chemical Company; Diamond Clear VOX.
   d. Lambert Corporation; Glazecote Sealer-20.
   e. L&M Construction Chemicals, Inc.; Dress & Seal WB.
   f. Meadows, W.R., Inc.; Vocomp-20.
   g. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 200E.
   h. Sonneborn, Div. Of ChemRex; Kure-N-Seal.
   i. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.

E. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:
    a. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
    b. Euclid Chemical Company; Super Diamond Clear VOX.
    c. Lambert Corporation; UV Safe Seal.
    d. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
    e. Meadows, W.R., Inc.; Vocomp-30.
    f. Symons Corporation, a Dayton Superior Company; Cure & Seal 31 Percent E.

2.08 RELATED MATERIALS:

A. Expansion and Isolation Joint Filler Strips: ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.0217-inch thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.09 REPAIR MATERIALS:

A. Repair Underlayment: Cement based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8-inch to ¼-inch or coarse sand as recommended by the underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C 109.

B. Repair Overlayment: Cement based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8-inch to ¼-inch or coarse sand as recommended by the topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C 109.

2.10 CONCRETE MIXTURES, GENERAL:

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer’s written instructions.

1. Use water-reducing, high-range water reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water cementitious materials ratio below 0.50.
4. Use retarding admixture in combination with Set accelerating Corrosion Inhibitor. Retarder is not required for non-set accelerating corrosion inhibitor.
5. Use corrosion inhibiting admixture in concrete mixtures where indicated.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS:

A. Footings, and Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 4-inches for concrete with verified slump of 2-inch to 4-inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1-inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Corrosion Inhibiting Admixture: Apply to all slabs at a rate of 4 gallons per cubic yard of concrete.

B. Slabs-on-Grade, Exterior Walks: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Slump Limit: 4-inches for concrete with verified slump of 2-inch to 4-inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1-inch
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
5. Corrosion Inhibiting Admixture: Apply to all slabs at a rate of 4 gallons per cubic yard of concrete.

2.12 FABRICATING REINFORCEMENT:

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice".

2.13 CONCRETE MIXING:

A. Ready-Mix Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94, and furnish batch ticket information.

B. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 GENERAL:

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing.

3.02 FORMWORK:

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8-inch for smooth-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspections ports where interior area formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.03 EMBEDDED ITEMS:

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges".
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting type screeds.

3.04 REMOVING AND REUSING FORMS:

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing

concrete, if concrete is hard enough to not be damaged by form removal operations and curing and protection operations are maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Engineer.

3.05 STEEL REINFORCEMENT:

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire ties.

3.06 JOINTS:

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or approved by the Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form keyed joints as indicated. Embed keys at least 1-1/2-inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.07 CONCRETE PLACEMENT:

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6-inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete

embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 degrees F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, providing water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing of concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.08 FINISHING FORMED SURFACES:

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with minimum number of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth finish with texture matching adjacent formed surfaces. Continue final surface treatment of

formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FINISHING FLOORS AND SLABS:

A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straightening until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 for a randomly trafficked floor surface:
3. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.

D. Broom Finish: Apply a broom finish to exterior platforms, steps, and ramps, and elsewhere as indicated.

3.10 MISCELLANEOUS CONCRETE ITEMS:

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.11 CONCRETE PROTECTING AND CURING:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Curing all slabs in the project with moisture curing. Keep surfaces continually moist for not less than seven days with the following materials:
    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in the widest practicable width, with sides and ends lapped at least 12-inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subject to heavy rainfall within three hours after initial applications. Maintain continuity of coating and repair damage during curing period.
    a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in

place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.12 JOINT FILLING:

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.13 CONCRETE SURFACE REPAIRS:

A. Defective Concrete: repair and patch defective areas when approved by the Engineer. Remove and replace concrete that cannot be repaired and patched to the Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than ½-inch in any dimension in solid concrete, but not less than 1-inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush coat holes and voids with bonding agent. Fill and compact patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by the Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, pop outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14-days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least ¾-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1-inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72-hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to the Engineer's approval.

3.14 FIELD QUALITY CONTROL:

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample of each day's pour of each concrete mixture exceeding 5 cubic yards, but less than 25 cubic yards, plus one set for each additional 50 cubic yards or fraction thereof.
2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.
6. Cast and laboratory cure five standard cylinder specimens for each composite sample.
7. Compressive Strength Tests: ASTM C 39; test one set of two-laboratory-cured specimens at 7 days and one set of two specimens at 28 days. Test remaining specimen at 28 days if previous results are satisfactory or retain this specimen for 56 day testing if results are not satisfactory.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive strength tests equals or exceeds specified

compressive strength and no compressive strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to the Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28 day tests.

1. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as the sole basis for approval or rejection of concrete.
2. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as required by the Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as required by the Engineer.
3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
4. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

3.15 GROUTING:

A. Mix grout in accordance with the approved manufacturer's instructions to a consistency which will permit placement. Place grout so as to ensure complete bearing and elimination of air pockets.

END OF SECTION

SECTION 04910

MASONRY RE-POINTING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section specifies the requirements for re-pointing of existing masonry structures.

1.02 REFERENCES:

The following standards form a part of these specifications as referenced:

American Society for Testing and Materials (ASTM):

C 67 Brick and Structural Clay Tile, Sampling and Testing

C 144 Aggregate for Masonry Mortar

C 150 Portland Cement

C 207 Hydrated Lime for Masonry Purposes

C 270 Mortar for Unit Masonry

PART 2 - PRODUCTS

2.01 MORTAR:

A. Mortar shall be Type K and shall meet the requirements of ASTM C 270 and shall match the existing mortar color.

B. Sand for mortar shall be clean and shall meet the gradation requirements of ASTM C 144.

C. Lime shall conform to ASTM C 207, Type S.

D. Portland cement shall conform to ASTM C 150, Type II. Cements shall contain less than 0.6% alkalis and less than 0.15% soluble alkalis.

E. Water shall be clean, potable, and free of deleterious amounts of acids, alkalies, or organic materials.

F. Chemical additives shall not be used, unless approved by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL:

A. All work shall be completed by qualified and experienced re-pointing craftsmen and shall be completed in accordance with the re-pointing index of ASTM C 270.

B. The mortar shall be pre-hydrated to reduce excessive shrinkage. All dry components shall be thoroughly mixed and only enough water should be added to produce a damp, workable consistency that will retain its shape when formed into a ball. The mortar should then stand for 1 to 1½ hours.

C. Just enough water should be added to the pre-hydrated mortar to provide a plastic mixture that will give a smooth surface when the back of the trowel is used to smooth the surface of the mortar.

3.01 MORTAR REMOVAL:

A. As shown on the Drawings, all joints with cracks that are 1/16-inches or wider shall be raked and re-pointed as described herein.

B. Remove existing mortar with a chisel to a minimum depth that is 2 times the width of the mortar joint, or until sound mortar is reached. Take care to not damage edges of existing masonry units to remain.

C. The depth of the joint shall be uniform across the bottom.

D. The use of rotary grinders is not acceptable.

E. Remove dust and debris from the joints by brushing, blowing with air or rinsing with water. Do not rinse when temperature is below freezing.

3.02 INSTALLATION OF MORTAR:

A. Immediately prior to application of mortar, dampen joints to be re-pointed. Prior to application of re-pointing mortar, allow masonry units to absorb surface water.

B. Tightly pack mortar into joints in thin layers, approximately 1/4-inch thick maximum.

C. Allow layer to become "thumbprint hard" before applying next layer.

D. Pack final layer flush with surfaces of masonry units. When mortar becomes "thumbprint hard", tool joints.

E. Protect newly re-pointed joints from rain, until re-pointed joints are sufficiently hard enough to prevent damage.

3.04 TOOLING OF JOINTS:

Tool joints with a jointing tool to produce a smooth, compacted, concaved joint.

3.05 CLEANING:

A. Clean exposed masonry surfaces on completion.

B. Remove mortar droppings and other foreign substances from wall surfaces.

C. First wet surfaces with clean water, then wash down with a solution of soapless detergent specially prepared for cleaning brick.

D. Brush with stiff fiber brushes while washing, and immediately thereafter hose down with clean water.

E. Free clean surfaces from traces of detergent, foreign streaks or stains. Protect materials during cleaning operations including adjoining construction.

F. Use of muriatic acid for cleaning is prohibited.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. The work of this Section consists of providing all labor, materials, and equipment required to furnish, fabricate, and erect the work of this Section including but not limited to:

1. Providing leveling plates, bearing plates, anchor bolts, beams, baseplates, bracing and connections, angles, channels, stiffeners, separator plates, clips, supports for steel deck at columns, openings, connections, welding filler material and electrodes, connection bolts, erection bolts, and any other structural steel called for on the Drawings.
2. Items of structural steel required to be built into concrete or masonry, as indicated or specified, shall be furnished to the respective trades at the proper time with complete instructions and template to facilitate inspection.
3. Design of bolted/welded connections.
4. Furnishing and installation of non-shrink grout under leveling and base plates.
5. Unless specifically excluded, providing all other items for structural steel work indicated on the Drawings, specified, or obviously needed to make the work of this Section complete.
6. All steel items shown or indicated on the Structural Drawings.
7. Furnishing any temporary bracing necessary for support and alignment of the work, and shop painting as herein specified.
8. Structural steel shall consist of all material as defined in Section 2, "Definition of Structural Steel," of the AISC Code, and accessory material called for, or reasonably implied by the drawings.

1.02 RELATED WORK:

A. Section 01450 – STRUCTURAL TESTS AND INSPECTIONS

B. Section 03300 - CAST-IN-PLACE CONCRETE

1.03 REFERENCES:

A. The following standards from a part of these specifications as referenced:

1. American Institute of Steel Construction (AISC)
    a. Code of Standard Practice for Steel Buildings and Bridges
    b. Specification for Structural Steel for Buildings
    c. Manual of Steel Construction
    d. Specification for Structural Joints Using ASTM A325 or A490 Bolts
2. American Society for Testing and Materials (ASTM)
    a. ASTM A36 Structural Steel
    b. ASTM A307 Carbon Steel Externally and Internally Threaded Standard Fasteners
    c. ASTM A325 High Strength Bolts for Structural Steel Joints
    d. ASTM A490 Heat-treated Steel Structural Bolts, 150 ksi Min. Tensile Strength
    e. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing
    f. ASTM A563 Carbon and Alloy Steel Nuts
    g. ASTM F436 Hardened Steel Washers
    h. ASTM A992 Standard Specifications for Structural Steel Shapes
3. American Welding Society (AWS)
    a. AWS D1.1 Structural Welding Code Steel
4. Steel Structures Painting Council (SSPC)
    a. SSPC-SP 6 Commercial Blast Cleaning
    b. SSPC-PA 2, Shop, Field and Maintenance Painting
5. Massachusetts State Building Code, Latest Edition.

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Product Data: Provide manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts (each type), including certified copies of mill reports for nuts and washers; include direct tension indicators if used.
3. Structural steel primer paint.
4. Touch-up paint for galvanized steel.
5. Grout.

6. Headed Stud Anchors.
7. Adhesive/Expansion Anchors

B. As-built Survey: Submit to the Engineer an as-built survey showing the locations of the anchor bolts prior to installation of leveling and bearing plates. This submittal is for information and file record.

C. Standard Shop Details and Connection Design Calculations: Submit to the Engineer prior to submitting detailed shop drawings, design calculations and details for connections not shown on the Drawings. Calculations shall be prepared, signed, and sealed by a registered professional engineer. Calculations and drawings are subject to review by the Engineer. The Engineer reserves the right to require revisions to this work at no additional cost to the Owner.

D. Checked shop drawings shall be submitted to the Engineer for review and approval. Fabrication shall not begin until the Engineer has approved the shop drawings.

E. Shop drawings shall include detail drawings, erection drawings, certifications, schedules, and all other information necessary for the fabrication and erection of component parts of the structure. The shop drawings shall be checked and properly coordinated with other parts of the construction. The following shall be included in the shop drawings:

1. Type of steel for each member, location and identification mark of each member, dimensions, size and weight of members, location and size of cuts, copes, slots, holes and openings required by other trades, type and location of shop and field connections, type, size, and extent of all welds, joint welding procedures, welding sequence, and painting requirements.
2. All requirements such as temporary members required for erection, including connections.
3. Use standard welding symbols of the American Welding Society.

F. Except as otherwise noted, the approval of shop drawings will be for size and arrangement of primary and secondary components and strength of connections. Any error in dimensions shown on the shop drawings shall be the responsibility of the Contractor.

G. Submit manufacturer's certification of bolts, nuts, and filler metal for welding.

1.05 QUALITY ASSURANCE:

A. Testing and Inspection

1. Refer to Section 01450 for Structural Testing and Inspections. Comply with the additional requirements specified in Section 01450, Structural Tests and Inspections.
2. The inspection and testing services provided by the Independent Testing Agency do not relieve the Contractor, the steel fabricator and erector from the responsibility to provide supervision, testing, inspection, and quality control in order to assure conformance with these specifications.

B. The Contractor must utilize the services of a Professional Structural Engineer licensed in the State of Massachusetts to design, sign, and seal calculations and drawings for the following:

1. Connection designs indicated on the Drawings to be designed by the Contractor.
2. Weld repairs.
3. Welded and bolted connection repairs.
4. Revisions required because of erection misalignment, fabrication defects, damage from construction activities.

C. The Contractor is responsible for fit up and installation of all steel work and shall field verify all dimensions and conditions.

D. The fabricator shall possess a valid certificate, category I Conventional Steel Building Structures as issued through the AISC Quality Certification Program, or shall have a detailed Quality Control Plan subject to audit as indicated in Section 01450.

E. Welder, Tacker and Welding Operator Qualifications: Use welders, tackers and welding operators who are currently qualified by tests as prescribed in the Structural Welding Code, AWS D1.1 of the American Welding Society to perform type of work required. Headed stud welding operators shall also be qualified in accordance with AWS D1.1.

F. Welded connections shall be designed and detailed utilizing AWS prequalified joints.

1.06 DELIVERY, STORAGE, AND HANDLING:

A. Store steel on platforms, skids, blocking or other supports to prevent dirt and debris contact. Protect from exposure to conditions that produce rust.

B. Handle steel so no parts are bent, broken or otherwise damaged and avoid damage to other material and work. Store beams with webs vertical. Exercise care to avoid scraping and overstressing the steelwork.

C. Ship small parts, such as bolts, nuts, washers, pins, fillers, and small connecting plates and anchors, in boxes, crates, or barrels. Pack separately each length and diameter of bolt and each size of nut and washer. Plainly mark an itemized list and description of the contents on the outside of each container.

PART 2 - PRODUCTS

2.01 STRUCTURAL STEEL MATERIALS:

A. Rolled steel wide-flange shapes: ASTM A992.

B. Steel channels, angles, plates and bars: ASTM A36.

C. Structural Steel Tubing: ASTM A500 Grade B.

2.02 BOLTS, CONNECTORS, AND ANCHORS:

A. High-Strength Structural Steel Bolts, Nuts and Washers:

1. Bolts: ASTM A325.
2. Nuts: ASTM A563.
3. Washers: ASTM F436.
4. Where steel is indicated on the Drawings to be galvanized, bolts, nuts and washers shall be hot dip galvanized in accordance with ASTM A153.
5. Refer to the Drawings for bolt head style requirements.

B. Anchor Bolts: ASTM F1554. Grade 36, unless noted otherwise. Headed type unless otherwise noted. Provide suitable nuts in accordance with ASTM F1554 and ASTM A563 and washers in accordance with ASTM F436.

C. Beveled Washers: Square, smooth and sloped to make contact surface of bolt head and nut parallel.

D. Headed Stud Anchors: Embedment anchors shall be headed anchors with fluxed ends or approved equal. Stud size as indicated on the Drawings. Studs shall be automatically end welded with suitable equipment in the shop or field on spacing’s indicated on the Drawings. All welds shall be made in accordance with the stud manufacturer's requirements. Field installed anchors shall be classified as Structural Steel.

1. Mechanical Properties of Headed Anchors. Low Carbon Steel complying with ASTM A108 Physical Properties:
   a. Tensile (Minimum) 60,000 PSI (60KSI)
   b. Yield (Minimum) 50,000 PSI (50KSI) (0.2% Offset)

c. Elongation (Minimum) 20% in 2-inches.

E. Adhesive Anchor Bolt Anchoring Systems: Composed of an anchor rod, nut, washer and an anchor rod adhesive cartridge.

1. Anchor Rod Assembly: Chamfered end, all thread steel anchor rod with nut and washer. Size and load capacity as indicated on the Drawings.
2. Adhesive Cartridge: Sealed capsule containing premeasured amounts of (resin, quartz sand aggregate, and a hardener contained in a separate vial within the capsule. Capsule ingredients activated by the insertion procedure of the anchor rod assembly.
3. Acceptable Manufacturers:
   a. Hilti Fastening Systems; HVA Adhesive System.
   b. Powers Fastening, Inc.; Rawl Fastening Systems.
   c. Or Approved Equal.

F. Welding Electrodes: E70XX in accordance with AWS Dl.l. Refer to the Drawings for special requirements at moment connections.

2.03 GROUT:

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.04 SHOP PRIMER PAINT:

A. Products to be used shall meet the regulations of jurisdiction for Volatile Organic Compounds (VOC) emissions.

B. Exterior Exposed Steel, Not Galvanized: Zinc-rich epoxy primer followed by an intermediate coat of epoxy paint.

C. Other Steel, Not Galvanized: Zinc-rich epoxy primer.

D. Shop primer paint shall be compatible with the specified finish paint system. Finish paints shall be in accordance with Section 09900.

2.05 HOT-DIPPED GALVANIZING:

A. Hot-dip galvanized steel fabrications so designated herein and on the drawings and after fabrication in compliance with ASTM A 123.

B. Hot-dip galvanized iron and steel hardware shall be in accordance with ASTM A 153.

PART 3 - EXECUTION

3.01 FABRICATION:

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in the shop to the greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

1. Provide camber in structural members where indicated.
2. Do not splice steel members unless given written approval by the Engineer.
3. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
4. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on the final shop drawings.

C. Cut, drill, and punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

D. Welding:

1. Provide quality control and qualification of welders and welding procedures and operations as specified under “Testing and Inspection” in this Section.
2. Shop Welded Process: Use shielded metal-arc, submerged arc, gas metal-arc, and flux cored-arc, or other process as approved by the Engineer.
3. Groove Welds: Provide complete penetration unless otherwise noted on the Drawings.
4. Fillet Welds: Where weld symbol is not shown or welds are not dimensioned, provide continuous fillet welds all around and on both sides as appropriate. Minimum dimension shall be as indicated in AISC Specification.
5. Base metal shall be checked by Contractor to insure absence of laminations or other defects. Welds shall be sound throughout and have no cracks.
6. Where structural joints are required to be welded, details of joints, technique of welding employed, appearance and quality of welds made, and methods used in correcting defective work shall conform to applicable requirements noted under References in this Section.

7. Prepare joint welding procedures and program of welding sequence (for each component and for welding jointing components to each other) and submit to Engineer for approval before any welding is done. After approval, welding procedures and sequences shall be followed without deviation unless specific approval for change is obtained from the Engineer. Engineer may require requalification's of these welding procedures by tests prescribed in AWS "Standard Qualification Procedures".
8. Each welder working on the project shall be assigned an identification symbol or mark. Each welder shall mark or stamp their identification symbol to each weldment completed, whether in shop or field.
9. Corrective Work: Structural steel elements having fabrication errors and/or which do not satisfy tolerance limits shall not be incorporated in finished work. Such elements may be corrected if permitted by the Engineer and/or Testing Agency. Submit to the Engineer drawings showing details of proposed corrective work. These drawings shall be approved by the Engineer prior to performing corrective work. Corrective work shall be performed in accordance with requirements of Contract Documents. Corrective work and any retesting which may be required shall be at the Contractor's expense.
10. Members scheduled to be fireproofed shall have surfaces prepared as required by the fireproofing material manufacturer.

3.02 SHOP PRIMER PAINTING:

A. General: Shop paint all structural steel, except as noted below:

1. Do not paint members which are to be galvanized.
2. Do not paint surfaces within two inches of any field weld (including shear connectors) or high strength bolted friction type connection.
3. Do not paint surfaces to be high-strength bolted with slip-critical connections, unless the paint is specifically compatible with slip-critical connections.
4. When members are to be partly embedded in concrete or mortar in the finished work, paint only the exposed portions and initial 2-inches of embedded areas. Do not paint members which will be entirely embedded in concrete or mortar in the finished work.
5. Do not paint surfaces to receive metal deck and/or shear connectors fastened by welding.
6. Do not paint surfaces to receive sprayed-on fireproofing.

B. Surface Preparation: At a minimum, clean steel in accordance with Steel Structures Painting Council (SSPC) as follows; except clean to more stringent surface preparation standard if required by primer manufacturer:

1. Steel to be primed with zinc-rich primer: Commercial Blast Clean (SSPC-SP6).
2. Comply with AISC requirements for slip-critical connections.

C. Painting

1. Immediately after surface preparation apply shop primer paint in accordance with manufacturer's recommendations.
2. Apply shop paint in accordance with SSPC-PA-2.
3. Minimum dry film thickness of shop paint shall be 4.0 mils.
4. Comply with AISC requirements for slip-critical connections.
5. Complete shop painting operations on completed shop welded connections after the connections have passed the specified structural tests and inspections.
6. Apply two coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

3.03 GALVANIZING:

A. General: Hot-dip galvanize all steel exposed to weather or corrosive environments and as indicated on the drawings.

B. Hot-dip galvanized steel shall be inspected for compliance with ASTM A 123 and shall be marked with a stamp that indicates the name of the galvanizer, the ASTM number, and the ounces of zinc per square foot of surface. A notarized Certificate of Compliance with all of the above shall be required from the galvanizer.

C. Hot-dip galvanized hardware shall comply with ASTM A 153.

D. Provide thickness of galvanizing specified in referenced standards.

E. Fill vent holes and grind smooth after galvanizing.

F. All hot-dip galvanized steel shall be safeguarded against embrittlement in conformance with ASTM A-143.

G. Finish color, if required, will be specified by the Engineer.

3.04 ERECTION:

A. Erect structural steel in accordance with the Drawings, the approved submittal documents, pertinent regulations, the referenced AISC standards and these Specifications.

1. Allow concrete foundations to reach a minimum of 14-day curing time before torqueing of anchor bolts.
2. Prior to installation of metal decking, clean the unpainted top flanges of structural steel members to be free of heavy rust, mill scale, dirt or such other substances detrimental to welding.
3. Comply with 29 CFR Part 1926 - Safety Standards for Steel Erection.

B. Surveys: Employ a licensed Land Surveyor or licensed engineer for accurate erection of structural steel. Check elevations on concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Engineer. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Engineer.

C. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

D. Setting base and bearing plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surfaces of leveling and bearing plates.

1. Set loose and attached leveling plates and bearing plates for structural members on steel wedges, shims, leveling devices, or as shown on the Drawings.
2. Grout under the plates after they have been positioned, plumbed and leveled. Do not remove wedges or shims but, if protruding, cut off flush with top or edges of base plates, or both prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer’s instructions.

E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of the complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will

be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure within specified AISC tolerances.
2. Establish required leveling and plumbing references with respect to expected mean service operating temperature inside the building. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

F. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges".

G. Splice members only where indicated and accepted on shop drawings.

H. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

3.05 FIELD CONNECTIONS:

A. General: Beams shall have framed connections using ¾-inch diameter, minimum, high strength bolts in accordance with the requirements of AISC "Manual of Steel Construction" and Contract Drawings.

B. High-Strength Bolts: Install high-strength steel-bolts in accordance with RCSC's "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless indicated otherwise on the drawings or where pretension or slip critical joints are recommended or required by RCSC or AISC.
2. Do not enlarge holes in members by burning or by using drift pins. Ram holes that must be enlarged to admit bolts.

C. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

D. Adhesive Anchor Bolt Anchoring System Installation:

1. General: Install adhesive anchors in strict accordance with manufacturer's instructions and in accordance with the following.
2. Drilling Holes: Use rotary hammer-type drill and make drill holes to the required diameter and depth as consistent with anchor manufacturer's instructions for size of anchors being installed,
    a. Prior to setting cartridge and anchor rod clean drilled holes free of loose material by vacuum process, finishing with a blast of compressed air and cover hole until actual use.
3. Anchor Rod Installation: Following cartridge installation in prepared drill holes, set anchor rod to the required depth. Set anchor rods truly perpendicular (normal) to the base plate of item being anchored.

E. Headed Stud Anchors:

1. Welding Specifications: All materials shall be clean, dry and free of paint, rust, oil or other contaminants. Test welding should be done in the same position being used for production. Test welds, after cooling, should be bent by hammer 45° from the vertical position without failure. Non-failure of two studs indicates that the weld setup is satisfactory and production welding may be started.

2. Inspection Requirements: After welding, the ceramic ferrule should be removed from each stud and the weld fillet visually inspected. A fillet of less than 360° is cause for further inspection. Such studs should be hammer tested, bending the stud 15° from the vertical toward the closest end of the embedment plate or steel member. Bending without failure indicates a satisfactory weld. Bent studs may be left bent unless stud projects into concrete cover or obstructs other materials. All bending and straightening when required shall be done without heating before completion of the production stud welding operation.

3. Do not weld studs to steel plates or members with temperatures below 32° F. Welding shall not be done when the steel surface is wet or exposed to rain or snow.

4. The Engineer reserves the right to require the Contractor to repair any welds, which are not a complete 360°, weld at no additional cost. The Engineer also reserves the right to require replacement of studs and the repair of the base metal at no additional cost. Any additional testing and inspection required will be at no additional cost to the Owner.

3.06 FIELD QUALITY CONTROL:

A. Testing Agency: Owner will engage a qualified independent testing and inspection agency to inspect field welds and high-strength bolted connections.

1. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations there from.
2. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
3. Testing agency may inspect structural steel at plant before shipment.

B. Bolted Connections: Field and shop-bolted connections will be inspected according to RSCS's "Specification for Structural Joints Using ASTM A325 or A490 Bolts.

C. Welded Connections: Inspect and test during erection of structural steel as follows:

1. Review welder's certifications and certify welders if required. Conduct inspections and tests as required. Record types and locations of defects found in the work. Record work required and performed to correct deficiencies.
2. All field welds will be visually inspected according to AWS D1.1.
3. Test all full penetration welds using ultrasonic inspection methods in accordance with ASTM E164.
4. Perform magnetic particle inspection in accordance with ASTM E709 on at least 20% of fillet welds. Magnetic particle inspection shall be performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

D. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

3.07 FIELD TOUCH-UP PAINTING OF SHOP PRIMER PAINTED STEEL AND GALVANIZED STEEL:

A. General: Immediately after erection, clean field welds, bolted connections, and other surfaces required to be painted. Apply paint to areas required to be painted using same material as used for shop painting. Apply by brush or spray to provide minimum dry film thickness specified in Part 2 of this Section for the shop-applied coat.

B. Touch-up paint welded connections after the connections have passed the specified structural tests and inspections.

C. Do not paint when ambient temperature is below 40 degrees F, or when conditions differ from paint manufacturer's recommendations, as approved by the Engineer.

D. Touch up damaged galvanizing with zinc-rich paint in accordance with ASTM A 780 and manufacturer's written instructions.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 -GENERAL

1.01 WORK INCLUDED:

A. This section of the specification covers all miscellaneous metal items required for the work, except as specified elsewhere.

B. All miscellaneous metalwork shall be fabricated as detailed or approved and shall be installed complete with all necessary anchors, anchor bolts, eye bolts, guides, bolts and other accessories.

C. In general, site and shop fabricated items are included under this section, and factory fabricated items excluded. This section includes but is not limited to: stairs, railings and posts, grating, hatches, frames and covers, loose metal frames, nosings, edgings, frames, and all other site or shop fabricated metal items.

1.02 RELATED WORK:

A. Section 03300, CAST-IN-PLACE CONCRETE

B. Section 05120, STRUCTURAL STEEL

1.03 QUALITY ASSURANCE:

A. The drawings show the character and extent of the work required, but do not attempt to show all methods, materials, and details of construction, fastening, etc. Supplementary parts customarily necessary to complete an item, though such parts are not definitely shown or specified, shall be included as part of the item.

B. Details of construction of the various items shall be submitted on the shop drawings. High quality construction with a neat, finished, and workmanlike appearance will be required.

C. The size and spacing of screws, connectors, anchors, and similar items, and the size and dimensions of metal items stated herein shall apply in general; specific sizes and spacing of fasteners and dimensions of metal items listed on the drawings shall take precedence.

D. Items supplied hereunder which are required to be built into the concrete, masonry, etc., shall be delivered to the site at locations as required by the Owner or Engineer, and as required by the overall construction schedule.

E. Manufacturers of other products comparable in quality and type to those specified will be acceptable if satisfactory data on past performance and other required information is furnished by the Contractor, and if approved by the Engineer.

F. Powdercoat system shall be guaranteed by manufacturer for 20 years.

G. Contractor shall submit an affidavit to Engineer that materials used are protected from or will not be subject to galvanic action.

1.04 REFERENCES:

A. The following standards from a part of these specifications, and indicate the minimum standards required:

American Institute of Steel Construction (AISC)

AISC Specification for Structural Steel Buildings

American Society for Testing and Materials (ASTM)

ASTM A36 Structural Steel

ASTM A53 Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless

ASTM A123 Zinc (Hot-Dip-Galvanized) Coatings on Iron and Steel Products

ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A239 Test for Uniformity of Coating by the Preece Test (Copper Sulfate Dip) on Zinc-Coated (Galvanized) Iron or Steel Articles

ASTM A307 Carbon Steel Externally and Internally Threaded Standard Fasteners

ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality

ASTM A525 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements

ASTM A569 Steel Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality

ASTM B221 Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes

ASTM B308 Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded

American Welding Society (AWS)

AWS D1.1 Structural Welding Code Steel

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Before fabricating or assembling any aluminum or stainless steel items, samples indicating full range of finish, color, and texture to be supplied shall be submitted to the Engineer for review.

B. Shop drawings for all metalwork included in this section shall be submitted to the Engineer for review.

C. The shop drawings shall be complete and checked, showing sizes, layout, method of assembly, fastenings, anchorage or connection with other work, finish, and coatings, etc. Shop drawings for aluminum work shall indicate alloys, temper and finish to be used.

D. Samples of colors and finishes for items that are to be color galvanized shall be submitted to Engineer for selection, from manufacturer's full range. Engineer shall have discretion of selecting up to four colors for application to fabricated items.

PART 2 - PRODUCTS

2.1 PRODUCTS:

A. Miscellaneous and ornamental items include the following. Requirements for materials, hot-dip galvanizing, and shop-applied primers are included with each item as applicable.

1. Aluminum Guardrail
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.

2.02 MATERIALS:

A. Steel:

1. Materials, fabrication, and erection of miscellaneous steel sections shall conform to the applicable requirements of the AISC Specification.

2. Steel shapes, plates and bars shall conform to ASTM A36/A 36M.
3. Stainless Steel Sheet, Strip, Plate and Flat Bars: ASTM A666, Type 316L
4. Sheet steel shall be cold-rolled or hot-rolled carbon sheet steel conforming to ASTM A366 or ASTM A569 as appropriate.
5. Steel pipe shall conform to ASTM A53/A 36M.
6. Stainless steel shall be Type 304 unless otherwise indicated or specified.

B. Aluminum:

General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.

Aluminum Association, Inc. (AA):

1. AA SAS-30, "Specifications for Aluminum Structures."

American Architectural Manufacturers Association (AAMA):

2. AAMA 611, "Voluntary Specifications for Anodized Architectural Aluminum (Revised)."
3. AAMA 2604, "Voluntary Specification, Performance Requirements, and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels."
4. AAMA 2605, "Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."

American Iron and Steel Institute (AISI):

5. AISI SG-673, Part I, "Specification for the Design of Cold-Formed Steel Structural Members."

American Welding Society (AWS):

6. AWS D1.2, "Structural Welding Code – Aluminum."

ASTM International (ASTM):

7. ASTM B26/B26M,"Standard Specification for Aluminum-Alloy Sand Castings."
8. ASTM B209/B209M,"Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."
9. ASTM B210/B210M, "Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes."
10. ASTM B221/B221M, "Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes."
11. ASTM B247/B247M, "Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings."
12. ASTM B429/B429M, "Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube."

13. ASTM E985, "Standard Specification for Permanent Metal Railing Systems and Rails for Buildings."
    Code of Federal Regulation (CFR):
    National Association of Architectural Metal Manufacturers (NAAMM):
14. NAAMM MFM, "Metal Finishes Manual."

PERFORMANCE REQUIREMENTS

B. General: guardrail shall withstand structural loading as determined by allowable design working stresses of materials based on the following standards.

1. Aluminum: AA SAS-30.
2. Cold-Formed Structural Steel: AISI SG-673, Part I.

C. Structural Performance: Provide handrails and guardrails capable of withstanding the following structural loads without exceeding allowable design working stress of materials for guardrails anchors, and connections:

1. Top Rail: Shall withstand the following loads:
   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf per foot (730 N/m) applied horizontally and vertically downward.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.

2. Handrails not Serving as Top Rails: Shall withstanding the following loads:
   a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
   b. Uniform load of 50 lbf per foot (730 N/m) applied in any direction.
   c. Concentrated and uniform loads above need not be assumed to act concurrently.

3. Guard Infill Area: Shall withstand the following loads:
   a. Concentrated horizontal load of 200 lbf (890 N) applied to 1 square foot (0.09 m^2) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.

D. Thermal Movements: guardrails shall allow for movements resulting from 120 degree F (49 degree C) changes in ambient and 180 degree F (82 degree C) surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

E. Corrosion Resistance: Separate incompatible materials to prevent galvanic corrosion.

F. Product Data:
   1. Submit manufacturer’s data sheets on each product to be used, including, but not limited to, the following:
      a. Preparation instructions and recommendations.

b. Storage and handling requirements and recommendations.
c. Installation methods.

2. Submit product data for manufacturers product lines of guardrails assembled from standard components, including, but not limited to, the following:
   a. Grout, anchoring cements and paint products.

G. Shop Drawings: Submit shop drawings showing fabrication and installation of guardrails. Include plans, elevations, sections, details, and attachments to other work.

H. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

I. Welding Standards: Comply with applicable provisions of AWS D1.2.

J. Mock-Ups: Prior to installation of the work, fabricate and erect mock-ups for each type of finish and application required to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of work. Locate mock-ups on site in location and of size indicated or, if not indicated, as directed by the Architect. Demonstrate the proposed range of aesthetic effects and workmanship to be expected in the completed work. Obtain the Architect's acceptance of mock-ups before start of final unit of work. Retain and maintain mock-ups during construction in undisturbed condition as a standard for judging completed unit of work.

   1. Accepted mock-ups in undisturbed condition at time of Substantial Completion may become part of completed unit of work.

K. Single Source Responsibility: Obtain aluminum guardrails from a single source with resources to produce products of consistent quality in appearance and physical properties without delaying the work.

L. Basis of Design: Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.

M. Metals: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

1. Aluminum: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of alloy and temper designated below for each aluminum form required.

a. Extruded Bar and Tube: ASTM B221/B221M, Alloy 6063-T5/T52.
b. Extruded Structural Pipe and Tube: ASTM B429/B429M, Alloy 6063-T832.
c. Drawn Seamless Tube: ASTM B210/B210M, Alloy 6063-T832.
d. Plate and Sheet: ASTM B209/B209M, Alloy 6061-T6.
e. Die and Hand Forgings: ASTM B247/B247M, Alloy 6061-T6.
f. Castings: ASTM B26/B26M, Alloy A356-T6.

2. Brackets, Flanges, and Anchors: Provide cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

a. Provide cast brackets with flange tapped for concealed anchorage to threaded hanger bolt.
b. Provide formed or cast brackets with predrilled hole for exposed bolt anchorage.
c. Provide formed steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
d. Provide brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

N. Assemble guardrail in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

O. Form changes in direction of guardrail members as shown on the Drawings.

P. Fabricate guardrail by connecting members with guardrail manufacturer's standard concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

Q. Provide manufacturer's standard brackets, flanges, miscellaneous fittings, and anchors to connect guardrail members to other construction.

R. Fabricate anchorage devices capable of withstanding loads imposed by guardrail. Coordinate anchorage devices with supporting structure.

S. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

T. Cut, reinforce, drill, and tap components as indicated on the Drawings to receive finish hardware, screws, and similar items.

U. Close exposed ends of guardrail members with prefabricated end fittings.

V. General: Comply with NAAMM MFM for recommendations for applying and designating finishes.
1. Appearance of Finished Work:

a. Variations in appearance of abutting or adjacent units are acceptable if they are within one-half of the range of final samples. Noticeable variations in the same unit are not acceptable.
b. Variations in appearance of other components are acceptable if they are within the range of final samples and are assembled or installed to minimize contrast.

W. Aluminum Finish: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

1. Class I Clear Anodized Finish: AA-M12-C22-A41 (Mechanical Finish: as fabricated, non-specular; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear film thicker than 0.7 mil [0.018 mm]) complying with AAMA 611..

2.03 FASTENERS:

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

1. Metalwork shall be complete, with all bolts, anchors, plates, washers, clamps, screws, studs and other such devices for proper securing and anchoring. Where positions of anchorages can be predetermined, they shall be shop-installed on the item; otherwise the material or equipment to be fastened shall be expansion bolted, toggle bolted, screwed, or otherwise fastened as shown on the drawings or called for herein.
2. Bolts and nuts for general anchorage and for miscellaneous ferrous metal assemblies and fasteners shall be galvanized, unfinished bolts conforming to ASTM A307 unless otherwise noted on the drawings.
3. The centerline of expansion shields shall not be closer than 3-inches to the edge of any concrete or masonry in which they are placed.
4. Material for fasteners shall match or be galvanically compatible with the materials fastened. Washers, nuts and other accessories shall match the bolts.
5. Where the specific type, material, size and spacing of fasteners has not been called for on the drawings or in specifications, the fasteners proposed by the Contractor shall be reviewed by the Engineer. If, in the opinion of the Engineer, they are not in accordance with good safety practices, the contractor shall revise and resubmit appropriate fasteners.

B. Anchor Bolts: ASTM F 1554, Grade 36. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

C. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

2.04 MISCELLANEOUS MATERIALS:

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified alkyd primer complying with MPI#79. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

D. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

E. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.05 ALUMINUM GUARDRAIL:

A. Guardrail shall be Model # 3 Line Aluminum Rail with Infill as manufactured by Idealshield, 2525 Clark Street, Detroit, MI 48209, (866)825-8659, www.idealshield.com, or approved equal.

B. General: Fabricate guardrail to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacing, and anchorage, but not less than that needed to withstand indicated loads.

C. Welded Connections: Fabricate guardrail with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

D. Form changes in direction of railings as detailed on the Drawings.

E. Close exposed ends of guardrail members with fabricated end fittings.

F. Brackets, Flanges, Fittings, and Anchors: Provide surface anchor brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

1. For all galvanized guardrails, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.

G. Fillers: Provide fillers made from aluminum plate, or other suitably crush-resistant material, where needed to transfer loads through posts and rail finishes to structural supports. Size fillers to suit deck finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.06 MISCELLANEOUS FRAMING AND SUPPORTS:

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts if units are installed after concrete is placed.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

2.11 FINISHES, GENERAL:

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.12 STEEL PRIMERS AND FINISHES:

A. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Urethane Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
3. Comply with SSPC-PA 2, "Measurement of Dry Coating Thickness with Magnetic Gages."

B. Zinc-Rich Primer: Urethane zinc rich primer compatible with topcoat Specified in Section 09900 – PAINTING. Provide primer with a VOC content of 340 g/L (2.8 lb./gal.) or less per OTC and HAPS COMPLIANT STANDARDS PER 2007 standards when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Provide Tnemec Series 394 Perimerprime at 3.0 mils DFT or approved equal by DuPont or Carboline.

C. Hot-Dip Galvanizing: For steel exposed to the elements, weather or corrosive environments and other steel indicated to be galvanized, provide coating for iron and steel fabrications applied by the hot-dip process. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced standards. The galvanizing bath shall contain high grade zinc and other earthly materials. Fill vent holes and grind smooth after galvanizing.

D. Hot-Dip Galvanizing And Factory-Applied Primer for Steel: Provide hot-dip galvanizing and factory-applied prime coat, certified OTC/VOC compliant less than 2.8 lbs/gal. and conforming to EPA and Commonwealth of Massachusetts requirements. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer. Blast cleaning of the surface is unacceptable for surface preparation. Primer shall have a minimum two year coat window for application of finish coat. Coatings must meet or exceed the following performance criteria:

1. Fire proofing adhesion: ASTM E736
2. Adhesion: ASTM D 4541 5 mm crosshatch 1150 psi.
3. Humidity Resistance: ASTM D 4585, 5000 hours
4. Salt Spray (Fog): ASTM B 117, 10,000 hours

PART 3 -EXECUTION

3.01 GALVANIZING:

A. Hot-Dip Galvanizing:

1. Provide a coating for iron and steel fabrication applied by the hot-dip process. The galvanizing bath shall contain 0.05-0.09% nickel. Immediately before galvanizing, the steel shall be immersed in a bath of zinc ammonium chloride. The use of the wet kettle process is prohibited. Comply with ASTM A-123 for fabricated products and ASTM A-153 for hardware. Provide thickness of galvanizing specified in referenced standards. Provide coating by Duncan galvanizing or approved equal.

B. Factory-Applied Primer Over Hot-Dip Galvanizing:

1. Provide a factory-applied polyamide epoxy coating primer, 2.0 mils dry film thickness minimum. Apply primer within 12 hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations or mechanically abrade to create a uniform surface profile of 1.0 – 2.0 mils, and as recommended by coating manufacturer. Provide primer coating by Duncan Galvanizing, Tnemec Co. or approved equal.

C. Factory – Or Field-Applied Architectural Finish Over Primer And Hot-Dip Galvanizing:

1. Provide a factory- or field-applied polyurethane color coating, 2.5 mils dry film thickness minimum. Apply coating at the galvanizer's plant or coating shop, immediately after application of the prime coat, in a controlled environment meeting applicable regulations, and as recommended by the coating manufacturer. Provide finish coating by Duncan Galvanizing, Tnemec Co. or approved equal.

D. The Contractor shall be responsible for determining if any fabricated items are not suitable to be hot-dip galvanized and shall notify the Engineer in writing.

E. Surfaces of metal to be galvanized shall be free from all dirt, grease, rust and moisture. Burrs and sharp projections shall be removed from edges, holes, etc., before galvanizing. Fabricated items shall be galvanized after fabrication.

3.02 WELDING OF STEEL:

Welding of steel shall be done in accordance with the AWS Code. Welds shall be continuous along entire line of contact, except where plug or tack welding is noted. Exposed welds shall be ground smooth.

3.03 WELDING OF ALUMINUM:

Welding of aluminum shall be done in accordance with the AWS "Welding Aluminum" as reprinted from the Welding Handbook. Aluminum shall be fusion welded by the inert

gas-shielded-arc method. Where appearance is not a factor and anodizing is not required, alloy 4043 rods may be used. For appearance match, rods shall be of an alloy similar to the alloy being welded.

3.04 FABRICATION AND ERECTION:

A. Metalwork shall be complete, with all necessary bolts, nuts, washers, anchors, plates, fastenings, and other fittings. To the extent possible, holes for attachment of blocking, clip angles, etc. shall be shop punched. Where shop punching is impracticable, holes shall be field drilled. Burned holes will not be permitted.

B. Material shall be straight, accurately fabricated with joints neatly framed, square, and well-riveted, bolted, or welded.

C. Metalwork to receive hardware shall have all cutouts and attachments accurately made using the hardware itself or templates where necessary.

D. Metalwork shall be accurately set and secured in position, with lines plumb and level and surfaces flush and square, or as otherwise required to conform to the structure as shown on the drawings.

E. Wherever possible, all metalwork shall be built into the masonry work and shall have sufficient anchors, well- fastened. Anchors shall be welded to steelwork and shall be staggered where attached to structural shapes. Metal- work impracticable to set before masonry is built shall be anchored to it with approved expansion bolts set in solid masonry units or in concrete.

F. Miscellaneous metalwork shall be plainly marked to indicate its location in the structure.

3.05 ALUMINUM WORK PROTECTION:

A. Aluminum surfaces, which after erection are to be in contact with wood or treated wood, shall be given a heavy brush coat of aluminum-pigmented bituminous paint or two (2) coats of aluminum metal and masonry paint.

B. Aluminum surfaces, which after erection are to be in contact with masonry or concrete, shall be given a heavy brush coat of alkali-resistant bituminous paint.

C. Aluminum surfaces which after erection are to be in contact with dissimilar metals, other than zinc or stainless steel, shall receive a heavy brush coat of zinc chromate primer, followed by two (2) coats of aluminum metal and masonry paint, or shall receive a heavy brush coat of alkali-resistant bituminous paint.

D. Aluminum surfaces which are to be exposed to the weather, including anodized surfaces, shall receive two sprayed-on shop coats of water-white methacrylate lacquer, capable of withstanding the action of lime mortar for at least one week in an atmosphere of 100 percent humidity at room temperature. Surfaces shall be perfectly clean and dry before lacquering.

E. Prior to the application of any of the above coatings, any and all areas where the paint has been damaged by abrasion or other cause shall be cleaned and repainted as required by the Engineer so that the aluminum will have a complete protective paint film when brought into contact with the material against which it is being protected.

F. Before application of any coating, the surface shall be cleaned of all dirt, heavy deposits of grease or oil, and other foreign substances such as paint, lacquer, tape, moisture, or other material, which might interfere with the adhesion of the coating to be applied. Aluminum shall be left in a clean condition. Cleaning methods shall employ steam, mild soaps, mild detergents, or solvents such as kerosene, or naphtha. Lacquered surfaces may be cleaned with a mineral solvent or turpentine. Thorough rinsing with clean water and drying with clean, soft cloths shall follow any of the above cleaning methods. No other cleaning method may be used without the specific permission of the Engineer.

G. After suitable cleaning, all aluminum work shall be given an approved shop coating of methacrylate lacquer to protect the surface from stain. The protective coating of lacquer on all aluminum work worn off due to handling or erection shall be replaced by a new coating of lacquer of the same type.

H. During construction, precautions shall be taken to prevent damage to the aluminum work from splashing or the accumulation of paint, concrete, mortar, or other similar materials, or from staining adjacent surfaces during cleaning operations. Any staining or damage that does occur shall be immediately and completely removed.

I. Each piece of aluminum in transit and in storage shall be individually wrapped with a non-scratching material, with the joints securely sealed. Wrapping shall completely cover and protect each item. Storage shall be out of the weather, protected from moisture, and with adequate ventilation around each piece of aluminum.

3.06 PAINTING:

A. Ferrous metals of this section, except for galvanized or stainless steel shall be shop primed in accordance with the following:

1. Submerged service components shall be sandblasted clean in accordance with SSPC-SP-10, Near White, immediately prior to priming.
2. Non-submerged service components shall be sandblasted clean in accordance with SSPC-SP-6, Commercial Grade, immediately prior to priming.
3. Shop primer, except as otherwise noted, shall be one spray applied coat with dry film thickness of 3.5 to 4.5 mils of Tnemec 66 Boston Gray Primer by Tnemec Co.; or Aquapun by PPG, Inc; or approved equal.
4. Portions of ferrous metals to be embedded in concrete or masonry shall be given a heavy brush coat of alkali resistant bituminous paint.
5. Scratches or abrasions in the shop coat and areas at field welds, bolts, nuts and other unpainted areas shall be touched up after erection with the paint specified for the shop coat. Cold galvanized paint shall be used for touch up of galvanized surfaces. Paint shall be one of the following; Sealube Co., ZRC; Galvicon Corp., Galvicon; Stanley Chemical Div., Zinc Shield; Duncan Galvanizing Corp., ZIRP; or an approved equal.
6. Shop and field prime paint systems shall be compatible with finish coat.

END OF SECTION

SECTION 06100

CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. This Section covers tools, equipment, labor, and materials necessary to perform rough carpentry work complete and miscellaneous carpentry items not specified elsewhere including fasteners and supports.

B. Nails, screws, bolts, anchors, brackets, and other hardware for fastening and securing items provided under this section of the specification shall be furnished under this section.

1.02 RELATED WORK:

A. Section 01450, STRUCTURAL TESTS & INSPECTIONS

B. Section 03300, CAST-IN-PLACE CONCRETE

C. Section 05120, STRUCTURAL STEEL

1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

A. Framing lumber product data and certifications from the appropriate grading agency.

B. Three sets of certificates of wood treatment upon delivery of treated wood product.

C. Treated wood product shall bear appropriate American Wood Preservers Bureau (AWPB) quality mark.

D. Fastener and connector product data.

E. Ipe wood product data and certifications from the appropriate grading agency.

1.04 DELIVERY:

Lumber, plywood, and other wood material shall be delivered to the job dry, and shall be protected from injury, dirt, dampness, and extreme changes of temperature and humidity at all times.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. LUMBER:

1. The grades of all materials under this section shall be defined by the rules of the recognized associations of lumber manufacturers producing the material specified, but the maximum defects and blemishes permissible in any specified grades shall not exceed the limitations of the American Lumber Standards.

2. Lumber shall bear the grade and trademark of the association under whose rules it is produced, and a mark of mill identification. Lumber shall be of sound stock, thoroughly seasoned, kiln dried to a moisture content not exceeding 15 percent.

3. Exposed surfaces of wood which are to be painted shall be free from defects or blemishes that will show after the second coat of paint is applied.

4. Framing Lumber for joists, rafters, plates, headers, stair stringers and carriages, and sleepers shall be Southern Pine Select Structural Grade with the following minimum properties:

Size Classification 12" Wide, 2" -4" Thick	Size Classification 5" x 5" or Larger
$E = 1.8 \times 10^6$ PSI Specific Gravity, G = 0.55 Fb = 1600 PSI Fv = 175 PSI Fc, perp. = 565 PSI Ft = 1100 PSI	$E = 1.5 \times 10^6$ PSI Specific Gravity, G = 0.55 Fb = 1500 PSI Fv = 165 PSI Fc, perp. = 375 PSI Ft = 950 PSI

5. Engineered wood products shall be preservative treated conforming to Trus Joist Pressure Treated Plus PSL or approved equal.

6. Decking and handrail Materials, as described in the plans, shall be naturally durable hardwood ipe (Tabebuia Spp Lapacho Group).
   a. Wood shall be certified sustainably harvested. Documentation shall be provided as part of submittals.
   b. Wood shall be partially air dried to a moisture content of 15%-20%
   c. Wood shall have minimum Fb-1,450 psi
   d. Wood shall be supplied S4S (surface four sides) E4E (eased four edges) with edges eased to a radius of 1/8".
   e. Measured at 30% moisture content, the width and thickness shall not vary from specified dimensions more than +- .04 inches.
   f. Ends of each piece shall be sealed with "Anchorseal" Mobil CER-M or an equal aqueous wax log sealer.

7. Materials not specifically listed shall be of an accepted grade dictated by good practice.

8. Fasteners and connection materials shall be exterior grade and hot-dipped galvanized to G185 minimum.

B. WOOD PRESERVATION TREATMENT:

1. The nailers, blocking, sills, and similar items encased in or in contact with concrete, masonry, or the ground shall be pressure treated with a pentachlorophenol preservative solution. The pentachlorophenol shall meet the requirements of the American Wood-Preserver's Association, AWPA Standard P-8, "Standards for Oil-Borne Preservatives." The solvent carrier shall meet the requirements of AWPA Standard P-9 "Standard for Hydrocarbon Solvents for Oil-Borne Preservatives." The preservative solution shall be equivalent to five percent of pure pentachlorophenol.

2. The treatment shall be applied in accordance with AWPA Standard C-2 (lumber, timber, etc.), C-9 (plywood) or C-28 (lumber treated before laminating). Penetration of pentachlorophenol shall be determined using the penta check method, Section 5, AWPA Standard A-3. Retention of pentachlorophenol shall be a minimum of 0.50 pounds per cubic foot of wood for in ground exposures, and 0.40 pounds per cubic foot for above ground exposures. The treating company shall furnish a notarized certificate of treatment that indicates all pertinent details of the treatment.

3. Before the preservative treatment is applied, the lumber to be treated shall be sawed to exact lengths required, and bored ready for use in the work so far as practicable, in order to reduce to a minimum cutting or boring of lumber after treatment. Only lumber of the same kind and approximately the same size and seasoning shall be treated in any one charge. All surfaces of treated lumber cut after treatment shall receive two heavy brush coats of pentachlorophenol solution before the lumber is placed in the work.

C. WOOD FIRE RETARDANT TREATMENT:

1. Exposed wood blocking and sheeting shall receive fire-retardant treatment conforming to American Wood Preservers Association, AWPA Standard C20 for lumber and AWPA C27 for plywood.

2. Fire retardant treated lumber shall bear UL label and shall have UL Fire-Hazard Classification "FR-S", when tested in accordance with ASTM E84.

PART 3 - EXECUTION

3.01 CONSTRUCTION:

A. Work shall be erected plumb, true and square.

B. Coordinate delivery and erection of prefabricated components. Field applied items shall be installed in accordance with good trade practices. Cutting and carpentry for other trades shall be performed. Cut ends and drilled holes of lumber previously treated with preservative specified shall be brush coated with the same material.

C. Except as otherwise indicated on the design drawings, fasteners for nailers and for other wood members used as nailers or anchorage material shall be the equivalent of 1/2-inch diameter bolts at 2'-6" o.c. for 2-inch material, and 3/8-inch diameter bolts at 2'-0" o.c. for 1-inch material. Wood members in general shall be fastened to masonry with masonry nails, power-driven fasteners, or bolts in expansion shields, except where otherwise indicated.

D. Minimum length of nails shall be twice the thickness of wood being fastened.

E. Ipe Wood shall be pre-drilled and attached with galvanized self-tapping screws. Every plank must be attached with at least two fasteners at each end. Decking shall be tied down such that there is no uplift or lateral movement (in direction of bridge span). All fasteners to be zinc plated. Planks are to be pre-drilled prior to installation of bolts and/or screws. Screw patterns shall be straight, consistent, and evenly spaced throughout and marked by chalk line prior to installation. Decking shall be designed such that deflection is limited to L/300 (where L is the distance between supports. Decking shall have a 1/16-inch gap between adjacent planks. Wood hand Railings shall be attached 2 ft on-center, maximum, to guardrails.

F. Temporary wood planking, sized to provide safe walking areas and protection against rough usage in construction, shall be placed over site elements during construction operations. Where wheeling of building material is necessary, special provision shall be made to protect site elements.

G. All shavings and wood cuttings of treated lumber shall be captured and removed. No shavings, cuttings, or scrap treated lumber shall enter the watercourse.

END OF SECTION

SECTION 06606

WEIRS, BAFFLES, LAUNDERS, AND SUPPORTS

PART 1 - GENERAL

1.01 WORK INCLUDES:

A. Provide and install weirs, baffles, launders and supports, of the type(s) specified in this Section and of the sizes and locations shown on the Drawings.

1.02 RELATED WORK:

A. Section 01330, SUBMITTALS

B. Section 03300, Cast-In-Place Concrete

1.03 SUBMITTALS:

A. Submit complete shop drawings in accordance with the provisions of Section 01330 SUBMITTALS.

1.04 QUALITY ASSURANCE:

A. All weirs, baffles and launders shall be fabricated of fiberglass-reinforced polyester furnished by a single manufacturer.

B. Description of System:

1. Employed as an accurate method of proportioning and measuring flow.
2. Baffle, positioned in front of weir and launders prevents floating solids from clogging discharge openings.

1.05 DELIVERY, STORAGE & HANDLING:

A. Deliver, store and handle materials to prevent damage of any nature.

B. Remove all damaged materials from the site and replace at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Acceptable Manufacturers:
1. F. B. Leopold Co., Sybron Corporation, Zelienople, Penn.
2. IMCO Inc. Moorestown, New Jersey.

3. Or equal.

2.02 MATERIALS:

A. Fiberglass reinforced polyester property at 70 Degrees F.:

1.	Ult. Tens. Str. psi	D-638	25,000
2.	Tens. Mod. x 10^6 psi	D-638	2.3
3.	Flex. Strength psi	D-790	32,000
4.	Flex. Mod. x 10^6 psi	D-790	2.0
5.	Compr. Str. (edgewise)	D-695	22,000
6.	Shear Str. (cross Fiber)	D-793	12,000
7.	Shear Str. (interlaminar)		2,000
8.	Shear Mod. x 106		1.1

B. Weir Plates and Launders:

1. Fiberglass suitably reinforced to withstand the seating head conditions.

C. Seats and Frame:

1. Structural angle fiberglass, embedded in the concrete with anchor bolts to secure it, and of suitable size to withstand the hydraulic forces.
2. Side frame shall extend upward a sufficient amount so that the weir or launder will contact the side seats at all positions and/or as shown on the Drawings.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Install weirs, baffles, launders and supports as shown on the Drawings and in strict accordance with the manufacturer's instructions and recommendations.

3.02 PROTECTION:

A. Protect weirs, baffles, launders, and supports to prevent damage from splashing or the accumulation of paint, concrete, mortar, etc.

3.03 CLEANING:

A. Remove splashes or the accumulation of paint, concrete, mortar, etc.

B. Do not mar surfaces of items being cleaned.

END OF SECTION

Attachment C – Opinion of Probable Construction Cost

Draft 100% Design - Opinion of Probable Construction Cost
Boardwalk and Stream Restoration
Walnut Street Area Flood Mitigation - City of Framingham MA
June 30, 2022

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
1	Mobilization and Demobilization _____ Dollars and Cents	LS	1	$ 50,000.00	$ 50,000.00
2	Traffic Management _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
3	Demolition _____ Dollars and Cents	LS	1	$ 10,000.00	$ 10,000.00
4	Clearing and Grubbing _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
5	Temporary Water Management/Brook Diversion _____ Dollars and Cents	LS	1	$ 30,000.00	$ 30,000.00
6	Helical Piles _____ Dollars and Cents	LS	1	$ 160,000.00	$ 160,000.00
7	Steel Support System _____ Dollars and Cents	Ton	23	$ 12,500.00	$ 287,500.00
8	Walking Surface Deck _____ Dollars and Cents	SF	2500	$ 30.00	$ 75,000.00
9	Handrails, Posts, Balusters, Screens _____ Dollars and Cents	LF	600	$ 250.00	$ 150,000.00
10	Removal and Disposal of Fill Under Boardwalk _____ Dollars and Cents	Ton	320	$ 60.00	$ 19,200.00
11	Precast Headwall and Wingwall _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
12	Stormwater BMP _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
13	Reinforced Concrete Approach Ramps _____ Dollars and Cents	CY	20	$ 1,100.00	$ 22,000.00

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
14	Permanent Signage _____ Dollars and Cents	ea.	1	$ 10,000.00	$ 10,000.00
15	Educational Kiosks at Outlooks _____ Dollars and Cents	ea.	2	$ 10,000.00	$ 20,000.00
16	Permanent Bollards with Solar Lights _____ Dollars and Cents	ea.	4	$ 2,500.00	$ 10,000.00
17	Round Post Lock Removable Bollards _____ Dollars and Cents	ea.	2	$ 2,000.00	$ 4,000.00
18	Bituminous Concrete Binder Course _____ Dollars and Cents	Ton	60	$ 300.00	$ 18,000.00
19	Bituminous Concrete Wearing Course _____ Dollars and Cents	Ton	50	$ 400.00	$ 20,000.00
20	Stream Restoration Type A _____ Dollars and Cents	LF	525	$ 325.00	$ 170,625.00
21	Stream Restoration Type B _____ Dollars and Cents	LF	330	$ 225.00	$ 74,250.00
22	Stream Restoration Type C _____ Dollars and Cents	LF	480	$ 250.00	$ 120,000.00
23	Stream J Hooks _____ Dollars and Cents	ea.	10	$ 1,000.00	$ 10,000.00
24	Stream Cross Veins _____ Dollars and Cents	ea.	4	$ 2,500.00	$ 10,000.00
25	Construction Matting _____ Dollars and Cents	LS	1	$ 75,000.00	$ 75,000.00
26	Removal and Disposal of Soil/Sediment _____ Dollars and Cents	Ton	1700	$ 75.00	$ 127,500.00
27	Plantings, Stabilization, Loan and Seed _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
28	Remove and Dispose Channel Debris Dams _____ Dollars and Cents	ea.	8	$ 10,000.00	$ 80,000.00

Item No.	Item Description Unit Price in Words	Units	Estimated Quantity	Unit Price (In Figures)	Estimated Cost (In Figures)
29	Erosion and Sedimentation Control _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
30	Site Restoration on Private Properties _____ Dollars and Cents	LS	1	$ 25,000.00	$ 25,000.00
31	Police Detail Allowance _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
32	Miscellaneous Work and Cleanup _____ Dollars and Cents	LS	1	$ 20,000.00	$ 20,000.00
				Sub-Total Project Cost	$ 1,763,075
				10% Contingency	$ 176,308
				Total Project Cost	**$ 1,939,383**

Attachment D - Geotechnical Engineering Report

55 Walkers Brook Drive, Suite 100 Reading, MA 01867 (HQ)
Tel: 978.532.1900

March 10, 2022

Mr. Eric V. Johnson, PE
City Engineer
City of Framingham
Department of Public Works
100 Western Avenue
Framingham, MA 01702

RE: Geotechnical Engineering Report
Walnut Street Boardwalk
Framingham, Massachusetts

Weston & Sampson Engineers, Inc. (Weston & Sampson) is pleased to present our geotechnical engineering report for the proposed boardwalk crossing the wetlands between Walnut Street (near the intersection with Buckminster Street) and Stonybrook Road in Framingham, Massachusetts. Our project understanding is based on recent discussions with the project team and City of Framingham representatives. Our services were completed in general accordance with Task Order 22 which was authorized on October 12, 2021.

The geotechnical considerations and recommendations presented in this report are based on our understanding of the proposed project as described herein, subsurface conditions encountered at discrete exploration locations, and the provisions of the Limitations section of this report.

Information on the use of this report is provided in the document titled "Important Information about this Geotechnical Engineering Report" by Geoprofessional Business Association (GBA), Inc., provided in *Attachment D*.

PROJECT UNDERSTANDING

There is an existing walkway on an earthen embankment (known as the "School Path") which crosses the wetland between Walnut Street (near the intersection with Buckminster Street) and the end of Stonybrook Road as shown on *Figure 1 – Site Location Map*. The walkway, with chain link fence along both sides, provides access to area schools and parks. The top of the embankment is a approximately El. 154 and reportedly is submerged several times a year making it impassable. The embankment and chain link fence also impedes surface water flow through the wetland resulting in sediment build-up, restriction of wild-life and aquatic species passage, and exacerbates flooding.

We understand that the goal of the project is to remove the embankment and construct an elevated pedestrian boardwalk to restore water and habitat connectivity and flood storage within

the wetland. The boardwalk deck is planned to be approximately 315-feet long with the ends tying into the existing grade on either side of the wetlands at approximately El. 156 and the center at approximately El. 157. To reduce the impact on the flood storage capacity of the wetland, the City Conservation Commission has requested boardwalk foundations be designed with the minimum practical area.

At the request of the City, the boardwalk is being designed to support pedestrian loads and a sidewalk snowplow weighing up to 5 tons. The project structural engineer has indicated that the corresponding foundation loads are about 12 kips per pile (AASHTO Strength I loading) assuming pile bents spaced at about 14 feet along the boardwalk and supported by three (3) piles.

In addition, a City sewer project in the area of this project, which is currently under review, may include construction of a sewer main across the wetlands. If approved, the sewer main pipes will be installed as part of a separate project that is designed by others.

Elevations in this report reference the North American Vertical Datum of 1988 (NAVD 88) datum.

SUBSURFACE CONDITIONS

Geologic Setting

Information from the United States Geological Survey (USGS) "Surficial Map of The Clinton-Concord-Grafton-Medfield 12-Quadrangle Area in East Central Massachusetts," (2007) compiled by J. R. Stone and B. D. Stone indicate that the site is located in a wetland area underlain by coarse glacial stratified drift deposits composed predominantly of sand and gravel with various amounts of cobbles, boulders, and silt.

Previous Subsurface Explorations by Others

Borings have been advanced by others in the vicinity of the boardwalk as part of the sewer project referenced above. Relevant explorations that have been reviewed as part of this preliminary evaluation included the following:

- Boring B-9 by SW Cole Engineering, Inc. (SWC) in 2012;
- Borings B-107 and B-108 by SWC in 2013; and
- Borings SB-2 and SB-3 by AECOM in 2017.

Excerpts (e.g., boring location plans and boring logs) from the associated geotechnical engineering reports are included in *Attachment A*. The approximate boring locations are shown on *Figure 2 – Exploration Location Plan*.

Recent Subsurface Exploration Program

Subsurface conditions were explored by Weston & Sampson on November 1, 2021 by advancing three (3) borings (B-201 through B-203) at the approximate locations shown in *Figure 2*. The primary purpose of the explorations was to further evaluate the presence, thickness and

composition of the organics. Weston & Sampson geotechnical engineering staff observed boring activities, measured boring locations relative to existing site features, and prepared logs for each boring.

The borings were completed by Technical Drilling Services, Inc. of Sterling, MA. Standard penetration tests (SPTs) were conducted continuously or at 5-foot intervals in each boring by driving a split spoon sampler with an automatic hammer in general accordance with ASTM D1586. The borings were advanced using hollow stem augers (HSA) to depths between approximately 27 and 37 feet and were backfilled with soil cuttings upon completion. Copies of the boring logs along with the Guide to Subsurface Exploration Logs are included in *Attachment B*.

Subsurface Conditions

Subsurface conditions encountered in the borings advanced by others and Weston & Sampson generally consisted of granular fill, peat and organic silt, sand and silt, and glacial till to the depths explored.

Subsurface soil and groundwater conditions described below have been interpreted based on a limited number of explorations as described above. Variations may occur and should be expected between locations. The strata boundaries shown in our boring logs and on *Figure 3 – Subsurface Profile* are based on our interpretations and the actual transitions may be gradual. Refer to the boring logs included in *Attachments A and B* for detailed descriptions of the soil samples collected. The general Unified Soil Classification System (USCS) designation(s) for each stratum is included in the descriptions below in parentheses. Depths provided below are relative to the existing ground surface at the time of drilling.

Surficial Materials – About 4 inches of forest duff was encountered at the ground surface in B-107. Surficial materials encountered in the other borings generally consisted of granular fill or topsoil.

Fill – Dense granular fill was encountered at the ground surface or below the surficial materials in each of the borings. The fill generally consisted of fine to coarse SAND with trace to few non-plastic fines, and few to little gravel (SP, SP-SM). Boring B-203 penetrated asphaltic pavement between about 5 and 6 feet. Fill extended to depths ranging from approximately 4 to 17.5 feet with the deepest fill near the middle of the proposed boardwalk alignment.

Organics – Fibrous peat was encountered below the fill in SB-2, B-202, B-9, and SB-3 and extended to depths ranging between approximately 5 and 28.5 feet (PT). Very soft to medium stiff organic silt was encountered below the fill or peat in B-201, SB-2, and B-203. The organic silt generally consisted of silt with few to little fine to medium sand (OL) and extended to depths between about 16 and 25 feet.

Silty Sand and Silt – Very loose to medium dense silty sand and very soft silt was encountered below the fill in B-108; and below the peat and organics in SB-2, SB-3, B-201, B-202, B-203,

and B-9. The silty sand generally consisted of fine to coarse SAND with few to some non-plastic fines (SM, SP-SM). The silt was generally comprised of non-plastic fines with trace to few fine sand. Borings B-201, B-202, B-203, B-9, and B-107 were terminated in this layer at depths between 17 and 37 feet. In borings B-108 where this layer was fully penetrated, it extended to depths between about 23 and 49.5 feet.

Well Graded Sand – Medium dense well graded sand was encountered below the silty sand and silt in SB-2 and SB-3 and generally consisted of fine to coarse sand with trace to some gravel and trace fines. This material extended to depths of approximately 52.5 and 47.5 feet in SB-2 and SB-3, respectively.

Glacial Till – Medium dense to very dense glacial till was encountered below the silty sand and silt in B-108 and below the well graded sand in SB-2 and SB-3. In SB-108 the glacial till generally consisted of silt with some sand and trace gravel (ML). In SB-2 and SB-3 the glacial till consisted of fine to coarse sand with some fines and few to trace gravel.

SB-108 was terminated at a depth of 55 feet on probable bedrock based on the boring log. SB-2 was terminated in the glacial till at a depth of 61.5 feet. The glacial till extended to about 54 feet in SB-3 which was advanced into probable bedrock to a depth of 57 feet.

Groundwater – Groundwater was encountered in several of the borings as indicated in the following table.

Groundwater Observations

Boring ID	Observation Date	Depth (feet)	Approximate Elevation
B-9	10/10/2012	0.5	153.5
B-107	10/31/2013	3.1	152.9
B-108	10/28/2013	8.0	153.8
SB-2	3/4/2017	1.0	152.8
SB-3	3/5/2017	2.3	153.3
B-201	11/1/2021	0.0	153.6
B-202	11/1/2021	0.0	153.5
B-203	11/1/2021	0.2	154.7

These water levels were taken during drilling on the date indicated and may not represent static water levels. We anticipate that groundwater levels will fluctuate with season, variations in precipitation, construction in the area, and other factors. Perched groundwater conditions could exist close to the ground surface, especially during and after extended periods of wet weather.

Laboratory Testing

A sample of the peat was submitted to Geotesting Express, Inc. of Acton, MA for laboratory moisture, ash, and organic matter content (ASTM D2974) and Atterberg Limit testing (ASTM D4318) to confirm field classifications and estimate engineering properties. Laboratory test results are included in the boring logs in *Appendix B* and the laboratory test results are included in *Appendix C- Laboratory Test Results*.

GEOTECHNICAL RECOMMENDATIONS

General

The primary geotechnical consideration for support of the proposed boardwalk is the presence of undocumented (i.e., non-engineered) fill, peat, and organic silt extending to depths of up to about 28.5 feet below the existing walkway which corresponds to about El. 125.5 as illustrated on *Figure 3*. These materials are not suitable for support of structure foundations due to the risk of differential settlement from variations in thickness, consistency, compaction, decomposition, and rates of compression of these materials. Additionally, the Massachusetts Building Code does not allow support of foundations on non-engineered fill or organics. Therefore, we recommend supporting the proposed boardwalk on deep foundations developing their geotechnical capacity in the native sand and glacial till strata as discussed below.

Pile Foundation Alternatives

Feasible deep foundation alternatives for support of the elevated boardwalk include helical piles, driven piles (e.g., timber, steel pipe, steel H-piles and pre-cast concrete) and drilled micropiles. The piles should be designed to derive their capacity in the medium dense (or denser) native sand and/or glacial till bearing strata underlying the existing fill and organics. Based on the relative cost of these foundation types, we recommend supporting the boardwalk on either helical piles or driven piles.

Due to the variable depth to the bearing strata as illustrated on *Figure 3*, pile lengths are anticipated to vary along the boardwalk alignment. Due to the different installation methods and soil support mechanisms, the geotechnical capacity varies for these different pile types as discussed below. They also vary in size and installation method which may impact water flow through the wetland.

Piles should be designed by a Structural Engineer licensed in the Commonwealth of Massachusetts and constructed in accordance with the provisions of the Massachusetts State Building Code and as discussed in the following sections. The piles should be designed for adequate corrosion protection (e.g., bituminous coating, grouted annulus, sacrificial steel thickness, etc.) resulting from exposure.

Helical Piles

As discussed above, the elevated boardwalks can be supported on helical piles. Helical piles develop their capacity through end bearing of the helical plates and are therefore installed to suitable embedment depths such that each of the plates bear within the bearing strata. During construction, the pile capacity is determined based on achieving a minimum embedment depth and installation torque.

Resistance to Vertical Loads
The capacity of helical piles is a function of the embedment depth, and the number and size of the helical plates. Preliminary calculations indicate the following helical pile configurations are expected to support a nominal axial load of 42 kips per pile from end bearing of the plates.

- At the ends of the boardwalk where the depth to the bearing strata is relatively shallow: 4.5 inch diameter (0.33 in. wall thickness) pipe pier section with a 10”-12”-14” lead helix section with the top plate bearing at least 10 feet below finished grade.

- At the middle of the boardwalk where the bearing material is deeper, a 4.5 inch diameter (0.33 in. wall thickness) pipe pier section with an 8”-10”-12” lead helix section with the top plate bearing at least 25 feet below finished grade.

We recommend a resistance factor of 0.45 be used to calculate factored resistance at the strength limit state if load testing is not performed. The resistance factor may be increased to 0.75 if static load testing is performed as described below. Friction along the shaft of the helical piers should be neglected.

Additional downward capacity may be possible with greater embedment depths.

We recommend that helical piers be installed to suitable embedment and installation torques in the medium dense (or denser) native glacial outwash and/or glacial till layers. Due to the variable nature of the site soils, actual pier lengths may vary. The piers should have a minimum horizontal spacing of three helix diameters.

The helical pier contractor should provide a helical pier design for capacities required by the structural engineer. The helical pier design should be stamped by a Professional Engineer licensed in the Commonwealth of Massachusetts and include calculations that demonstrate adequate geotechnical and structural capacities including resistance to buckling. Required installation torques should also be specified.

The helical piers and installation equipment must be capable of installation to the estimated embedment and suitable torques. All steel helical pier components must be galvanized.

Full time observation of helical pier installation is required by the Massachusetts State Building Code. Weston & Sampson should observe installation of all helical piers to document minimum embedment depths and installation torques.

Resistance to Lateral Loads
Lateral loads should be resisted by buried foundation elements such as pier caps and grade beams, cross bracing or battered (inclined) piers. Lateral resistance against pier caps and grade beams can be calculated using a passive equivalent fluid pressure of 250 pcf. Passive resistance should be ignored in the top 1-foot of embedment. Lateral resistance from the helical pier shafts should be ignored.

Driven Piles

As discussed above, the elevated boardwalks can be supported on driven piles which develop their capacity through a combination of friction and end-bearing resistance in the bearing strata. Driven piles will require sufficient embedment to resist compression, uplift, and lateral forces.

Resistance to Vertical and Lateral Loads
The following design parameters can be used for design of deep foundations.

Design Parameter	Value For:			
	Fill	Organics	Silty Sand, Silt, and Well Graded Sand	Glacial Till
Total Unit Weight (lbs/ft^3)	120	80	125	125
Friction Angle (degrees)	30	28	30	36
Coefficient of Passive Earth Pressure (Rankine)	3.0	2.8	3.0	3.7
Nominal Unit Skin Resistance (for axial pile capacity, psf) (1, 2)	NA	NA	250	400
Horizontal Modulus of Subgrade Reaction (For L-Pile Analysis) (lbs/in^3)	20	20	30	125

Notes: (1) Unit skin resistance is estimated assuming total pile lengths of approximately 10 feet.

(2) The following resistance factors should be applied:

- 0.40 if pile load testing is not performed.
- 0.65 if dynamic load testing is performed on at least 2 piles
- 0.75 if static load testing is performed on at least 1 pile

(3) Side resistance in the top 4 ft. (frost zone) and lateral resistance in the top 2 ft. of pile embedment should be neglected.

Axial capacity of driven piles should be computed based on skin resistance within the sand, silt, and/or glacial till soils, neglecting side resistance in the upper 4 feet (frost zone). Lateral resistance in the top 2 feet of pile embedment should be neglected.

Pile Driving Criteria
A Professional Engineer engaged by the contractor should perform wave equation analyses (WEAP) to develop requirements for the pile hammer system planned for installing the piles, and to estimate the anticipated driving resistance, pile stresses during driving, and termination criteria based on the design pile capacity. The termination criteria should include both a minimum tip elevation based upon the soil profile along the length of the boardwalk and driving criteria. The results of this analysis should be submitted to the Geotechnical Engineer for review.

Piles should be driven until they meet the termination criteria. Adjustment of the termination criteria may be required during pile construction. The penetration into the bearing stratum required to achieve the required axial resistance may be greater or less than that estimated based on conditions encountered during installation.

The contractor should drive all piles of the same type using the same pile driving equipment. Pile installation should be observed by Weston & Sampson and continuous installation records should be maintained for all driven production piles.

Concrete Pads

We understand free-standing concrete pads are proposed at the ends of the elevated boardwalk. Foundation loads and dimensions were not provided, but we anticipate relatively light loads. Based on conditions encountered in our borings, the pad on the western end will bear on the existing fill and the pad on the eastern end will bear on the natural silty sand. Due to the high fines content of these materials, they have a high susceptibility to frost heave.

To reduce the potential for frost heave, we recommend removing the existing soils to at least 2 feet below finished grade and backfilling with crushed stone wrapped in filter fabric. Additional resistance to frost heave can be provided by replacing the existing soils to the frost depth of 4 feet.

Seismic Design

Seismic site class is determined in accordance with the International Building Code (IBC) as adapted by the MSBC using a weighted average of SPT blow counts in the upper 100 feet of soil at a site. Based upon the conditions encountered in the borings as described above, which extended to depths up to 57 feet, our site class evaluation considered mapped surficial geologic conditions in the site vicinity and assumed SPT blow counts below a depth of 57 feet. Based on the results of explorations and analyses and depths of proposed structures, we recommend that the subject project be evaluated using parameters associated with Site Class E. The structural engineer shall determine the seismic site parameters (S_1 and S_s) based on the site location and site coefficients (F_a and F_v) based on the seismic site parameters and Site Class.

Liquefaction is the sudden drop in shear strength between soil particles that can occur in saturated, cohesionless soils as a result of ground acceleration during a seismic event. Liquefaction typically results in soil densification and subsequent settlement of overlying features and structures. Conditions most likely to contribute to liquefaction include a soil matrix containing loose, uniform medium to fine sand (poorly graded sand) below the groundwater table. Based on the soil and groundwater conditions encountered in our explorations, the risk of liquefaction induced structurally damaging ground deformations is low.

CONSTRUCTION CONSIDERATIONS

Site Preparation

Prior to earthwork construction, the sites should be prepared by removing existing vegetation and fill along the elevated boardwalk to the limits indicated on the contract documents. Existing organic materials should be removed below the concrete pads at the ends of the boardwalk.

Root balls from trees may extend several feet deep and grubbing operations can cause considerable subgrade disturbance. In general, roots greater than one-inch in diameter should be removed below the permeable paths and pavements as well as areas of concentrated smaller roots.

Over excavated areas should be brought back to grades with compacted crushed stone or free-draining Structural Fill as described below.

Subgrade Preparation and Protection

Following stripping and site preparation, subgrades supporting concrete pads should be proof compacted. Soft, loose, or disturbed areas will require additional re-compaction or over-excavation, stabilization, and backfill with compacted Granular Base.

Footing and slab subgrades in granular materials should be proof compacted with at least 5 passes by a minimum 12-ton smooth drum vibratory roller. All subgrades should be observed by Weston & Sampson prior to placement of fill and concrete.

Soils containing more than trace amounts of silt are highly susceptible to softening and disturbance by construction activity during wet or freezing weather. Subgrade protection should be the responsibility of the Contractor and special precautions and protective measures appropriate for the weather and traffic conditions during construction should be used during earthwork construction to preserve the integrity of subgrades. Construction traffic should not operate directly on subgrades.

A few inches of angular crushed stone can be placed and compacted at the base of footing excavations to protect subgrades from disturbance during construction and wet weather conditions. If foundation construction occurs during freezing conditions, insulating blankets, heaters, or other suitable measures should be employed to prevent foundation subgrades from

freezing until the foundations are backfilled sufficiently to prevent frost from reaching the footing subgrades and penetrating beneath foundation elements.

Pile Load Testing

We recommend static load testing to verify the axial load capacity of helical piles supporting the boardwalk. At a minimum, one static load test should be performed. The static pile load test should be performed prior to the start of production pile installation. The static load test should be performed in accordance with the American Society for Testing and Materials (ASTM) standard D1143.

If driven piles are selected, a minimum of two indicator piles should be installed with pile dynamic analyzer (PDA) testing performed in accordance with ASTM D4945. Production pile lengths and driving criteria should be determined based on data obtained from the driving of indicator piles. Pile driving equipment used to install indicator piles should be the same as what the Contractor proposes to use for installation of production piles.

Groundwater and Surface Water Controls

Dewatering may be required during construction of the concrete pads at the ends of the proposed boardwalk. The Contractor should be prepared to manage and control infiltrating groundwater and surface water during foundation excavation as well as control surface water from entering excavations to provide a dry and stable subgrade. The method of dewatering excavations will depend on several factors, including depth of excavation, localized soil conditions encountered, time of year, size of the open excavation and the length of time the excavation is left open. The dewatering system should be capable of lowering the groundwater table at least 2 ft. below the anticipated excavation depths and be kept operational until fill placement and compaction have been completed to a level of at least 2 ft. above the groundwater table elevation.

The Contractor should be responsible for selecting dewatering methods based on their proposed methods and equipment used for excavation to achieve the desired objectives (that is, maintaining a dry condition at the bottom of the excavation during installation of structures, preparation of stable subgrades, etc.). We anticipate that multiple sump pumps will be required to control groundwater during foundation construction. Local sump pumps should be surrounded by ¾-inch crushed stone wrapped in non-woven filter fabric to reduce migration of fines.

Dewatering efforts should satisfy requirements of local, state, and federal environmental and conservation authorities.

Temporary Slopes

All slopes and excavations should be constructed in accordance with applicable OSHA and local safety standards. Temporary slopes up to 10 ft. high can be inclined up to 1.5H:1V provided no seepage or sloughing is present. Equipment should not be allowed to induce vibration or infiltrate water above the slopes and no surcharges should be located within 20 ft. of slope crests.

Temporary slopes should be expected to ravel somewhat, depending on weather conditions, soil conditions, seepage, and duration of exposure. The loose fill will likely require flatter slopes, erosion control measures, drainage elements, and/or temporary excavation support.

Fill

Structural Fill – Well graded sand and gravel with a maximum particle size of 4 inches and less than approximately 10 percent fines (such as MassDOT M1.03.0, type B Gravel Borrow or M2.01.7 Dense-graded Crushed Stone) are recommended for use as Structural Fill beneath proposed concrete pads. Structural Fill should be placed in maximum 12-inch-thick lifts (measured prior to compaction) with each lift compacted to at least 95 percent of maximum dry density as determined by ASTM D1557 (modified Proctor) for the specific fill material.

Ordinary Fill – Well graded sand and gravel with a maximum particle size of 6 inches and less than approximately 20 percent fines (such as MassDOT M1.01 Ordinary Borrow) is recommended for use as Ordinary Fill beyond the zone-of-influence of the concrete pads. Ordinary Fill should be placed in maximum 12-inch-thick lifts (measured prior to compaction) with each lift compacted to at least 92 percent of maximum dry density as determined by ASTM D1557 (modified Proctor) for the specific fill material.

Crushed Stone - Crushed stone shall consist of durable crushed rock or durable crushed gravel stone, free from ice and snow, sand, clay, loam, or other deleterious or organic material. The crushed stone shall be uniformly blended and shall conform to the requirements provided in MassDOT Standard Specifications section M2.01.0. Crushed stone should be placed and compacted to a firm and unyielding condition with at least 4 passes of a vibratory compactor.

A geosynthetic separation layer should be placed between the excavation subgrade and crushed stone backfill. We recommend that a geosynthetic used for stabilization consist of a non-woven geosynthetic such as Mirafi 160N or equivalent.

Reuse of On-Site Soils - Fill and natural soils excavated from the site that are free of organics, contamination (including metals, VOCs, SVOCs, etc.), and other deleterious materials may be suitable for reuse as Structural or Ordinary Fill provided the grain size distribution meets the requirements provided above. Use of on-site materials as Structural or Ordinary Fill should be evaluated on a case-by-case basis during construction by the Geotechnical Engineer.

The moisture content of fill materials should be within 3 percent of the optimum moisture content. Moisture conditioning, if required, could consist of drying by scarification and frequent mixing in thin lifts during warm, dry conditions.

Density testing should be completed on each lift of fill during construction to confirm adequate compaction. In addition to density testing, we recommend that the fill lifts pass a proof roll using a fully loaded 10-wheel dump truck or equipment of similar size and weight and observed by the Geotechnical Engineer. In confined areas and where only hand-guided compaction equipment can

be used, the lift thickness should be reduced to not more than six inches and the maximum particle size reduced to three inches.

LIMITATIONS

We have prepared this report for use by the owner, members of the design and construction team for the subject project and site, only. The data and report can be used for estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

Explorations indicate soil conditions only at specific locations and only to the depths penetrated. They do not necessarily reflect subsurface conditions that may exist outside or between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, reevaluation will be necessary, and we should be consulted.

Site development plans and design details were considered preliminary at the time this report was prepared. If changes are made in site grades, configuration, design loads, or type of construction for the structure, the conclusions and recommendations may not be applicable. We should be consulted to review final design drawings and specifications to see that our recommendations are suitably followed. If design changes are made, we should be retained to review our conclusions and recommendations and provide a written evaluation or modification. Additional geotechnical engineering analyses will be required, and explorations may be necessary.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, is given. For additional information on the use of this report, please refer to the document titled “Important Information about This Geotechnical-Engineering Report” included in *Attachment D*.

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Jennifer MacGregor, PE
Geotechnical Technical Leader

Stephen Spink, PE
Geotechnical Team Leader

Attachments:
Figure 1 – Locus Plan
Figure 2 – Exploration Location Plan
Attachment A – Boring Logs by Others
Attachment B – Boring Logs by Weston & Sampson
Attachment C- Laboratory Test Results
Attachment D – Important Information about This Geotechnical-Engineering Report

JACM:STS

File path: P:\MA\Framingham MA\Task Order No. 22 - Walnut Street Flood Mitigation - Final Design (Project No. ENG21-0957)\Boardwalk Design\Geotechnical\5.0 report\2 geotech report\Geotech Report_Walnut St Boardwalk.docx

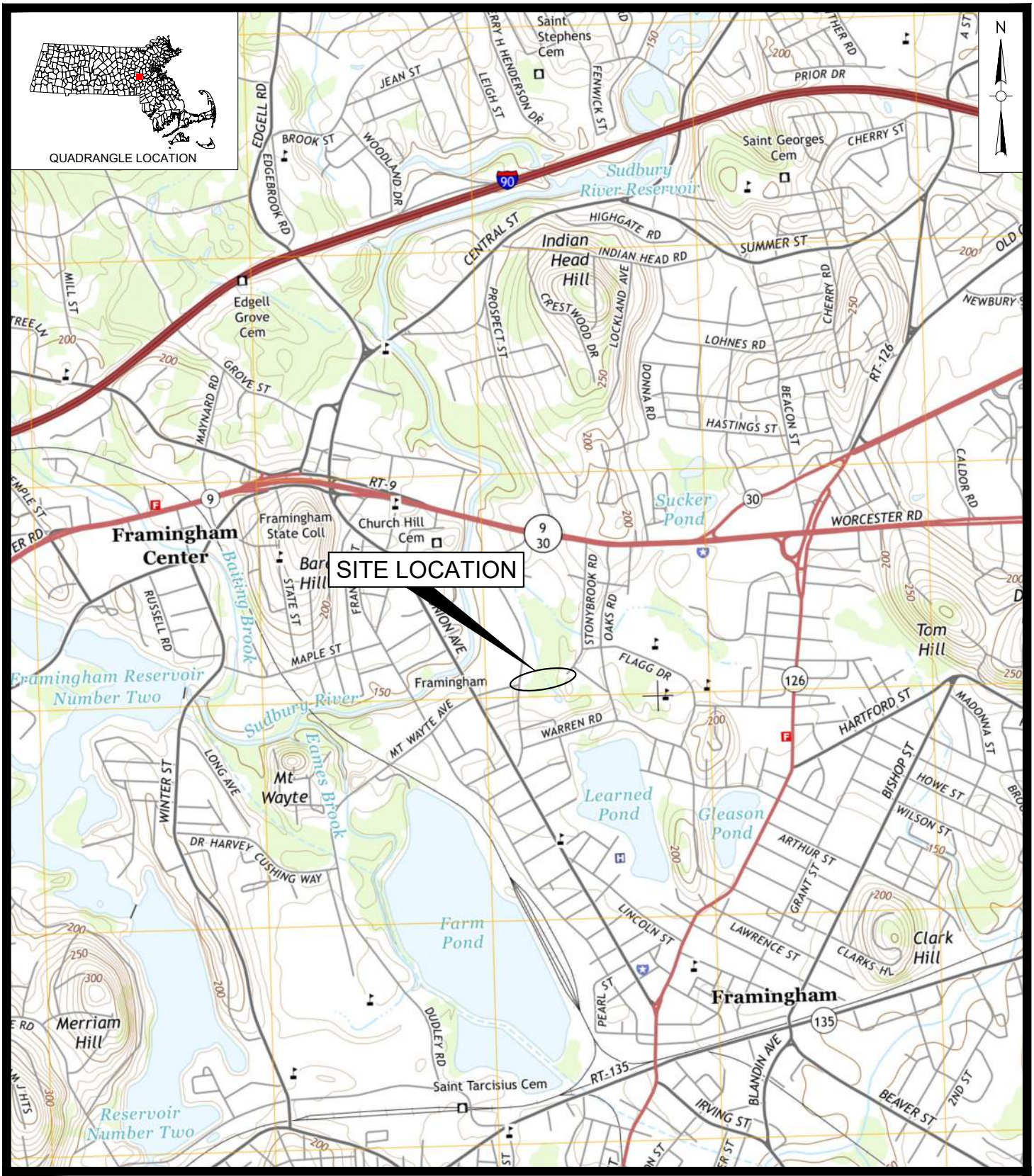

FIGURE 1
WALNUT STREET BOARDWALK
FRAMINGHAM, MASSACHUSETTS

LOCUS MAP

SCALE: 1"=2000'

0 2000 4000

Weston & Sampson

Date: 01/28/2022

\\wse03.local\WSE\Projects\MA\Framingham MA\Task Order No. 22 - Walnut Street Flood Mitigation - Final Design (Project No. ENG21-0957)\Boardwalk Design\Geotechnical\3.1 CADD\Walnut Street Figures.dwg

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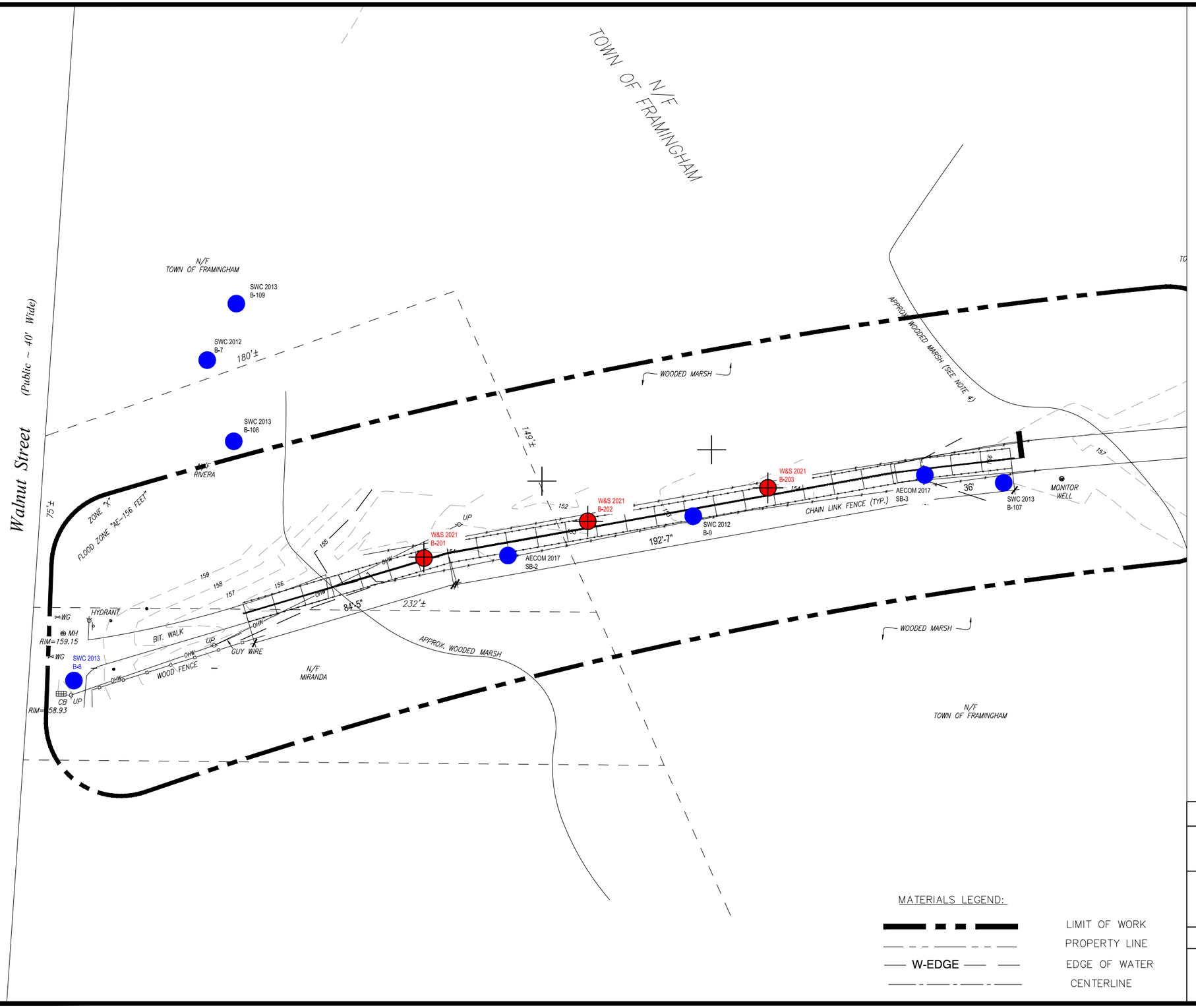

NOTES:

1. THIS PLAN IS BASED ON A SURVEY BY WESTON AND SAMPSON DATED APRIL 25TH, 2021.
2. WESTON & SAMPSON BORINGS WERE PERFORMED BY TECHNICAL DRILLING SERVICES, INC ON NOVEMBER 1, 2021.
3. BORING LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS RELATIVE TO EXISTING SITE FEATURES.
4. ELEVATIONS SHOWN ON THIS PLAN ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

LEGEND:

B-# DESIGNATION AND APPROXIMATE LOCATION OF BORING BY WESTON & SAMPSON

B-# DESIGNATION AND APPROXIMATE LOCATION OF BORING BY OTHERS

N

40 20 0 40 80

SCALE: 1"=40'

MATERIALS LEGEND:

LIMIT OF WORK
PROPERTY LINE
W-EDGE EDGE OF WATER
CENTERLINE

FIGURE 2

WALNUT STREET BOARDWALK
FRAMINGHAM, MASSACHUSETTS

EXPLORATION LOCATION PLAN

DESIGNED BY:	VS	CHECKED BY:	JM	DATE:	JANUARY 2022

Weston & Sampson

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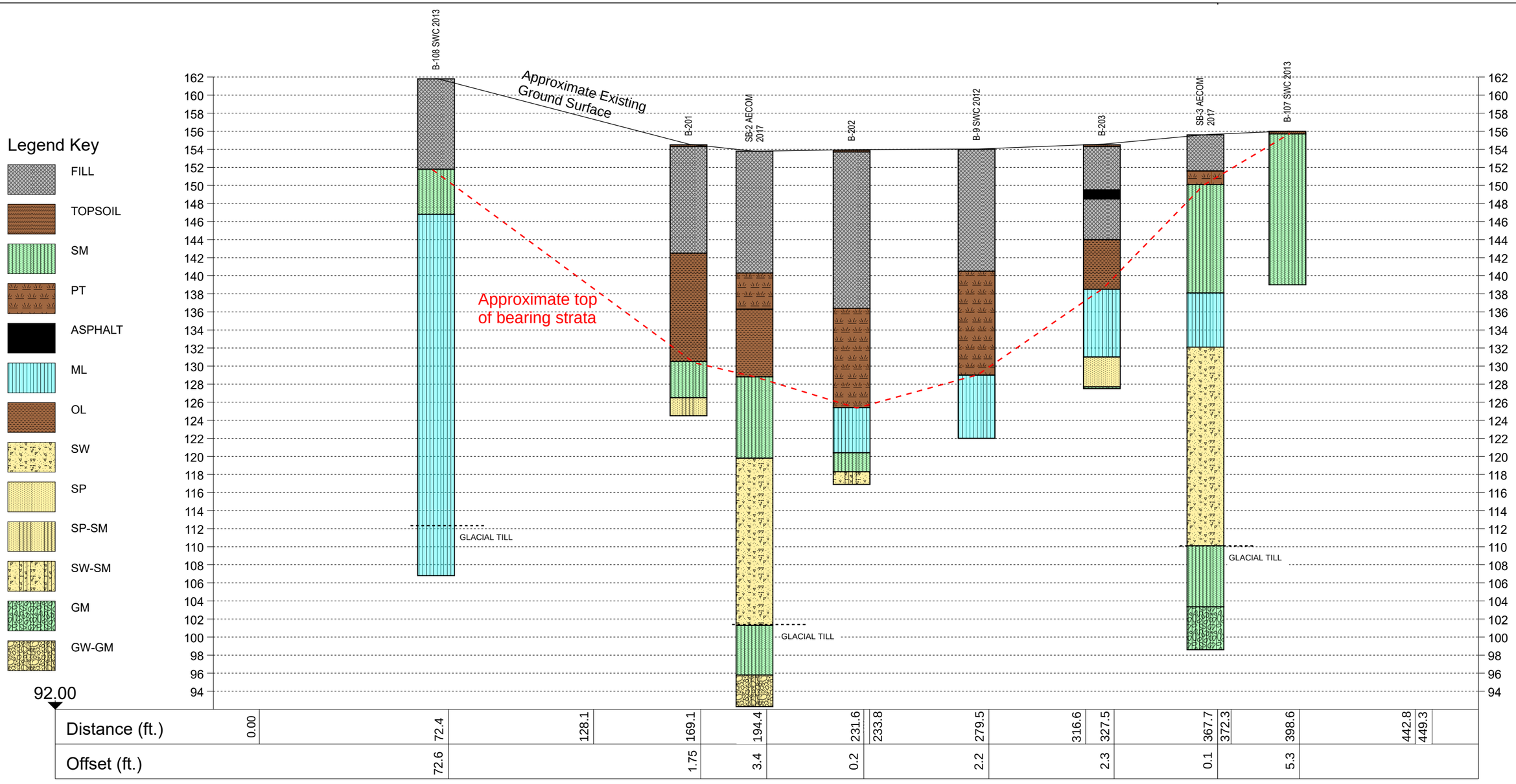

Notes

1) Horizontal scale values (distances and offsets) are approximate and included only for perspective purposes
2) The strata boundaries are based on our interpretations of data presented on the borings logs and the actual transitions may be gradual.
3) Subsurface information based on borings advanced by SW Cole Engineering, Inc. in 2012 and 2013, by AECOM in 2017, and Weston & Sampson in 2021.
4) Groundwater measurements were made on the dates and under the conditions stated on the boring logs. Fluctuations of the groundwater level may occur.

FIGURE 3
SUBSURFACE PROFILE

WALNUT STREET BOARDWALK

FRAMINGHAM, MASSACHUSETTS

DESIGNED BY: MJZ	CHECKED BY: JACM	DATE: FEBRUARY 2022

Weston & Sampson℠

Attachment A

Boring Logs by Others

R E P O R T

November 30, 2012
Revised January 8, 2013
12-0660 S

Environmental Survey and Geotechnical Engineering Services

Proposed Worcester Road Pump Station Elimination Project
Framingham, Massachusetts

PREPARED FOR:
Wright-Pierce
Attention: Mr. Robert Steen, P.E.
Project Manager
40 Shattuck Road
Andover, MA 01810

PREPARED BY:
S. W. Cole Engineering, Inc.
Chad B. Michaud, P.E.
Senior Geotechnical Engineer
10 Centre Road
Somersworth, NH 03878
(603) 692-0088
cmichaud@swcole.com

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- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

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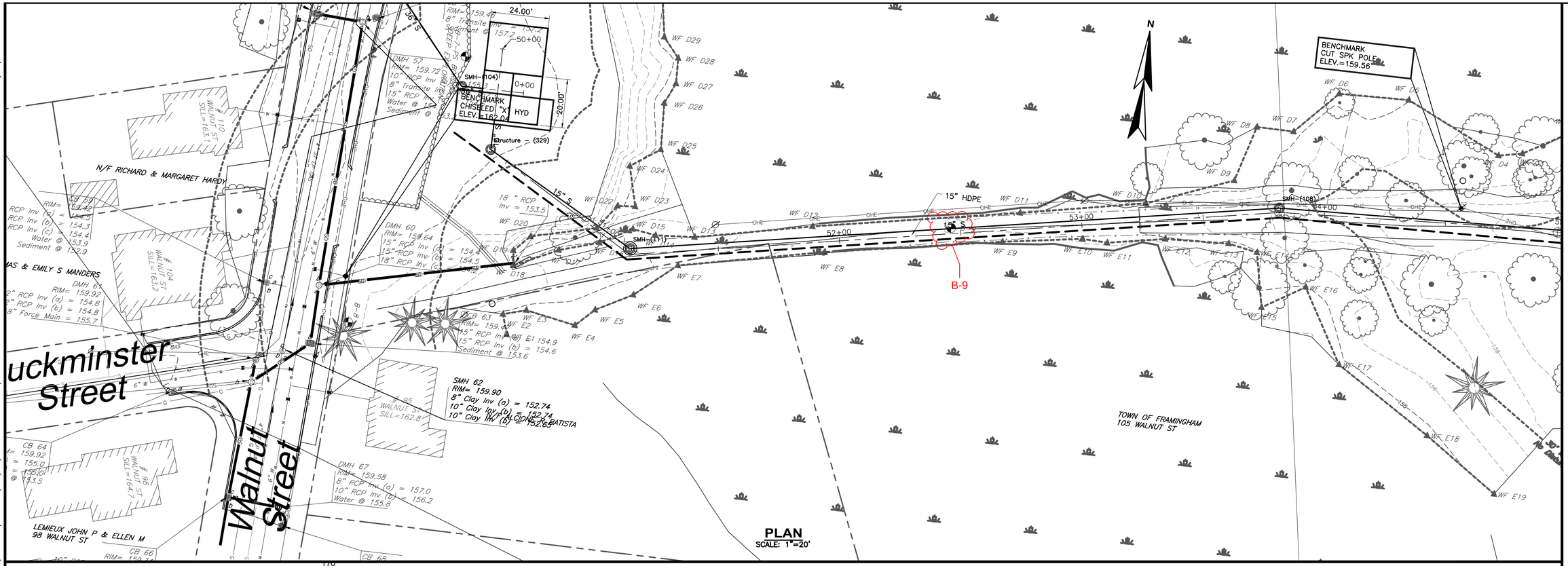

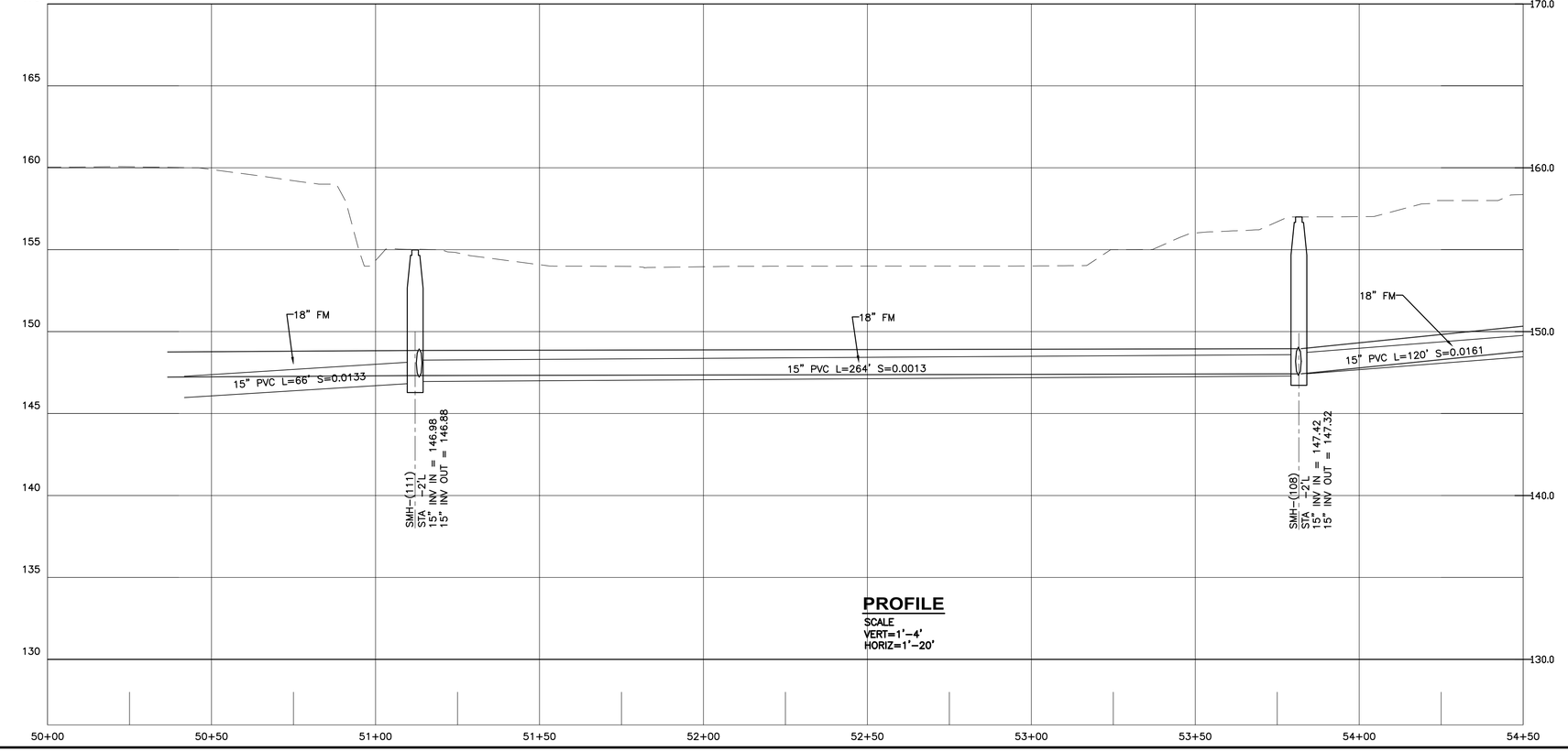

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

DESIGNED BY:
CAD COORD:
CAD:
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO:

WRIGHT-PIERCE
Engineering a Better Environment
Offices Throughout New England
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FRAMINGHAM MASSACHUSETTS
WORCESTER RD PUMP STATION
ELIMINATION PROJECT

DRAWING
C-6

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-9**
SHEET: 1 OF 1
PROJECT NO.: 12-0660

PROJECT / CLIENT: PROPOSED WORCESTER RD PUMP STATION ELIMINATION / WRIGHT-PIERCE
LOCATION: FRAMINGHAM, MASSACHUSETTS
DRILLING FIRM: GREAT WORKS TEST BORING, INC. DRILLER: JEFF LEE

DATE START: 10/10/2012
DATE FINISH: 10/10/2012
ELEVATION: NOT AVAILABLE
SWC REP.: CJC

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HSA	2.25"		
SAMPLER:	SS	2"	140 lbs	30"
CORE BARREL:				

WATER LEVEL INFORMATION
SATURATED SOILS ENCOUNTERED AT
APPROXIMATELY 0.5 FEET

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA	PID Results (ppm)
	1D	24"	4"	2.0'	6	9	13	13		GRAY, SILTY SAND AND GRAVEL (FILL) ~MEDIUM DENSE~	0.3
	2D	24"	10"	4.0'	13	11	9	9			0.4
	3D	24"	8"	7.0'	3	5	5	4		~MEDIUM DENSE~	ND
	4D	24"	10"	12.0'	4	6	4	2		~MEDIUM DENSE~	0.3
									13.5'		
	5D	24"	5"	17.0'	3	3	2	3		BLACK, FIBEROUS ORGANIC PEAT ~LOOSE~	0.1
									21.0'		
	6D	24"	19"	22.0'	1	1	1	1		BROWN, DECOMPOSED ORGANIC PEAT ~LOOSE~	ND
									25.0'		
	7D	24"	2"	27.0'	1	2	2	1		GRAY, SILT AND CLAY ~SOFT~	0.1
									30.0'		
										GRAY, SILT WITH SOME SAND	
	8D	24"	12"	32.0'	3	6	5	5	32.0'	~MEDIUM STIFF~	0.1
										BOTTOM OF EXPLORATION AT 32 FEET	

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS: ppm= Parts per million, ND = Non-Detect, PID calibrated to 100 ppm isobutylene

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-9**

R E P O R T

Revised December 20, 2013
12-0660 S

Environmental Survey and Geotechnical Engineering Services

Proposed Worcester Road Pump Station Elimination Project
Framingham, Massachusetts

PREPARED FOR:
Wright-Pierce
Attention: Mr. Barry Yaceshyan, P.E.
40 Shattuck Road, Suite 305
Andover, MA 01810

PREPARED BY:
S. W. Cole Engineering, Inc.
Chad B. Michaud, P.E.
Senior Geotechnical Engineer
10 Centre Road
Somersworth, NH 03878
(603) 692-0088
cmichaud@swcole.com

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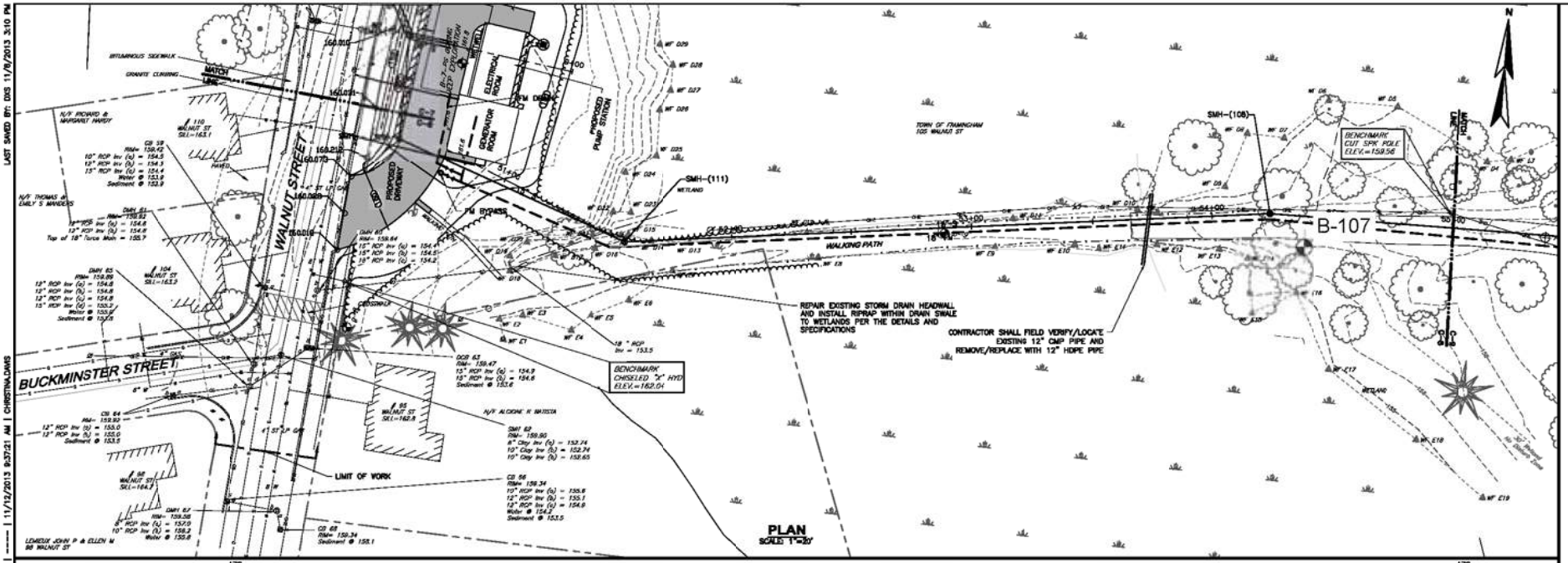
- *Construction Materials Testing*
- *GeoEnvironmental Services*
- *Ecological Services*

www.swcole.com



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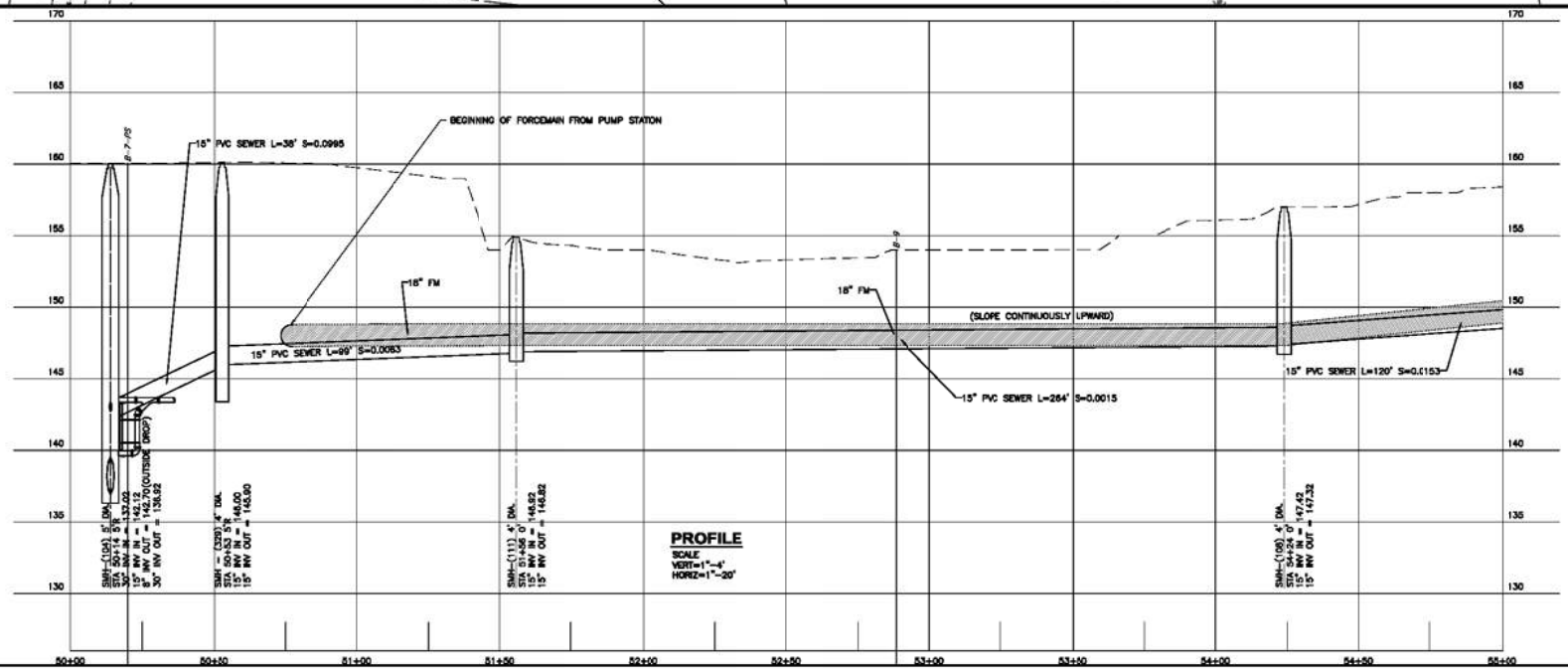

PROFILE
SCALE
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HORIZ=1"=20'

NO	SUBMISSIONS/REVISIONS	APP'D	DATE

DESIGNED BY: DXS/RRS
CAD COORD: DXS
CAD: DXS.CAD2
CHECKED BY:
DATE:
APPROVED BY:
DATE:
PROJECT NO: 12543

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TOWN OF FRAMINGHAM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
WORCESTER ROAD PUMP STATION
ELIMINATION PROJECT

WALKING PATH EASEMENT PLAN & PROFILE I

DRAWING
C-8

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S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-107**
SHEET: 1 OF 1
PROJECT NO.: 12-0660

PROJECT / CLIENT: PROPOSED WORCESTER RD PUMP STATION ELIMINATION / WRIGHT-PIERCE
LOCATION: FRAMINGHAM, MASSACHUSETTS
DRILLING FIRM: GREAT WORKS TEST BORING, INC. DRILLER: PETE MICHAUD

DATE START: 10/31/2013
DATE FINISH: 10/31/2013
ELEVATION: NOT AVAILABLE
SWC REP.: CJC

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4.0"		
SAMPLER:	SS	2"	140 lbs	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 3.1 FEET ON 10/31/2013

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA	PID Results (ppm)
									0.3'	FOREST DUFF	
	1D	24"	14"	2.0'	5	3	3	4		BROWN SILTY SAND WITH SOME GRAVEL ~LOOSE TO MEDIUM DENSE~	ND
	2D	24"	0"	4.0'	10	12	15	15	4.0'		ND
	3D	24"	6"	7.0'	8	12	13	10		BROWN SAND AND GRAVEL WITH SOME SILT ~MEDIUM DENSE~	ND
	4D	24"	16"	9.0'	11	9	9	6			ND
									11.0'		
	5D	24"	14"	12.0'	10	10	6	6		BROWN SILTY FINE SAND ~MEDIUM DENSE~	ND
	6D	24"	0"	17.0'	2	9	10	11	17.0'		ND
										BOTTOM OF EXPLORATION AT APPROXIMATELY 17 FEET 2 INCH DIAMETER MONITORING WELL SET AT 14.5 FT WITH WELL SCREEN IN FILTER SAND BETWEEN 4.5 AND 14.5 FT	

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[ ] LABORATORY TEST

REMARKS: ppm= Parts per million, ND = Non-Detect, PID calibrated to 100 ppm isobutylene

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-107**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-108**
SHEET: 1 OF 2
PROJECT NO.: 12-0660

PROJECT / CLIENT: PROPOSED WORCESTER RD PUMP STATION ELIMINATION / WRIGHT-PIERCE
LOCATION: FRAMINGHAM, MASSACHUSETTS
DRILLING FIRM: GREAT WORKS TEST BORING, INC. DRILLER: PETE MICHAUD

DATE START: 10/28/2013
DATE FINISH: 10/28/2013
ELEVATION: NOT AVAILABLE
SWC REP.: CJC

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4.0"		
SAMPLER:	SS	2"	140 lbs	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 8.0 FEET ON 10/31/2013

CASING BLOWS PER FOOT	SAMPLE NO.	PEN.	REC.	DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA	PID Results (ppm)
	1D	24"	8"	2.0'	6	12	30	35			0.4
	2D	3"	3"	2.3'	50/3"	-	-	-			1.0
										BROWN GRAVELLY SILTY SAND WITH FREQUENT ROOTLETS (FILL) ~DENSE TO MEDIUM DENSE~	
	3D	24"	3"	7.0'	14	13	11	11			20.4
	4D	24"	3"	9.0'	10	9	9	7			15.2
									10.0'		
									11.0'	DARK GRAY SILTY SAND WITH SOME GRAVEL w = 19.0%	
	5D	24"	12"	12.0'	7	11	11	12			0.8
										GRAY SILTY FINE SAND ~MEDIUM DENSE~	
									15.0'		
	6D	24"	12"	17.0'	10	12	9	12		BROWN SILT AND FINE SAND ~MEDIUM DENSE~	1.5
									20.0'		
	7D	24"	20"	22.0'	9	9	9	9			ND
										GRAY CLAYEY SILT WITH TRACE FINE SAND ~MEDIUM DENSE~	
	8D	24"	20"	27.0'	9	7	8	9		w = 28.9%	ND
	9D	24"	18"	32.0'	6	6	8	6			ND
	10D	24"	18"	37.0'	7	7	7	7			ND

SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: ppm= Parts per million, ND = Non-Detect, PID calibrated to 100 ppm isobutylene

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

BORING NO.: **B-108**

S.W.COLE ENGINEERING, INC.

BORING LOG

BORING NO.: **B-108**
SHEET: 2 OF 2
PROJECT NO.: 12-0660

PROJECT / CLIENT: PROPOSED WORCESTER RD PUMP STATION ELIMINATION / WRIGHT-PIERCE
LOCATION: FRAMINGHAM, MASSACHUSETTS
DRILLING FIRM: GREAT WORKS TEST BORING, INC. DRILLER: PETE MICHAUD

DATE START: 10/28/2013
DATE FINISH: 10/28/2013
ELEVATION: NOT AVAILABLE
SWC REP.: CJC

	TYPE	SIZE I.D.	HAMMER WT.	HAMMER FALL
CASING:	HW	4.0"		
SAMPLER:	SS	2"	140 lbs	30"
CORE BARREL:				

WATER LEVEL INFORMATION
WATER AT 8.0 FEET ON 10/31/2013

CASING BLOWS PER FOOT	SAMPLE NO.	SAMPLE PEN.	SAMPLE REC.	SAMPLE DEPTH @ BOT	SAMPLER BLOWS PER 6" 0-6	6-12	12-18	18-24	DEPTH	STRATA & TEST DATA	PID Results (ppm)
	11D	24"	20"	42.0'	6	7	7	6		GRAY CLAYEY SILT WITH TRACE FINE SAND ~MEDIUM DENSE~	ND
									45.0'		
	12D	24"	18"	47.0'	8	10	10	12		q_P = 2.5 KSF GRAY CLAYEY SILT WITH TRACE FINE SAND ~VERY STIFF~	ND
									49.5'		
	13D	24"	14"	52.0'	12	12	13	15		GRAY SILT WITH SOME SAND AND TRACE GRAVEL COBBLE AT 53 FEET (GLACIAL TILL) ~MEDIUM DENSE~	ND
									55.0'		
										BOTTOM OF EXPLORATION AT APPROXIMATELY 55 FEET DUE TO REFUSAL ON PROBABLE BEDROCK 2 INCH DIAMETER MONITORING WELL SET AT 30.2 FT W/ WELL SCREEN IN FILTER SAND BETWEEN 15.2 AND 30.2 FT	

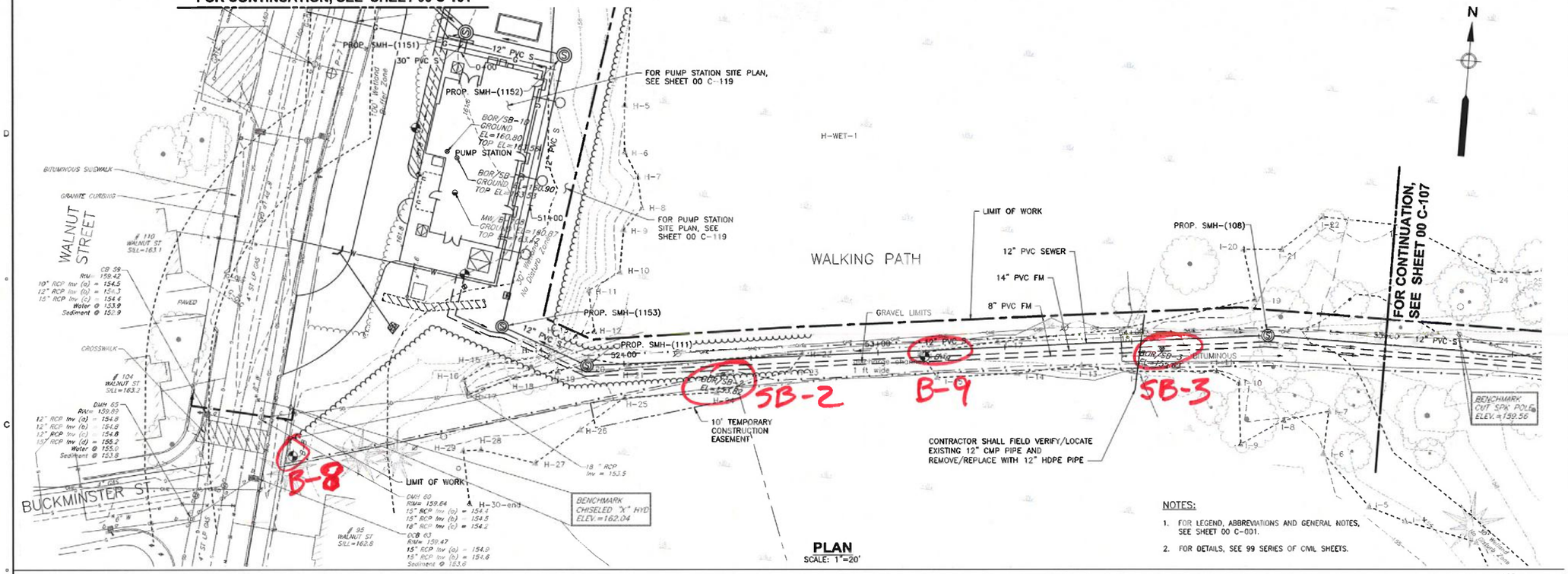
SAMPLES:
D = SPLIT SPOON
C = 3" SHELBY TUBE
U = 3.5" SHELBY TUBE

SOIL CLASSIFIED BY:
[ ] DRILLER - VISUALLY
[X] SOIL TECH. - VISUALLY
[X] LABORATORY TEST

REMARKS: ppm= Parts per million, ND = Non-Detect, PID calibrated to 100 ppm isobutylene

STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.

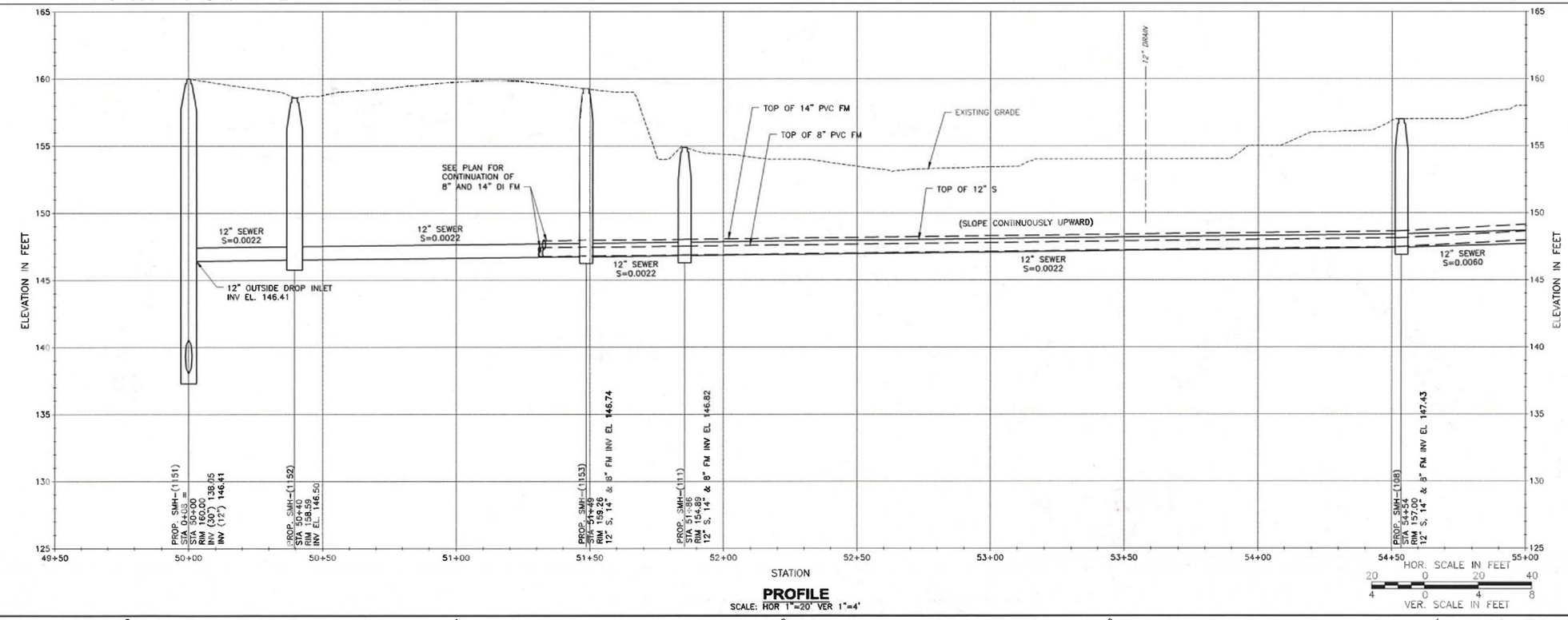
BORING NO.: **B-108**



NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE SHEET 00 C-001.
2. FOR DETAILS, SEE 99 SERIES OF CIVIL SHEETS.

PLAN
SCALE: 1"=20'



PROFILE
SCALE: HOR 1"=20' VER 1"=4'

AECOM

PROJECT
WORCESTER ROAD PUMP STATION ELIMINATION

CLIENT
City of Framingham, MA

CONSULTANT
AECOM TECHNICAL SERVICES, INC.
250 APOLLO DRIVE
CHELMSFORD, MA 01824
PHONE: (978) 905-2100
www.aecom.com

REGISTRATION

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NOTE: This document is preliminary only and is not intended for any purpose except review and comment by the owner and its agents.

ISSUE/REVISION

I/R	DATE	DESCRIPTION

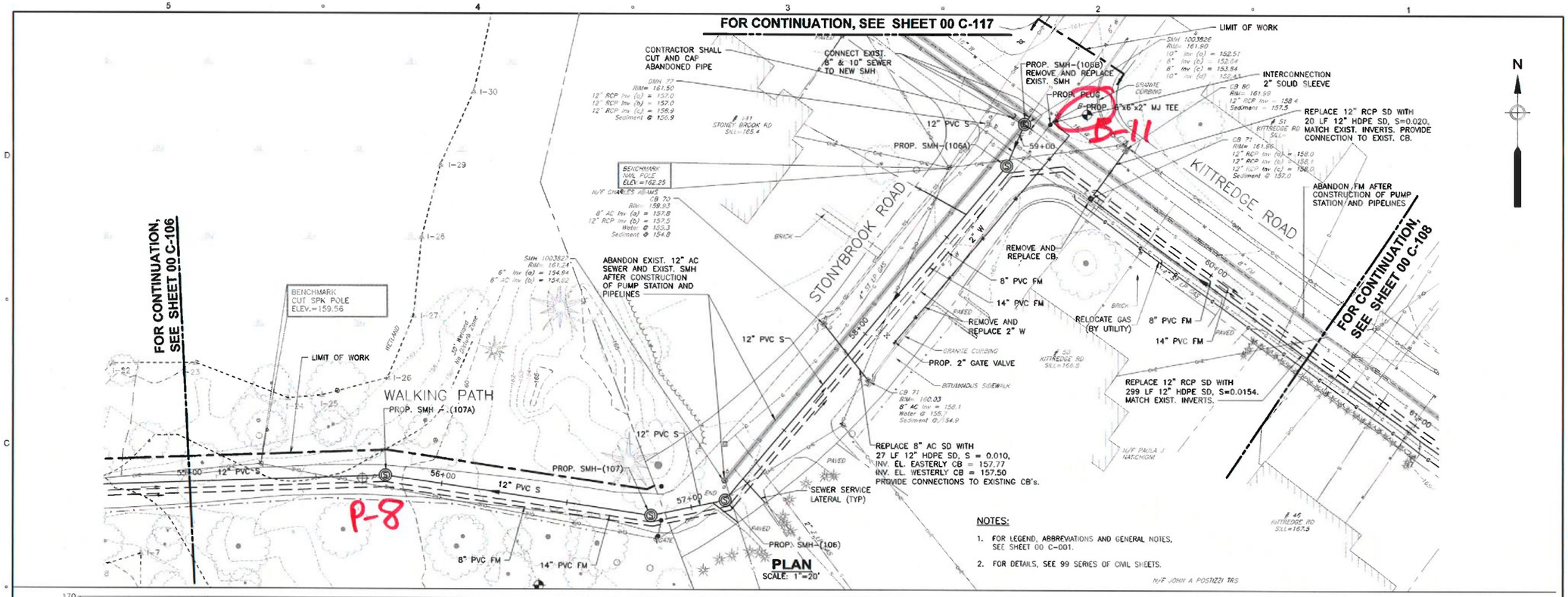
PROJECT NUMBER
60545792

Designed By:	A. ANGLES
Drawn By:	M. CURRAN
Dept Check:	M. MESERVE
Proj Check:	J. BOCCADORO
Date:	JULY 2018
Scale:	AS NOTED

DISCIPLINE
CIVIL

SHEET TITLE
WALKING PATH EASEMENT PLAN & PROFILE I

SHEET NUMBER
00 C-106



PATH/FILENAME: P:\605-60392 - WORCESTER ROAD PS ELIMINATION PROJECT\SHEETS\00 C-107.DWG
LAST UPDATE: Friday, Jun 13, 20 9 9:27:49 AM
PLOT DATE: Monday, July 16, 2018 7:38:09 PM

AECOM

PROJECT
WORCESTER ROAD PUMP STATION ELIMINATION

CLIENT
City of Framingham, MA

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ISSUE/REVISION

IR	DATE	DESCRIPTION

PROJECT NUMBER
60545792

Designed By:	A. ANGLES
Drawn By:	M. CURRAN
Dept Check:	M. MESERVE
Proj Check:	J. BOCCADORO
Date:	JULY 2018
Scale:	AS NOTED

DISCIPLINE
CIVIL

SHEET TITLE
WALKING PATH EASEMENT PLAN & PROFILE II

SHEET NUMBER
00 C-107

Exploration Location

NORTHING: 2,931,563.75 **EASTING:** 676,865.6 **STATION:** _____ **OFFSET:** _____
HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree
VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 153.8
LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG
SB-2

Drilling Information

DATE START / END: 3/4/2017 - 3/4/2017 **TOTAL DEPTH (FT):** 61.5
CONTRACTOR: Drilex Environmental **DRILLER:** J. Jalutkewicz **LOGGED BY:** Kevin Harten
EQUIPMENT: CME-55 ATV **EXPLORATION TYPE/METHOD:** HW Casing (to 44'), NW Casing to EOB
AUGER ID/OD: _____ **CASING ID/OD:** 4-inch and 3-inch ID **CORE INFORMATION:** _____
HAMMER TYPE: Automatic **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Assume 1-ft. below ground surface
GENERAL NOTES: Borehole backfilled with cuttings and topped with concrete upon completion

ABBREVIATIONS:
ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length
bpf = Blows per Foot; mpf = Minute per Foot; S = Sample
ST = Undisturbed Tube Sample; RC = Rock Core; FVS = Field Vane Shear; CBR = California Bearing Ratio
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
Q_p = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
			Grab		0 to 4	48				(Gravelly Fill with few to several cobbles)	▽	Borehole locations cleared to 4+ ft. using vactor - no split-spoon samples were collected
	150		SS-1		4 to 6	24/8	11-34-15-29	pH, Sulfate, Chloride, Ox. Red.		Top 5": Wet, clean, brown SAND (SW): fine to coarse, trace non-plastic fines Bottom 3": Wet, dark gray, angular GRAVEL (GP); possible cobble fragments		
5										(Few COBBLES)		
	145		SS-2		9 to 11	24/3	18-17-18-24	pH, Sulfate, Chloride, Ox. Red.		Wet, gray SAND & GRAVEL: coarse, some fine gravel, few fine to medium sand, trace non-plastic fines; probable wash		Likely driving piece of crs. gravel (or small cobble) during SS-2 sample collection
10												
	140		SS-3		14 to 16	24/4	1-1-1-1	Org. %, Sieve & Hydrometer		Wet, brown PEAT w/ Sand (Pt): fiberous, stratified, some fine to coarse sand, some low plasticity fines, few fine gravel		Organics observed in wash during casing cleanout
15												
	135		SS-4		19 to	24/4	WOH-1-	Org. %, Sieve & Hydrometer		Wet, brown ORGANIC SILT (OL): low to moderately plastic, some clay, few fine to coarse		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM
PROJECT NAME: Walnut Street PS
CITY/STATE: Framingham, MA
AECOM PROJECT NUMBER: 60478890

AECOM

Exploration Location

NORTHING: 2,931,563.75 **EASTING:** 676,865.6 **STATION:** _____ **OFFSET:** _____

HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree

VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 153.8

LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG

SB-2

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
					21		WOH-WOH			sand, some to few fibers		
	130		SS-5		24 to 26	24/0	1/12"-2-2			No Recovery		
25			SS-6		27 to 29	24/12	2-2-3-2			Top 6": Wet, stratified, gray Silty SAND (SM): fine, some silt and fine to medium sand seams Bottom 6": Wet, gray Silty SAND (SM): fine to coarse, little non-plastic fines, few fine gravel		(Separate sample into two jars) Observe drilling water loss
	125		SS-7		29 to 31	24/12	2-2-3-3	Sieve & Hydrometer		Wet, gray Silty SAND (SM): fine to coarse, little non-plastic fines, few fine gravel		
30												
	120		SS-8		34 to 36	24/10	2-2-2-1			Wet, gray SAND (SP-SW): sample consists of fine to medium sand w/ a 4" coarse sand interlayer, trace fines; PROBABLE WASH		Incomplete casing washout due to thin wash water - (i.e., few fines) (Thicken drill water w/ bentonite)
35												
	115		SS-9		39 to 41	24/3	6-4-5-4			Wet, brown SAND (SW): fine to coarse, few fine to coarse gravel, trace fines; several inches of gray sand wash in spoon		
40												
	110		SS-10		43.5 to 45.5	24/7	6-3-4-4			Wet, mostly clean, well graded, brown SAND (SW): fine to coarse, trace coarse gravel, trace fines; possible washout of fines during sample retrieval		Telescope NW Casing through HW Casing (@ 43.5')
45												

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM

PROJECT NAME: Walnut Street PS

CITY/STATE: Framingham, MA

AECOM PROJECT NUMBER: 60478890

AECOM

MASSDOT I-90 REV. 2 WALNUT STREET PS_PROJECT.GPJ 9/8/17

Exploration Location

NORTHING: 2,931,563.75 **EASTING:** 676,865.6 **STATION:** _____ **OFFSET:** _____

HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree

VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 153.8

LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG

SB-2

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
50	105		SS-11		49.5 to 51.5	24/1	5-7-7-5			Poor Recovery: clean, brown Sand & Gravel WASH; Brown silty fine to coarse SAND & fine GRAVEL in spoon tip		Encounter Running Sands - approx. 12-inches of blow-in @ time of SS-11 collection
55	100		SS-12		54.5 to 56.5	24/8	27-19-18-18			Wet, well graded, olive brown Silty SAND (SM): fine to coarse, some to little fines, trace fine to coarse gravel; till-like matrix, coarse gravel lodged in spoon tip		
60	95		SS-13		59.5 to 61.5	24/8	31-55-59-50			Wet, well graded, olive gray Sandy GRAVEL (GM-GW): fine to coarse, some fine to coarse sand, few fines; Glacial Till		
65	90									End of Boring at 61.5 feet		
70	85											

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM

PROJECT NAME: Walnut Street PS

CITY/STATE: Framingham, MA

AECOM PROJECT NUMBER: 60478890

AECOM

MASSDOT I-90 REV. 2 WALNUT STREET PS_PROJECT.GPJ 9/8/17

Exploration Location

NORTHING: 2,931,593.45 **EASTING:** 677,035.84 **STATION:** _____ **OFFSET:** _____
HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree
VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 155.6
LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG
SB-3

Drilling Information

DATE START / END: 3/4/2017 - 3/5/2017 **TOTAL DEPTH (FT):** 57.0
CONTRACTOR: Drilex Environmental **DRILLER:** J. Jalutkewicz **LOGGED BY:** Kevin Harten
EQUIPMENT: CME-55 ATV **EXPLORATION TYPE/METHOD:** HW Casing (to 39'), NW Casing to EOB
AUGER ID/OD: _____ **CASING ID/OD:** 4-inch and 3-inch ID **CORE INFORMATION:** _____
HAMMER TYPE: Automatic **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Measured @ 2.3 ft. below grade when casing at 14 ft.
GENERAL NOTES: Borehole backfilled with cuttings and topped with concrete upon completion

ABBREVIATIONS:
ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length
bpf = Blows per Foot; mpf = Minute per Foot; S = Sample
ST = Undisturbed Tube Sample; RC = Rock Core; FVS = Field Vane Shear; CBR = California Bearing Ratio
WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; PID = Photoionization Detector
Q_p = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
	155									No Upper Sample Collected; upper 4-ft. is assumed to be Fill	▽	Borehole locations cleared to 4+ ft. using vactor - no split-spoon samples were collected
			SS-1		4 to 6	24/10	1-1-1-3			Wet, brown SAND w/ Gravel (SW-SM): fine to coarse, little fine gravel, few non-plastic fines; possible Fill Bottom 1" of sample contains wet dark brown PEAT & SANDY ORGANIC SILT (Pt/OL)		The SS-1 sample interval likely disturbed and mixed during the utility clearing effort
5	150											No Organics observed in drilling wash water
			SS-2		9 to 11	24/14	8-8-8-11	Sieve & Hydrometer		Wet, gray Silty SAND (SM): fine to medium, some non-plastic fines, trace rootlets/fibers near top of sample		
10	145											
			SS-3		14 to 16	24/10	5-3-3-5			Wet, gray Silty SAND (SM): fine to medium, some to little non-plastic fines, trace coarse sand		
15	140											
			SS-4		19 to	24/7	3-2-1-4	Sieve & Hydrometer		Wet, stratified, gray and brown (@ tip) fine Sandy SILT (ML): non-plastic, some fine to coarse sand,		(Color change to brown @ ~20.5 ft.)

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM
PROJECT NAME: Walnut Street PS
CITY/STATE: Framingham, MA
AECOM PROJECT NUMBER: 60478890

AECOM

MASSDOT I-90 REV. 2 WALNUT STREET PS_PROJECT.GPJ 9/8/17

Exploration Location

NORTHING: 2,931,593.45 **EASTING:** 677,035.84 **STATION:** _____ **OFFSET:** _____

HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree

VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 155.6

LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG
SB-3

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
	135			X	21					trace fine gravel		
												(Roller bit chatter @ 23 ft.)
25	130		SS-5	X	24 to 26	24/5	9-8-6-8			Wet, clean, well graded, brown Gravelly SAND (SW): fine to coarse, some fine to coarse gravel, trace fines		
30	125		SS-6	X	29 to 31	24/8	8-5-6-6			Wet, mostly clean, brown SAND (SW), fine to medium, trace coarse sand, trace fines, occasional silt lenses		(Some sand blow-in; add bentonite to drill water)
35	120		SS-7	X	34 to 36	24/8	7-5-5-5			Wet, stratified, brown SAND (SW): fine to coarse, trace fines w/ few fine sandy silt seams		
40	115		SS-8	X	39 to 41	24/0	5-7-11-24			No Recovery (except wash) (Crs. Gravel in wash water)		(Some sand blow-in; telescope NW casing)
45	110		SS-9	X	44 to 46	24/9	12-9-7-16			Top 7": Wet, clean, brown SAND (SW): fine to coarse (mostly med. to crs.), little fine to coarse gravel, trace fines		(Separate sample into two jars)

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM

PROJECT NAME: Walnut Street PS

CITY/STATE: Framingham, MA

AECOM PROJECT NUMBER: 60478890

AECOM

MASSDOT I-90 REV. 2 WALNUT STREET PS_PROJECT.GPJ 9/8/17

Exploration Location

NORTHING: 2,931,593.45 **EASTING:** 677,035.84 **STATION:** _____ **OFFSET:** _____

HORIZONTAL DATUM: NAD 83 **INCLINATION FROM VERTICAL:** 0 degree

VERTICAL DATUM: NGVD 1929 **GROUND SURFACE ELEV. (FT):** 155.6

LOCATION: Foot Path (proposed pipeline align't) **ESTIMATED/SURVEYED?:** Surveyed

GEOLOGIC LOG

SB-3

Depth (ft)	Elev. (ft)	Casing Pen. (bpf) or Core Rate (mpf)	SAMPLE INFORMATION: Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blows Count or RQD	Field/ Laboratory Test Data	GRAPHIC LOG	Sample Description & Classification	H_20 Depth	Remarks
										Bottom 2": Wet, well graded, olive brown SAND (SM): fine to coarse, few fines, trace to little fine gravel; Glacial Till		
50	105		SS-10		48.5 to 50.5	24/8	85-20-25-52			Wet, well graded, gray brown Gravelly SAND (SM): fine to coarse, some fine to coarse gravel, few fines; Glacial Till		(probable cobble @ 48.5 ft.)
55	100		SS-11		54 to 54.17	2/1	90/2"			Wet, black sandy GRAVEL FRAGMENTS (GM): fragments set in an olive gray clayey silt matrix; possible weathered rock (Roller bit drill from 54 ft. to EOB; steady cut rate and black grains in wash indicate bedrock or large boulder)		
										End of Boring at 57 feet		
60	95											
65	90											
70	85											

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

LOGGED BY (Consultant): AECOM

PROJECT NAME: Walnut Street PS

CITY/STATE: Framingham, MA

AECOM PROJECT NUMBER: 60478890

AECOM

MASSDOT I-90 REV. 2 WALNUT STREET PS_PROJECT.GPJ 9/8/17

Attachment B

Logs of Borings by Weston & Sampson

Weston & Sampson

Walnut Street Flood Mitigation
Walnut Street, Framingham, MA

BORING ID: B-201

WSE Project: ENG21-0957

CONTRACTOR:	Technical Drilling Services, Inc.	BORING LOCATION:	See Attached Plan	DATE START:	November 1, 2021
FOREMAN:	Bret Balyk	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	November 1, 2021
LOGGED BY:	J. Westgate, EIT	AUGER DIAMETER:	4-1/4" ID (Stem), 7-5/8" OD (Flights)	GROUND EL:	154.5 ± (NAVD88)
CHECKED BY:	Jenn MacGregor, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	30.0 ft.
EQUIPMENT:	All-Terrain Drill Rig	CORING METHOD:	N/A	GRID COORDS:	N:2931566 ± / E:676852 ±
SPT HAMMER:	Automatic (140-lb.)	BACKFILL MATERIAL:	Drill Cuttings	GRID SYSTEM:	NAD83 State Plane (MA)

GEOTECHNICAL TEST DATA: ● N-Value, Raw (bpf); ⊠ Organic Content (%) (10, 20, 30, 40); ⊕ Moisture Content (%); ▶ Plastic Limit, PL (%); ◀ Liquid Limit, LL (%) (25, 50, 75, 100)

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	N-Value, Raw (bpf)	Moisture Content (%)	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
					Surface: Unpaved trail.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
	S-1 6/24	4 9 9 9	18		Topsoil- 2 inches thick.		[0.0] Water level measured on 11/01/21 (during drilling).
					Poorly graded sand (SP) - Medium dense to dense; olive; wet; mostly fine to medium SAND, few fine gravel, trace non plastic fines. [FILL]		
	S-2 12/24	15 11 12 13	23				[2.0 - 5.0] - Auger grinding on possible cobbles/ boulders.
5	S-3 4/24	5 26 21 17	47		Becomes Fine to Coarse Sand	150	
10	S-4 0/24	7 11 15 16	26			145	
	S-5 1/24	7 3 0 1	3		Organic soil (OL) - Medium stiff to very soft; olive to dark brown; wet; mostly organic non plastic FINES; organic odor.		
15	S-6 2/24	0 0 1 2	1		[14.0 - 20.0] - Common to occasional roots	140	
	S-7 9/24	3 3 3 3	6	71 366			[16.0 - 17.0] Water content: 366.5% Organic matter: 70.7% AL: N/A (sample determined to be peat).
	S-8 8/24	0 0 0 0	0			135	
20	S-9 13/24	0 0 0 0	0				
	S-10 13/24	0 0 0 0	0				
	S-11 21/24	0 0			Silty sand (SM) - Very loose; olive to dark brown; wet; mostly fine SAND, some non plastic fines; organic odor.	130	

Refer to the attached index sheets for important information about this log including general notes, legends, and guidance on description methods and procedures.

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
			0 0	N-Value, Raw (bpf) Organic Content (%) 10 20 30 40 Moisture Content (%) Plastic Limit, PL (%) Liquid Limit, LL (%) 0 25 50 75 100		Silty sand (SM) - Very loose; olive to dark brown; wet; mostly fine SAND, some non plastic fines; organic odor.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		S-12 19/24	0 0 0 0	0				
		S-13 24/24	5 5 4 5	9		Poorly graded sand with silt (SP-SM) - Loose; gray; wet; mostly medium to coarse SAND, few non plastic fines.	125	
30								Heaving sand at 30.0 ft. (exploration ended).
35							120	
40							115	
45							110	
50							105	

Weston & Sampson

WSE Project: ENG21-0957

Walnut Street Flood Mitigation
Walnut Street, Framingham, MA

BORING ID: B-202

CONTRACTOR:	Technical Drilling Services, Inc.	BORING LOCATION:	See Attached Plan	DATE START:	November 1, 2021
FOREMAN:	Bret Balyk	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	November 1, 2021
LOGGED BY:	J. Westgate, EIT	AUGER DIAMETER:	4-1/4" ID (Stem), 7-5/8" OD (Flights)	GROUND EL:	153.9 ± (NAVD88)
CHECKED BY:	Jenn MacGregor, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	37.0 ft.
EQUIPMENT:	All-Terrain Drill Rig	CORING METHOD:	N/A	GRID COORDS:	N:2931580 ± / E:676913 ±
SPT HAMMER:	Automatic (140-lb.)	BACKFILL MATERIAL:	Drill Cuttings	GRID SYSTEM:	NAD83 State Plane (MA)

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA: N-Value, Raw (bpf) / Organic Content (%)	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
						Surface: Unpaved trail.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
		S-1 7/24	5 7 9 13	16		Topsoil- 2 inches thick. Poorly graded sand with silt and gravel (SP-SM) - Medium dense; olive to brown; wet; mostly fine to medium SAND, little fine gravel, few non plastic fines. [FILL]		[0.0] Water level measured on 11/01/21 (during drilling). [1.0 - 5.0] - Auger grinding on possible cobbles.
5		S-2 11/24	5 8 7 8	15			149	
10		S-3 16/24	5 3 1 1	4			144	
15		S-4 14/24	7 7 6 2	13		Silt with sand (ML) - Stiff; gray; wet; mostly non plastic FINES, little fine to medium sand, trace fine gravel. [FILL]	139	
						Peat (PT) - Very soft; dark brown; wet; mostly non plastic FINES; organic odor; Numerous roots.		
20		S-5 16/24	0 0 2 2	2			134	

GEOTECHNICAL TEST DATA: Organic Content (%) 10 20 30 40; Moisture Content (%); Plastic Limit, PL (%); Liquid Limit, LL (%) 25 50 75 100

Walnut Street Flood Mitigation
Walnut Street, Framingham, MA

BORING ID: B-202

DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
		S-6 11/24	0 0 0 0	● N-Value, Raw (bpf); ⊠ Organic Content (%); 10 20 30 40; ⊕ Moisture Content (%); ▶ Plastic Limit, PL (%); ◀ Liquid Limit, LL (%); 25 50 75 100		Peat (PT) - Very soft; dark brown; wet; mostly non plastic FINES; organic odor; Numerous roots.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
				● 0				
30		S-7 2/24	0 0 0 0	● 0		Silt (ML) - Very soft; gray; wet; mostly non plastic FINES, few fine sand.	124	
						Silty sand (SM) - Gray; wet; mostly fine SAND, some non plastic fines; occasional roots.		
35		S-8 15/24	3 4 3 2	● 7		Well graded sand with silt (SW-SM) - Loose; gray; wet; mostly fine to coarse SAND, few non plastic fines.	119	Heaving sand at 37.0 ft. (exploration ended).
40							114	
45							109	
50							104	

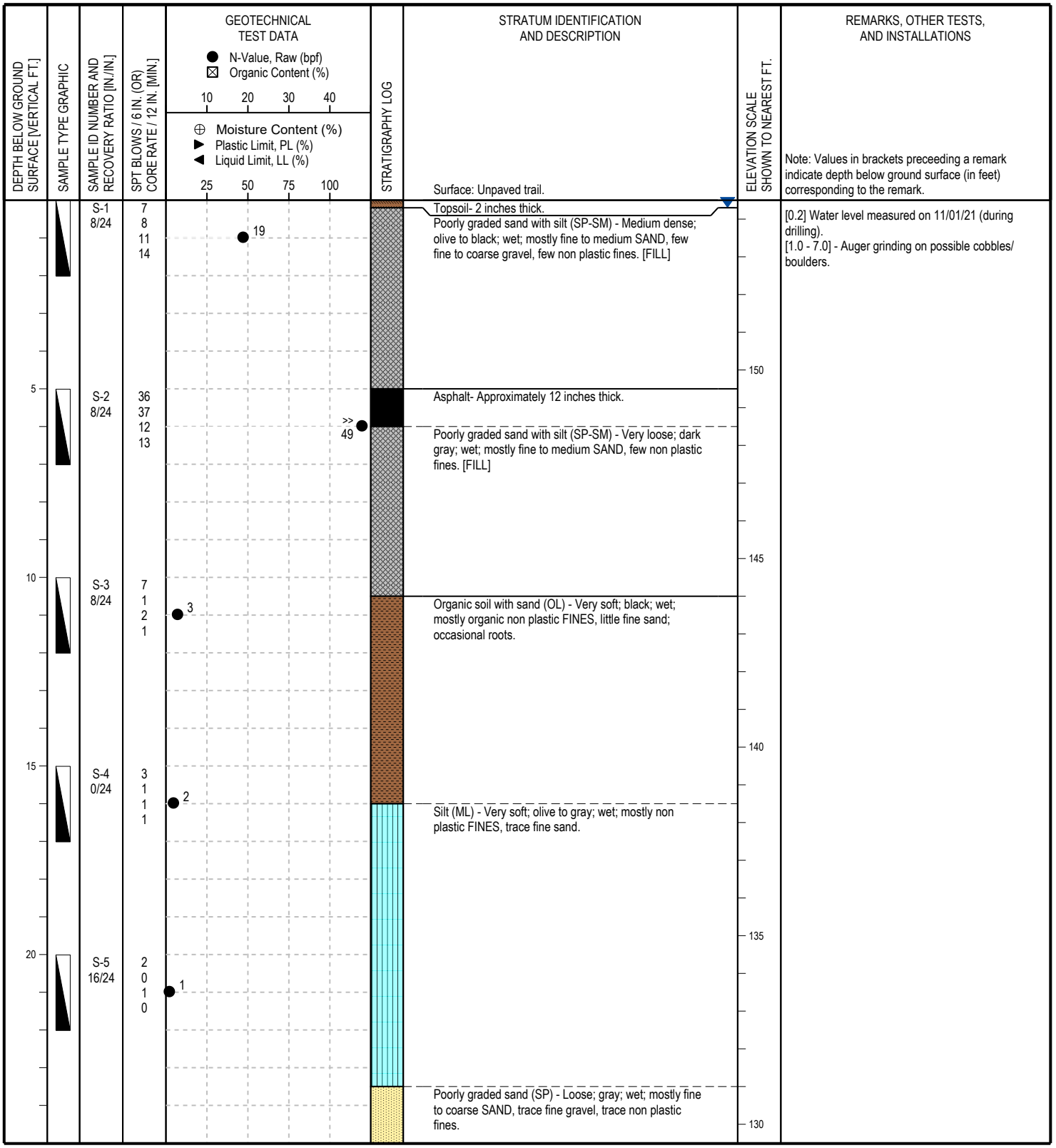
Weston & Sampson

WSE Project: ENG21-0957

Walnut Street Flood Mitigation
Walnut Street, Framingham, MA

BORING ID: B-203

CONTRACTOR:	Technical Drilling Services, Inc.	BORING LOCATION:	See Attached Plan	DATE START:	November 1, 2021
FOREMAN:	Bret Balyk	ADVANCE METHOD:	Hollow-Stem Auger Drilling	DATE FINISH:	November 1, 2021
LOGGED BY:	J. Westgate, EIT	AUGER DIAMETER:	4-1/4" ID (Stem), 7-5/8" OD (Flights)	GROUND EL:	154.5 ± (NAVD88)
CHECKED BY:	Jenn MacGregor, PE	SUPPORT CASING:	N/A	FINAL DEPTH:	27.0 ft.
EQUIPMENT:	All-Terrain Drill Rig	CORING METHOD:	N/A	GRID COORDS:	N:2931596 ± / E:677008 ±
SPT HAMMER:	Automatic (140-lb.)	BACKFILL MATERIAL:	Drill Cuttings	GRID SYSTEM:	NAD83 State Plane (MA)



DEPTH BELOW GROUND SURFACE [VERTICAL FT.]	SAMPLE TYPE GRAPHIC	SAMPLE ID NUMBER AND RECOVERY RATIO [IN./IN.]	SPT BLOWS / 6 IN. (OR) CORE RATE / 12 IN. [MIN.]	GEOTECHNICAL TEST DATA	STRATIGRAPHY LOG	STRATUM IDENTIFICATION AND DESCRIPTION	ELEVATION SCALE SHOWN TO NEAREST FT.	REMARKS, OTHER TESTS, AND INSTALLATIONS
		S-6 24/24	3 2 3 4	● N-Value, Raw (bpf) ⊠ Organic Content (%) 10 20 30 40 ⊕ Moisture Content (%) ▶ Plastic Limit, PL (%) ◀ Liquid Limit, LL (%) 25 50 75 100 ● 5		Poorly graded sand (SP) - Loose; gray; wet; mostly fine to coarse SAND, trace fine gravel, trace non plastic fines.		Note: Values in brackets preceeding a remark indicate depth below ground surface (in feet) corresponding to the remark.
						Silty sand (SM) - Light gray; wet; mostly fine SAND, some non plastic fines.		Heaving sand at 27.0 ft. (exploration ended).
30							125	
35							120	
40							115	
45							110	
50							105	

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 1 GENERAL INFORMATION

GENERAL NOTES AND USE OF LOGS

1.) Explorations were made by ordinary and conventional methods and with care adequate for Weston & Sampson's study and/or design purposes. The exploration logs are part of a specific report prepared by Weston & Sampson for the referenced project and client, and are an integral part of that report. Information and interpretations are subject to the explanations and limitations stated in the report. Weston & Sampson is not responsible for any interpretations, assumptions, projections, or interpolations made by others.

2.) Exploration logs represent general conditions observed at the point of exploration on the date(s) stated. Boundary lines separating soil and rock layers (strata) represent approximate boundaries only and are shown as solid lines where observed and dashed lines where inferred based on drilling action. Actual transitions may be gradual and changes may occur over time.

3.) Soil and rock descriptions are based on visual-manual examination of recovered samples, direct observation in test pits (when permissible), and laboratory testing (when conducted).

4.) Water level observations were made at the times and under the conditions stated. Fluctuations should be be expected to vary with seasons and other factors. Use of fluids during drilling may affect water level observations. The absence of water level observations does not necessarily mean the exploration was dry or that subsurface water will not be encountered during construction.

5.) Standard split spoon samplers may not recover particles with any dimension larger than 1-3/8 inches. Reported gravel conditions or poor sample recovery may not reflect actual in-situ conditions.

6.) Sections of this guide provide a general overview of Weston & Sampson's practices and procedures for *identifying* and *describing* soil and rock. These procedures are predominantly based on ASTM D2488, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)*, the International Society of Rock Mechanics (ISRM) standards, and the *Engineering Geology Field Manual* published by the Bureau of Reclamation. Not all aspects of this guide relating to description and identification procedures of soil and rock may be applicable in all circumstances.

SAMPLER GRAPHICS

- Split Spoon (Standard) 2" OD, 1-3/8" ID
- Split Spoon (Oversize) 3" OD, 2-3/8" ID
- Shelby or Piston Tube 3" OD, 2-7/8" ID
- Double-Tube Rock Core Barrel 2" Core Diameter
- Direct Push with Acetate Liner Various Liner Sizes
- A — Auger Sample *(from cuttings or hand auger)*
- G — Grab Sample *(manual, from discrete point)*
- C — Composite Sample *(multiple grab samples)*

WELL GRAPHICS

- Cement concrete seal around casing or riser pipe
- Bentonite seal around casing or riser pipe
- Cement grout seal around casing or riser pipe
- Soil backfill around riser pipe or beneath screen
- Gravel backfill around screen or riser pipe
- Sand backfill around screen or riser pipe (filter sand)
- Solid-wall riser; Sch. 40 PVC, 1" ID unless noted otherwise
- Slotted screen; Sch. 40 PVC, 1" ID with machined slots

CAVING / SEEPAGE TERMS

The following caving and/or seepage terms may appear on a test pit log.

Caving Term	Criteria
Minor	less than 1 cubic ft.
Moderate	1 to 3 cubic ft.
Severe	greater than 3 cubic ft.

Seepage Term	Criteria
Slow	less than 1 gpm
Moderate	1 to 3 gpm
Fast	greater than 3 gpm

KEY TO WATER LEVELS

- Observed in exploration during advancement.
- Measured in exploration at completion, prior to backfilling or well installation.
- Measured in exploration after the stated stabilization period, prior to backfilling, or in well installation if noted.

DEFINITIONS OF COMMON TERMS

Sample Recovery Ratio - The length of material recovered in a drive or push type sampler over the length of sampler penetration, in inches (e.g. 18/24).

Standard Penetration Test (*SPT*) - An in-situ test where a standard split-spoon sampler is driven a distance of 12 or 18 inches (after an initial 6-inch seating interval) using a 140-lb. hammer falling 30 inches for each blow.

SPT Blows - The number of hammer blows required to drive a split-spoon sampler each consecutive 6-inch interval during a *Standard Penetration Test*. If no discernable advancement of a split spoon sampler is made after 50 consecutive hammer blows, 50/X indicates *sampler refusal* and is the number of blows required to drive the sampler X inches.

SPT N-Value (*N*) - The uncorrected blow count representation of a soil's penetration resistance over a 12-inch interval after an initial 6-in. seating interval, reported in blows per foot (bpf). The N-value is correlated to soil engineering properties.

Auger Refusal - No discernable advancement of the auger over a period of 5 minutes with full rig down pressure applied.

Casing Refusal (Driven) - Casing penetration of less than 6 inches after a minimum 50 blows of a drop hammer weighing 300 lbs. or a minimum 100 blows of a drop hammer weighing 140 lbs.

PID Measurement - A measurement (electronic reading) taken in the field using a photoionization detector (PID) to detect the presence of volatile organic compounds in a soil sample. Values are reported as benzene equivalent units in parts per million (ppm) unless noted otherwise.

Rock Quality Designation (RQD) - A qualitative index measure of the degree of jointing and fracture of a rock core taken from a borehole. The RQD is defined as the sum length of solid core pieces 4 inches or longer divided by the run (cored) length, expressed as a percentage. Higher RQD values may indicate fewer joints and fractures in the rock mass.

Fill (Made Ground) - A deposit of soil and/or artificial waste materials that has been placed or altered by human processes.

LABORATORY TESTS AND FIELD MEASUREMENTS

MC	Moisture Content	IC	1D Incremental Consolidation
OC	Organic Content	VS	Laboratory Vane Shear
PL	Plastic Limit	US	Unconfined Compression
LL	Liquid Limit	TC	Triaxial Compression
GC	Gravel Content	PP	Pocket (Hand) Penetrometer
SC	Sand Content	TV	Torvane (Hand Vane)
FC	Fines Content	PID	Photoionization Detector
DS	Direct Shear	FID	Flame Ionization Detector

BORING ADVANCEMENT METHODS

Hollow-Stem Auger Drilling - Utilizes continuous flight auger sections with hollow stems to advance the borehole. Drill rods and a plug are inserted into the auger stem to prevent the entrance of soil cuttings into the augers.

Rotary Wash Drilling - Utilizes downward pressure and rotary action applied to a non-coring bit while washing the cuttings to the surface using a circulating fluid injected down the drill rods. The borehole is supported with either steel casing or the drilling fluid. Where a casing is used, the borehole is advanced sequentially by driving the casing to the desired depth and then cleaning out the casing. The process of driving and cleaning the casing is commonly referred to as the 'drive-and-wash' technique.

Continuous Sampling - Includes a variety of methods and procedures during which the borehole is advanced via continuous recovery of soil samples. *Direct Push* sampling is a common method that uses static downward pressure combined with percussive energy to drive a steel mandrel into the ground at continuous intervals while recovering soil samples in disposable acetate liners.

Rock Coring - Utilizes downward pressure and rotary action applied to a core barrel equipped with a diamond-set or tungsten carbide coring bit. During conventional coring, the entire barrel is retrieved from the hole upon completion of a core run. Wireline coring allows for removal of the inner barrel assembly containing the actual core while the the drill rods and outer barrel remain in the hole. Various types and sizes of core barrels and bits are used.

GUIDE TO SUBSURFACE EXPLORATION LOGS

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INDEX SHEET 2
SOIL DESCRIPTION

SOIL CONSTITUENTS

Naturally occurring soils consist of one or more of the following matrix constituents defined in terms of particle size.

Constituent		U.S. Sieve Size			Observed Size (in.)		
Gravel	(Coarse)	3/4 in.	-	3 in.	3/4	-	3
Gravel	(Fine)	No. 4	-	3/4 in.	1/5	-	3/4
Sand	(Coarse)	No. 10	-	No. 40	1/16	-	1/5
Sand	(Medium)	No. 40	-	No. 10	1/64	-	1/16
Sand	(Fine)	No. 200	-	No. 40	1/300	-	1/64
Fines	(Silt or Clay)	Smaller than		No. 200	Less than		1/300

SOIL IDENTIFICATION

Soil identification refers to the grouping of soils with similar physical characteristics into a category defined by a **group name** and corresponding **group symbol** based on estimation of the matrix soil constituents to the nearest 5% and simple manual tests. Proportions of cobbles, boulders, and other non-matrix soil materials are not considered during this procedure but are included in the overall soil description if observed or thought to be present. Refer to the following descriptions and tables adapted from ASTM D2488.

Coarse-Grained Soil - Coarse-grained soils contain fewer than 50% fines and are identified based on the following table.

Primary Constituent	Fines Percent	Type of Fines and Gradation		Group Symbol	Group Name [1]
GRAVEL *% gravel > % sand*	≤ 5%	well graded		GW	Well graded gravel
		poorly graded		GP	Poorly graded gravel
	10%	clayey fines	well graded	GW-GC	Well graded gravel with clay
			poorly graded	GP-GC	Poorly graded gravel with clay
		silty fines	well graded	GW-GM	Well graded gravel wth silt
			poorly graded	GP-GM	Poorly graded gravel with silt
	15% to 45%	clay fines		GC	Clayey gravel
		silt fines		GM	Silty gravel
SAND *% sand ≥ % gravel*	≤ 5%	well graded		SW	Well graded sand
		poorly graded		SP	Poorly graded sand
	10%	clayey fines	well graded	SW-SC	Well graded sand with clay
			poorly graded	SP-SC	Poorly graded sand with clay
		silty fines	well graded	SW-SM	Well graded sand with silt
			poorly graded	SP-SM	Poorly graded sand with silt
	15% to 45%	clay fines		SC	Clayey sand
		silt fines		SM	Silty sand

[1] If soil is a gravel and contains 15% or more sand, add "with sand" to the group name. If soil is a sand and contains 15% of more gravel, add "with gravel" to the group name.

Inorganic Fine-Grained Soil - Fine-grained soils contain 50% or more fines and are identified based on the following table.

Plasticity Criteria	Dry Strength	Coarse Fraction S = Sand, G = Gravel		Group Symbol	Group Name [1]
Medium	Medium to high	< 15% S + G		CL	Lean clay
		≥ 30%	% S ≥ % G	CL	Sandy lean clay
		S + G	% S < % G	CL	Gravelly lean clay
Non-plastic	None to low	< 15% S + G		ML	Silt
		≥ 30%	% S ≥ % G	ML	Sandy silt
		S + G	% S < % G	ML	Gravelly silt
High	High to very high	< 15% S + G		CH	Fat clay
		≥ 30%	% S ≥ % G	CH	Sandy fat clay
		S + G	% S < % G	CH	Gravelly fat clay
Low to Medium	Low to medium	< 15% S + G		MH	Elastic silt
		≥ 30%	% S ≥ % G	MH	Sandy elastic silt
		S + G	% S < % G	MH	Gravelly elastic silt

[1] If soil contains 15% to 25% sand or gravel, add "with sand" or "with gravel" to the group name.

Organic Fine-Grained Soil - Fine-grained soils that contain enough organic particles to influence the soil properties are identified as Organic Soil and assigned the group symbol **OL** or **OH**.

Highly Organic Soil (Peat) - Soils composed primarily of plant remains in various stages of decomposition are identified as Peat and given the group symbol **PT**. Peat usually has an organic odor, a dark brown to black color, and a texture ranging from fibrous (original plant structure intact or mostly intact) to amorphous (plant structure decomposed to fine particles).

SOIL DESCRIPTION

Soils are *described* in the following general sequence. Deviations may occur in some instances.

Identification Components

(1) Group Name and Group Symbol

Description Components

(2) Consistency (Fine-Grained) or Apparent Density (Coarse-Grained)
(3) Color (*note, the term "to" may be used to indicate a gradational change*)
(4) Soil Moisture
(5) Matrix Soil Constituents (Gravel, Sand, Fines)
  └► Proportion (*by weight*), particle size, plasticity of fines, angularity, etc.
(6) Non-Matrix Soil Materials and Proportions (*by volume*)
(7) Other Descriptive Information (Unusual Odor, Structure, Texture, etc.)
(8) [Geologic Formation Name or Soil Survey Unit]

SPT N-VALUE CORRELATIONS

Consistency	SPT N-Value	Apparent Density	SPT N-Value
Very soft	0 - 2	Very loose	0 - 5
Soft	2 - 4	Loose	5 - 10
Medium stiff	4 - 8	Medium dense	10 - 30
Stiff	8 - 15	Dense	30 - 50
Very stiff	15 - 30	Very dense	> 50
Hard	> 30		

SOIL MOISTURE

Dry..... Apparent absence of moisture; dry to the touch.
Moist..... Damp but no visible water.
Wet..... Visible free water; saturated.

PROPORTIONS / PERCENTAGES

Proportions of gravel, sand, and fines (excluding cobbles, boulders, and other constituents) are stated in the following terms indicating a range of percentages by weight (to nearest 5%) of the minus 3-in. soil fraction and add up to 100%.

Mostly ..... 50% - 100%
Some ..... 30% - 45%
Little ..... 15% - 25%
Few ..... 5% - 10%
Trace..... Less than 5%

Proportions of cobbles, boulders, and other non-matrix soil materials including artificial debris, roots, plant fibers, etc. are stated in the following terms indicating a range of percentages by volume (to the nearest 5%) of the total soil.

Numerous ..... 40% - 50%
Common ..... 25% - 35%
Occasional ..... 10% - 20%
Trace..... Less than 5%

PLASTICITY (FINES ONLY)

Non-plastic.....Dry specimen ball falls apart easily. Cannot be rolled into thread at any moisture content.
Low.....Dry specimen ball easily crushed with fingers. Can be rolled into 1/8-in. thread with some difficulty.
Medium.....Difficult to crush dry specimen ball with fingers. Easily rolled into 1/8-in. thread.
High.....Cannot crush dry specimen ball with fingers. Easily rolled and re-rolled into 1/8-in. thread.

COBBLES AND BOULDERS

Cobbles - Particles of rock that will pass a 12-in. square opening and be retained on a 3-in. sieve.

Boulders - Particles of rock that will not pass a 12-in. square opening.

Note: Where the percentage (by volume) of cobbles and/or boulders cannot be accurately or reliably estimated, the terms "with cobbles", "with boulders", or "with cobbles and boulders" may be used to indicate observed or inferred presence.

GUIDE TO SUBSURFACE EXPLORATION LOGS

Weston & Sampson℠

INDEX SHEET 3
ROCK DESCRIPTION

ROCK DEFINITION

Where reported on an exploration log, *rock* is defined as any naturally formed aggregate of mineral matter occurring in larges masses or fragments. This definition of rock should not be taken as a replacement for any definitions relating to rock and/or rock excavation defined in construction documents. Intensely weathered or decomposed rock that is friable and can be reduced to gravel size particles or smaller by normal hand pressure is identified and described as soil. Poorly indurated formational materials which display both rock-like and soil-like properties are identified and described as rock followed by the soil description. In such cases, the term "poorly indurated" or "weakly cemented" is added to the rock name (e.g. weakly cemented sandstone).

ROCK IDENTIFICATION

Rock is identified by a combination of *rock type* (igneous, metamorphic, or sedimentary) followed by the the *rock name* (e.g. granite, schist, sandstone).

ROCK DESCRIPTION

Rock descriptions are presented in the following general sequence. The detail of description is dictated by the complexity and objectives of the project.

Identification Components

(1) Rock Type and Name

Description Components

(2) Rock Grain Size (*for clastic sedimentary rock*)
(3) Crystal Size (*for igneous and metamorphic rock*)
(4) Bedding Spacing (*for sedimentary rock*)
(5) Color
(6) Hardness and Weathering Descriptors
(7) Fracture Density
(8) [Geologic Formation Name]

ROCK QUALITY DESIGNATION

$$\text{RQD (\%)} = \frac{\Sigma \text{ Length of intact core pieces} \geq 4 \text{ inches}}{\text{Total length of core run (inches)}} \times 100$$

The RQD should correlate with the fracture density in most cases. Higher RDQ values generally indicate fewer joints and fractures.

GRAIN / CRYSTAL SIZE

Grain Size for Clastic Sedimentary Rock

The names of clastic sedimentary rocks are generally based on their predominant clast or grain size (e.g. fine sandstone, medium sandstone, coarse gravel conglomerate, cobble conglomerate, siltstone, claystone).

Crystal Size for Igneous and Metamorphic Rock

Grain Size Description	Average Crystal Size (in.)
Very coarse grained (pegmatitic)	Greater than or equal to 3/8
Coarse-grained	Between 3/16 and 3/8
Medium-grained	Between 1/32 and 3/16
Fine-grained	Between 1/250 and 1/32
Aphanitic	Less than or equal to 1/250

BEDDING SPACING

Bedding Description	Thickness / Spacing
Massive	Less than 10 ft.
Very thickly bedded	3 ft. to 10 ft.
Thickly bedded	1 ft. to 3 ft.
Moderately bedded	4 in. to 1 ft.
Thinly bedded	1 in. to 4 in.
Very thinly bedded	1/4 in. to 1 in.
Laminated	Less than 1/4 in.

Note: Bedding is generally only applicable to sedimentary or bedded volcanic rocks.

HARDNESS

Hardness	Criteria
Extremely hard	Cannot be scratched with a pocketknife or sharp pick. Can only be chipped with repeated heavy hammer blows.
Very hard	Cannot be scratched with a pocketknife or sharp pick with difficulty. Breaks with repeated heavy hammer blows.
Hard	Can be scratched with with a pocketknife or sharp pick with difficulty. Breaks with heavy hammer blows.
Moderately hard	Can be scratched with a pocketknife or sharp pick with light or moderate pressure. Breaks with moderate hammer blows.
Moderately soft	Can be grooved 1/16 in. deep with a pocketknife or sharp pick with moderate or heavy pressure. Breaks with light hammer blow or heavy manual pressure.
Soft	Can be grooved or gouged easily with a pocketknife or sharp pick. Breaks with light to moderate manual pressure.
Very soft	Can be readily indented, grooved, or gouged with fingernail, or carved with a pocketknife. Breaks with light manual pressure.

WEATHERING (INTACT ROCK)

Weathering Description	Discoloration and/or Oxidation	General Characteristics
Fresh	Body of rock and fracture surfaces are not discolored or oxidized.	Rock texture unchanged. Hammer rings when crystalline rocks are struck.
Slightly weathered	Discoloration or oxidation limited to surface of, or short distance from, fractures. Most surfaces exhibit minor to complete discoloration.	Rock texture preserved. Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately weathered	Discoloration or oxidation extends usually throughout. Fe-Mg minerals appear rusty. All fracture surfaces are discolored or oxidized.	Rock texture generally preserved. Hammer does not ring when rock is struck. Body of rock slightly weakened.
Intensely weathered	Discoloration or oxidation throughout. Feldspar and Fe-Mg minerals altered to clay to some extent. All fracture surfaces are discolored or oxidized and friable.	Rock texture altered by chemical disintegration. Can usually be broken with moderate to heavy manual pressure or by light hammer blow . Body of rock is significantly weakened.
Decomposed	Discoloration or oxidation throughout but resistant minerals such as quartz may be unaltered. All feldspar and Fe-Mg minerals are completely altered to clay.	Resembles a soil; partial or complete remnant rock structure may be preserved. Can be granulated by hand. Resistant minerals may present as stringers or dikes.

FRACTURE DENSITY

Description	Observed Fracture Density
Unfractured	No fractures
Very slightly fractured	Core lengths greater than 3 ft.
Slightly fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely fractured	Core lengths mostly from 1 in. to 4 in.
Very intensely fractured	Mostly chips and fragments

Note: Fracture density is based on the fracture spacing in recovered core, measured along the core axis (excluding mechanical breaks).

Attachment C

Laboratory Test Results

Client:	Weston & Sampson Engineers				
Project:	Walnut St Boardwalk				
Location:	Framingham,MA			Project No:	GTX-314936
Boring ID:	B-201	Sample Type:	jar	Tested By:	cam
Sample ID:	S7	Test Date:	01/12/22	Checked By:	jsc
Depth :	16-17	Test Id:	648763		
Test Comment:	---				
Visual Description:	Moist, very dark gray peat				
Sample Comment:	---				

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
B-201	S7	16-17	Moist, very dark gray peat	366.5

Notes: Temperature of Drying : 110º Celsius

Client:	Weston & Sampson Engineers				
Project:	Walnut St Boardwalk				
Location:	Framingham, MA			Project No:	GTX-314936
Boring ID:	B-201	Sample Type:	jar	Tested By:	cam
Sample ID:	S7	Test Date:	01/12/22	Checked By:	jsc
Depth :	16-17	Test Id:	648764		
Test Comment:	---				
Visual Description:	Moist, very dark gray peat				
Sample Comment:	---				

Moisture, Ash, and Organic Matter - ASTM D2974

Boring ID	Sample ID	Depth	Description	Moisture Content,%	Ash Content,%	Organic Matter,%
B-201	S7	16-17	Moist, very dark gray peat	366	29.3	70.7

Notes: Moisture content determined by Method A and reported as a percentage of oven-dried mass;
dried to a constant mass at temperature of 105º C
Ash content and organic matter determined by Method C; dried to constant mass at temperature 440º C

Client:	Weston & Sampson Engineers				
Project:	Walnut St Boardwalk				
Location:	Framingham, MA			Project No:	GTX-314936
Boring ID:	B-201	Sample Type:	jar	Tested By:	cam
Sample ID:	S7	Test Date:	01/11/22	Checked By:	jsc
Depth :	16-17	Test Id:	648747		
Test Comment:	---				
Visual Description:	Moist, very dark gray peat				
Sample Comment:	---				

Atterberg Limits - ASTM D4318

Sample determined to be Peat (PT)

Symbol	Sample ID	Boring	Depth	Natural Moisture Content,%	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S7	B-201	16-17	366	n/a	n/a	n/a	n/a	

Dry Strength: LOW

Dilatancy: RAPID

Toughness: n/a

Sample determined to be Peat (PT), therefore Atterberg Limits testing is not applicable

Attachment D

Important Information about This Geotechnical-Engineering Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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Attachment E – Wetland Delineation Report

Weston & Sampson

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Wetland Delineation Report



November 2021

Framingham, Massachusetts
Project # ENG21-0346

Walnut Street
Framingham, MA

Wetland Delineation Conducted By:
Devin Batchelder, CWS on
11/8/2021 & 11/9/2021

Delineation Report Reviewed By:
Mel Higgins, PWS



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1.0 SITE DESCRIPTION

On November 8th and 9th, 2021, the presence of wetland resources was investigated near Walnut Street in Framingham, MA. The investigation area is located within a developed area surrounded by residential and commercial properties, as well as the City's Bowditch Field Athletic Complex. Please see Figure 1 (Wetlands Field Map) and Figure 2 (USGS Topographic Map) of this report for the investigation area.

Wetland resource areas including a Bordering Vegetated Wetland, a perennial stream and an intermittent stream, were identified and flagged in the field using pink flagging by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) and the US Army Corps of Engineers methodology. Further descriptions of these wetland resource areas are presented in the following sections.

2.0 DELINEATION OF WETLAND RESOURCES

2.1 Site Observations

The Weston & Sampson wetland scientist, trained in the ACOE Wetland Delineation Manual and Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetland Protection Act guidance document, observed the following protected wetland resources at the site:

- Bordering Vegetated Wetland (BVW)
- Bank – Perennial Stream
- Bank – Intermittent Stream

Field data were recorded on US Army Corps of Engineers (ACOE) Wetland Determination Data Forms. See Appendix A for completed data forms and Appendix B for site photographs.

2.2 Wetland Delineation Methodology

A wetland delineation assessment was conducted in accordance with the Massachusetts Wetland Protection Act Regulations (310 CMR 10.55(2)(c)), Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Protection Act (March 1995), and ACOE Wetland Manual (Technical Report Y-87-1).

The bordering vegetated wetlands (BVW) delineation methodology included the characterization of vegetation, soil and hydrologic conditions in both wetland and upland areas to identify the transitional area, which was used as the wetland limit. Pink flags with distinct flag numbers are left in the field to show wetland resource area limits.

Vegetation, hydrology and soils are assessed in both wetland and upland areas to accurately place the wetland limits at each site. The percentage of vegetative species was estimated by creating sample plots. Sample plot radii for trees, saplings, shrubs, groundcover and woody vine strata were 30', 15', 15', 5' and 30', respectively. After creating the sample plot areas, the percent basal area coverage of each species within the monitoring plot was recorded. Using these field observations, the percent dominance of each species within its stratum was calculated. The 50/20 Rule was then used to

determine dominance. Dominant species were considered the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceeds 50% of the total dominance measure (basal area) for the stratum, plus any additional species comprising 20% or more of the total dominance measure for the stratum. Once the dominant species were determined, they were treated equally to determine the presence of hydrophytic vegetation. If the number of dominant species with a Wetland Indicator Status of Facultative (FAC) (excluding FAC-), Facultative Wetland (FACW) or Obligate (OBL) is greater than, or equal to, the number of remaining dominant species, the area was considered a jurisdictional wetland resource area based on vegetation.

A soil sample from each wetland sample plot is also taken. Each soil sample goes to a depth of at least 12-24 inches. The soil is characterized to determine if the soil sample is considered a hydric (wetland) soil. Soil samples, including mottles, are characterized based on color using Munsell Soil-Color charts as a color reference.

The general area is then assessed for hydrologic conditions, including, but not limited to, site inundation, depth to free water, depth of soil saturation, water marks, drift lines, sediment deposits, and water stained leaves.

2.3 Bordering Vegetated Wetlands (BVW)

A single BVW series was delineated at the site. This BVW is located adjacent to two unnamed intermittent streams. The limit of the BVW resource areas were determined by locating the transitional area between wetland and upland vegetation, soils and hydrologic conditions. Wetland flags left in the field included:

- BVW-A1 through BVW-A74 (BVW “A” Series)
- BVW “B” Series Deleted in the Field, Combined into A Series
- BVW-C1 through BVW-C24 (BVW “C” Series)
- BVW-D1 through BVW-D6 (BVW “D” Series)

Dominant vegetation within the wetland resource area included red maple (*Acer Rubrum*), tussock sedge (*Carex stricta*), coastal sweetpepper (*Clethra alnifolia*), duckweed (Lemna minor), highbush blueberry (*Vaccinium corymbosum*), species that generally thrive in wet conditions. Soils within the

BVW's were composed of a thick organic layer underlain by a fine sandy loam with redoximorphic features. Other indicators of wetland hydrology included surface water, highwater table and saturation.

Dominant upland vegetation in the area included red maple (*Acer rubrum*), Japanese barberry (*Berberis thunbergii*), striped prince's pine (*Chimaphila maculata*), glossy buckthorn (*Frangula alnusm*), Blackcherry (*Prunus serotina*), northern red oak (*Quercus rubra*), and highbush blueberry (*Vaccinium corymbosum).* Soils within the upland were composed of fine sandy loam, with no evidence of mottling or hydrology within the top 12 inches.

A 100-foot buffer zone is associated with the BVW resource area.

2.4 Bank

Water bodies, including perennial streams, intermittent streams, ponds and lakes, have banks which are protected by the Massachusetts Wetland Protection Act. Bank is a wetland resource area defined by 310 CMR 10.54(2)(a) as "the portion of land surface which normally abuts and confines a water body. It occurs between a waterbody and a vegetated bordering wetland and adjacent floodplain, or, in absence of these, it occurs between a waterbody and an upland." Vegetated banks provide valuable functions such as flood control, stormwater prevention, fisheries protection, and water quality protection. The limit of this resource area is identified by Top of Bank (TOB) which is located at the first observable break in slope or the Mean Annual Flood Level (MAFL), whichever is lower. TOB is easily identified in the field so that indicator was utilized for this wetland delineation.

Perennial Stream Banks

A single unnamed perennial stream (Stream 1) was identified on the eastern side of the investigation area originating at a culvert under Stoney Brook Road and flowing north. The Stream 1 channel was fragmented with blockages consisting of dense vegetation and likely fill. This fragmentation can be seen when looking at historic aerials of the investigation area (See Appendix B Photos). At the northern extent of the investigation area, both the perennial and intermittent streams join to form a single perennial stream which flows north off the property adjacent to Georgetown Drive.

The boundary of the perennial stream was identified in the field utilizing Top of Bank (TOB), identified by flag line TOB-A. Stream 1 is shown as intermittent on the current United States Geographical Survey

(USGS) map however, because the stream has a watershed size greater than 0.5 square miles and the predicted flow rate is greater than or equal to 0.01 cubic feet per second at the 99% flow duration in size according to USGS Stream Stats (See Appendix C), Stream 1 is classified as perennial per 310 CMR 10.58 (2)(a)(1)(b-c). The boundary of the perennial stream was identified in the field by the first observable break in slope (TOB). Wetland flags left in the field included:

- TOB-B1 through TOB-B16 (Intermittent Stream Bank "B" Series) (Stream 1)
- TOB-D1 through TOB-D18 (Intermittent Stream Bank "D" Series) (Stream 1)
- TOB-F1 through TOB-F19(Intermittent Stream Bank "F" Series) (Stream 1)

Perennial streams are subject to a 200-foot Riverfront Area under the Massachusetts Wetland Protection Act per 301 CMR 10.58(2)(a)(2)(c).

Intermittent Stream Banks

A single unnamed perennial stream (Stream 2) was identified on the western side of the investigation area originating within the wetland and flowing north. The Stream 2 channel was fragmented with blockages consisting of dense vegetation and likely fill. This fragmentation can be seen when looking at historic aerials of the investigation area (See Appendix B Photos). The stream channel banks were inaccessible in some locations due to deep water and mud. At the northern extent of the investigation area, both the perennial and intermittent streams join to form a single perennial stream which flows north off the property adjacent to Georgetown Drive.

Stream 2 is shown as intermittent on the current United States Geographical Survey (USGS) map and has a watershed size less than 0.5 square miles in size according to USGS Stream Stats (See Appendix C) which classifies the stream as intermittent per 310 CMR 10.58 (2)(a)(1)(b-c). The boundaries of the intermittent stream were identified in the field by the first observable break in slope (TOB) wherever accessible. Wetland flags left in the field included:

- TOB-A1 through TOB-A33 (Intermittent Stream Bank "A" Series) (Stream 2)
- TOB-E1 through TOB-E7 (Intermittent Stream Bank "E" Series) (Stream 2)

Intermittent stream banks are subject to a 100-foot buffer under the Massachusetts Wetland Protection Act per 301 CMR 10.02(2)(b).

2.5 Other Protected Areas

Weston & Sampson created an Environmental Resources Map (see Figure 4) of the site to determine the presence of other protected areas. The data source of these map layers was the Massachusetts Geographic Information System (MassGIS). These areas included:

- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified and Potential Vernal Pools
- Areas of Critical Environmental Concern (ACEC)
- Outstanding Resource Waters (ORW)

Wetland resources identified in the field were also added to these maps. Based on the MassGIS information there is a NHESP Potential Vernal Pool located on the eastern side of the investigation area. According to information from the local Conservation Commission there is a potential vernal pool +/- 300 feet from the wetland crossing that is not mapped (it is one of two potential vernal pools on the south side on the crossing). The City of Framingham has established a 125- foot No Alteration Zone around both Certified and Potential Vernal Pools, per the Framingham Wetlands Protection Bylaw.

FEMA Flood Insurance Rate Maps (FIRM) were created online from the FEMA website to determine if there is a 100-year flood zone at the site. See Figure 3 for FIRM map. Based on FEMA flood maps. the investigation area is located within the 100-year flood zone.

3.0 SUMMARY

On November 8th and 9th, 2021, the presence of wetland resources was investigated near Walnut Street in Framingham, MA. A Bordering Vegetated Wetland, a perennial stream and an intermittent stream were identified and flagged at the site.

Additional environmental mapping was conducted using MassGIS data layers and FEMA FIRM mapping. This additional mapping indicates that there is a NHESP Potential Vernal Pool located on the eastern side of the investigation area, and two unmapped potential vernal pools south of the wetland crossing on site. Additionally, the entire investigation area is located within the 100-year flood zone.

This Wetlands Delineation Report has been reviewed and approved by a Professional Wetland Scientist PWS.

4.0 REFERENCES

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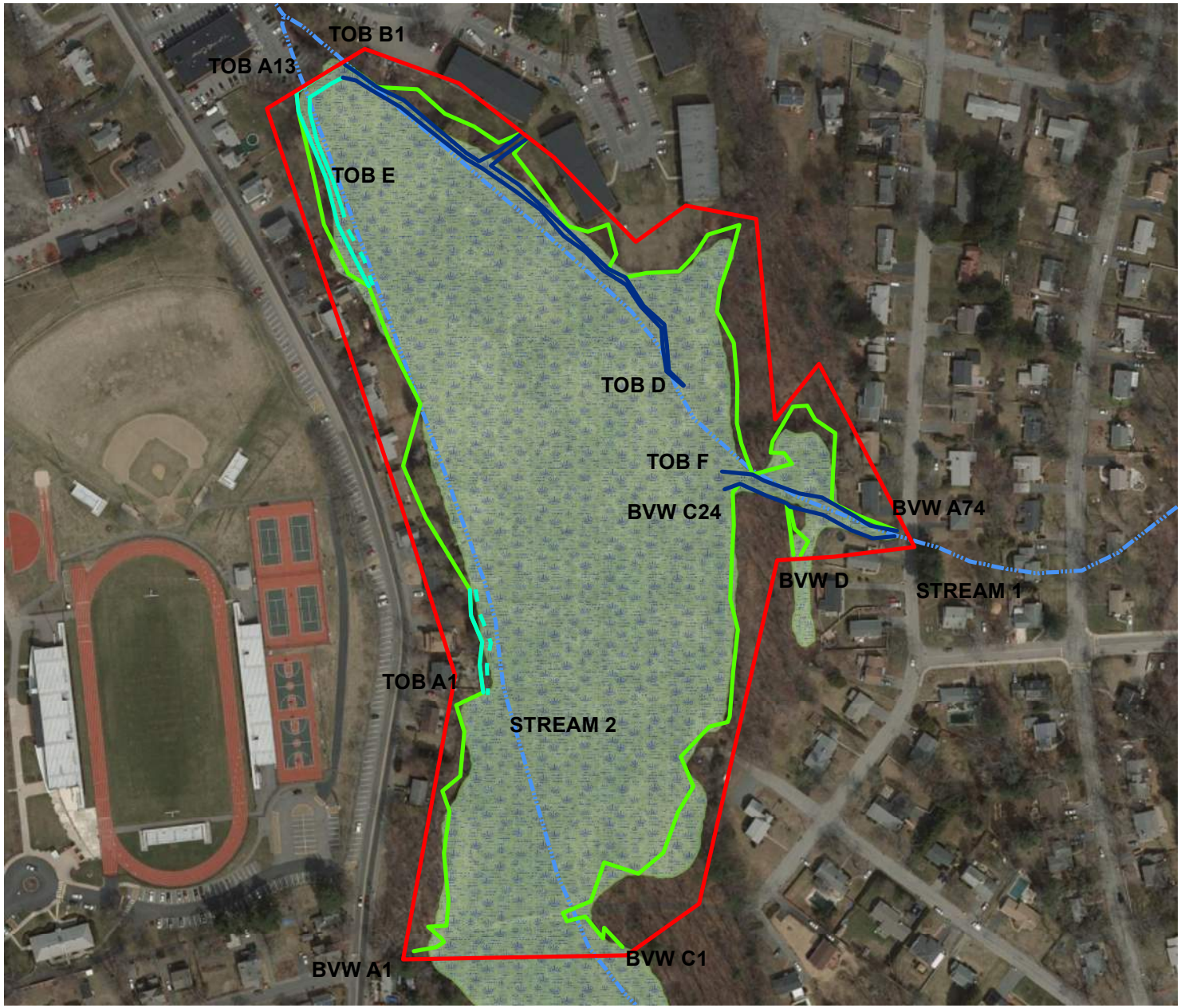

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

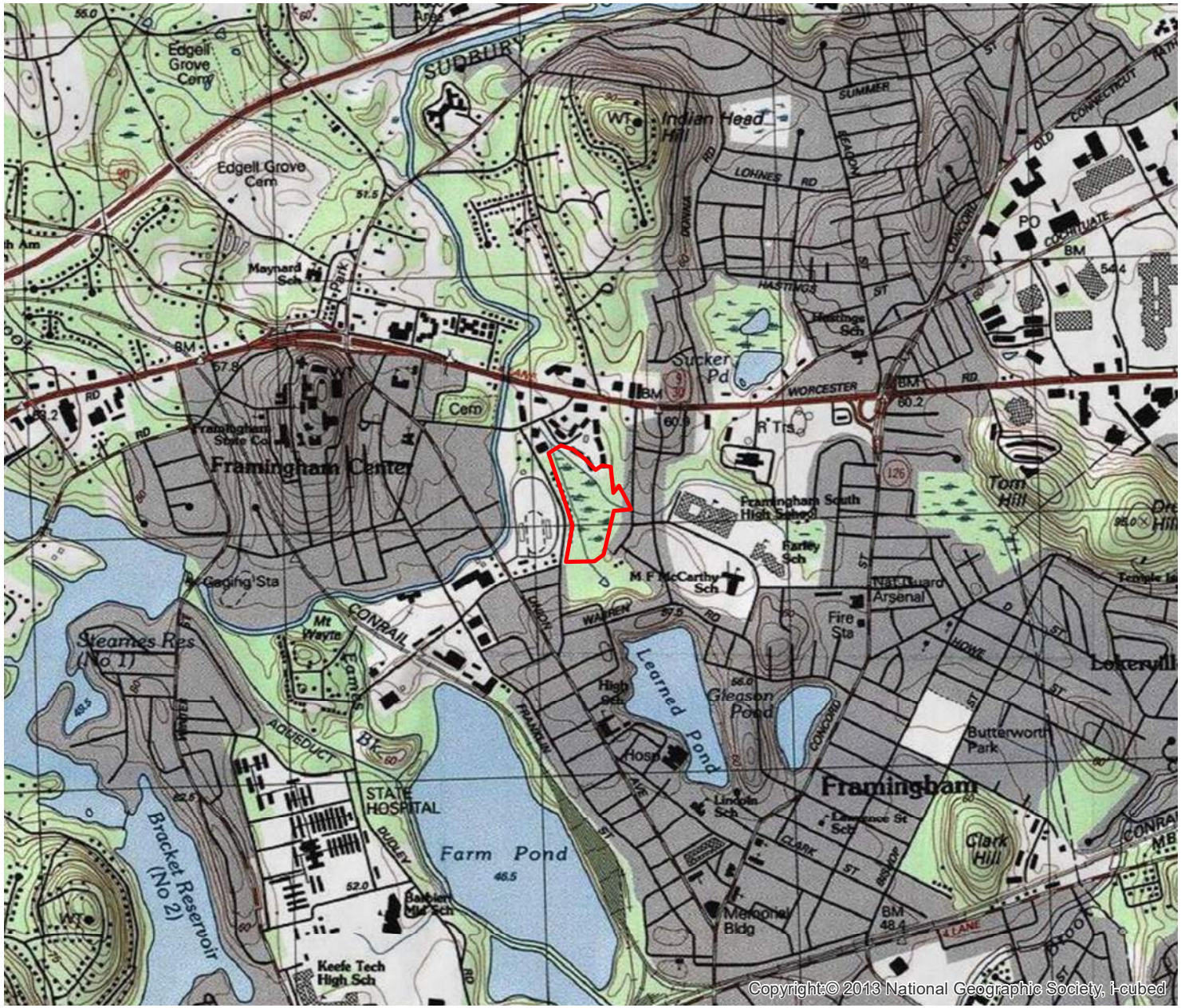
- Investigation Area
- Perennial Stream Banks
- Intermittent Stream Banks
- Inaccessible Intermittent Stream Banks
- Bordering Vegetated Wetlands
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Open Water

FIGURE 1

WALNUT STREET
FRAMINGHAM MA

WETLAND FIELD MAP

Weston & Sampson



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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

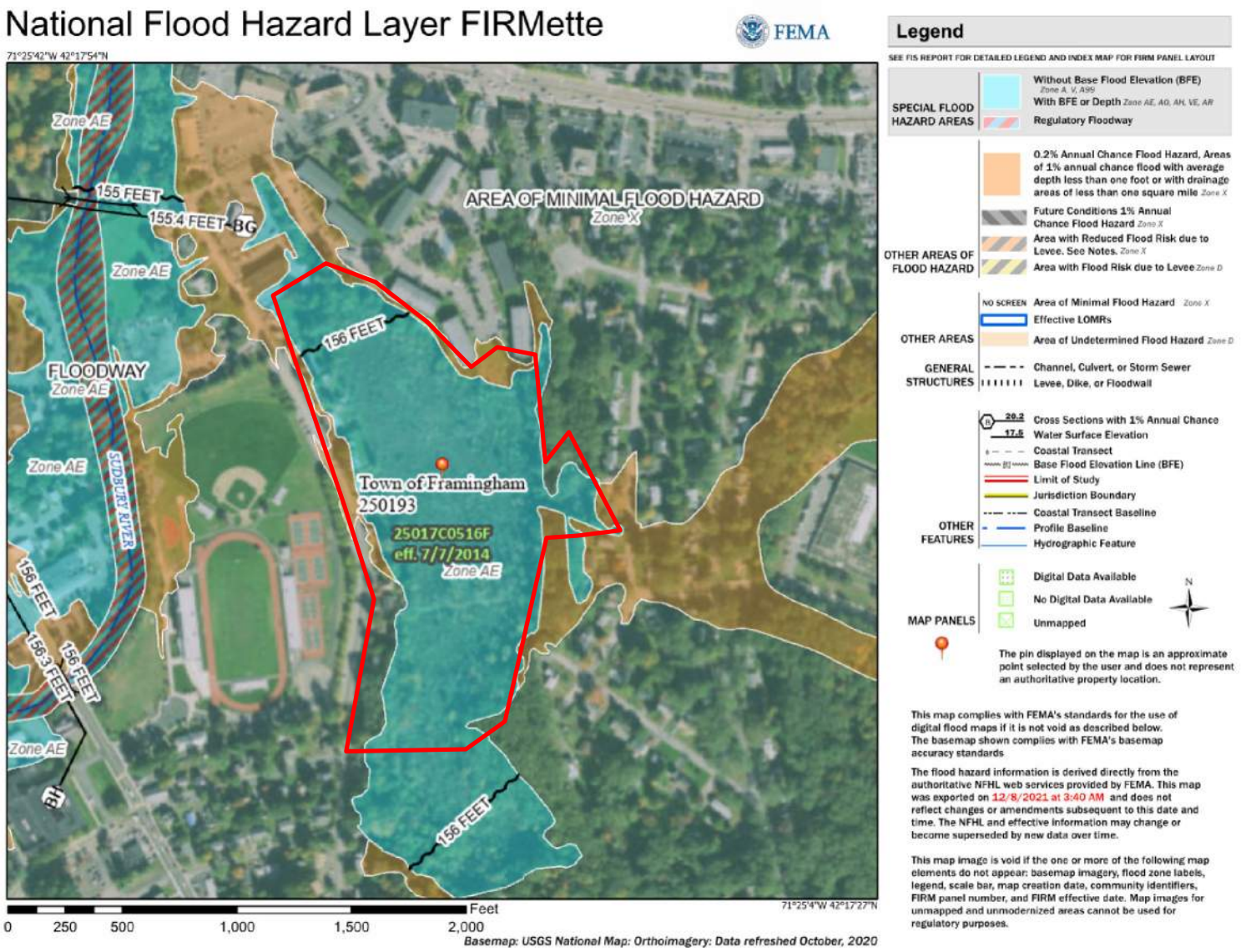
Investigation Area

FIGURE 2

WALNUT STREET
FRAMINGHAM MA

USGS TOPOGRAPHIC MAP

Weston & Sampson



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Investigation Area

FIGURE 3

WALNUT STREET
FRAMINGHAM MA

FEMA MAP

Weston & Sampson

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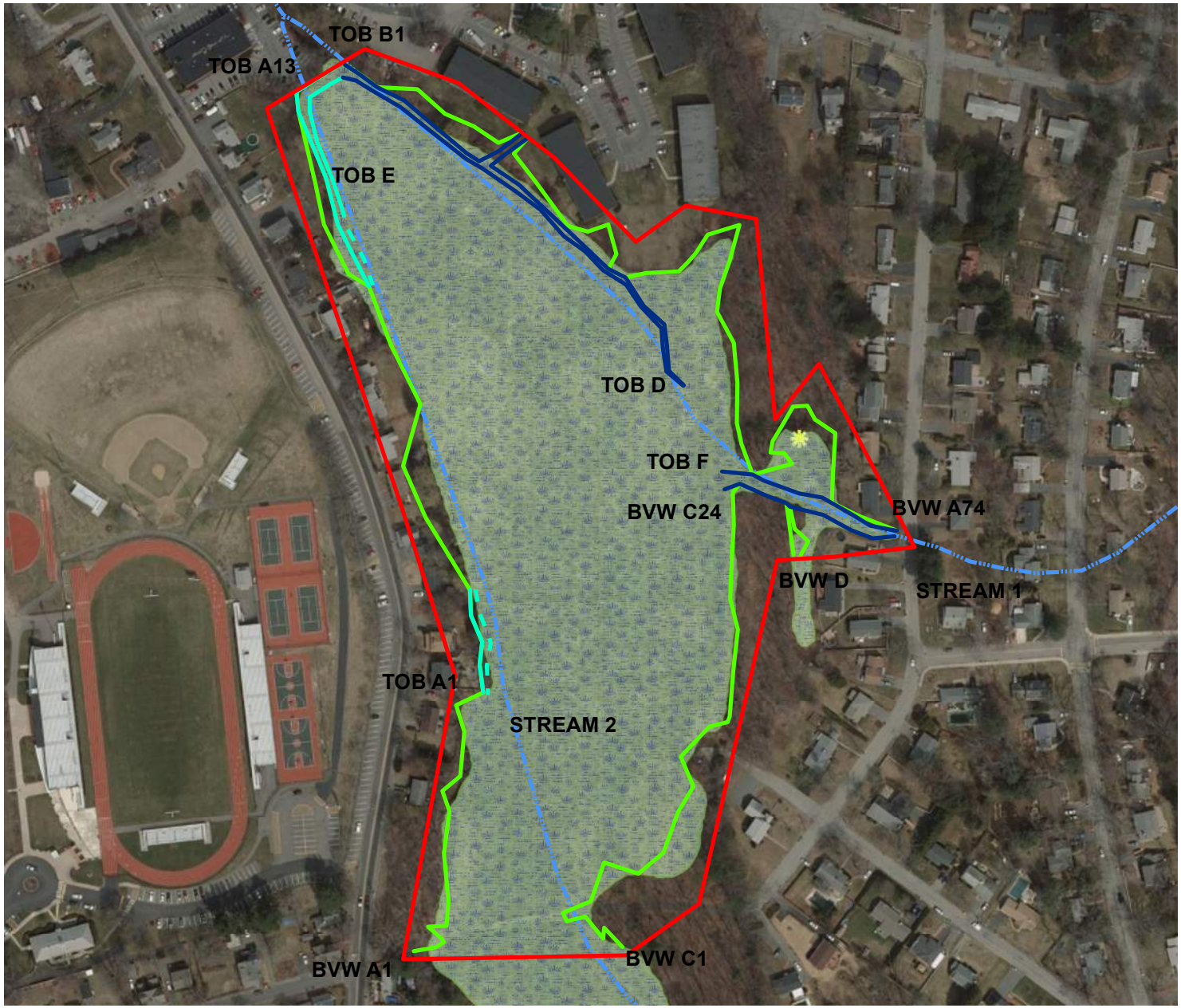

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Investigation Area
- Perennial Stream Banks
- Intermittent Stream Banks
- Inaccessible Intermittent Stream Banks
- Bordering Vegetated Wetlands
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Open Water
- ACECs
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools
- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other

FIGURE 4

WALNUT STREET
FRAMINGHAM MA

ENVIRONMENTAL RESOURCES MAP

Weston & Sampson

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Photo Locations
- Investigation Area
- Perennial Stream Banks
- Intermittent Stream Banks
- Inaccessible Intermittent Stream Banks
- Bordering Vegetated Wetlands
- USGS Perennial Stream
- USGS Intermittent Stream

FIGURE 5

WALNUT STREET
FRAMINGHAM MA

SITE PHOTO LOCATION MAP

Weston & Sampson

APPENDIX A

ACOE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Walnut Street City/County: Framingham Sampling Date: 11/9/2021

Applicant/Owner: _____ State: MA Sampling Point: BVW A-D UP

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 0-1% Lat: 42°17'35.07"N Long: 71°25'21.56"W Datum: _____

Soil Map Unit Name: Freetown muck NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW A-D UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Northern red oak (Quercus rubra)	25	Yes	FACU
2. Red Maple (Acer rubrum)	5	No	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. Red Maple (Acer rubrum)	5	Yes	FAC
2. Blackcherry (Prunus serotina)	5	Yes	FACU
3. Japanese Barberry(Berberis thunbergii)	1	Yes	FACU
4. Glossy buckthorn (Frangula alnusm)	1	Yes	FAC
5. Highbush blueberry (Vaccinium corymbosum)	1	Yes	FACW
6. smooth witherod (Vubirnum nudum)	1	No	FACU
7.			
	14	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Striped Prince's pine(Chimaphila maculata)	1	Yes	N/A
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	1	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 29 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	11	x 3 =	33
FACU species	32	x 4 =	128
UPL species	0	x 5 =	0
Column Totals:	43 (A)		161 (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW A-D UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR3/2	100					FSL	
8-16	10YR4/6	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Walnut Street City/County: Framingham Sampling Date: 11/9/2021

Applicant/Owner: _____ State: MA Sampling Point: BVW A-D WET

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 0-1% Lat: 42°17'35.07"N Long: 71°25'21.56"W Datum: _____

Soil Map Unit Name: Freetown muck NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 0"
Water Table Present?	Yes X	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW A-D WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Red Maple(Acer Rubrum)	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Highbush blueberry (Vaccinium corymbosum)	15	Yes	FACW
2. Coastal Sweetpepper(Clethra alnifolia)	10	Yes	FAC
3. Arrowwood(Viburnum dentatum)	10	No	FAC
4. Red Maple(Acer Rubrum)	5	No	FAC
5. White Pine(Pinus strobus)	1	No	FACU
6.			
7.			
	41 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Duckweed(Lemna minor)	15	Yes	OBL
2. Tussock Sedge(Carex stricta)	10	Yes	OBL
3. Fringe Sedge(Carex crinita)	5	No	OBL
4. Sensitive Fern(Onoclea sensibilis)	5	No	FACW
5. Skunk Cabbage(Symplocarpus foetidus)	5	No	OBL
6. Brown Fox Sedge(Carex vulpinoidea)	1	No	OBL
7. Blue Flag Iris(Iris versicolor)	1	No	OBL
8.			
9.			
10.			
11.			
12.			
	42 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW A-D WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
12-0	10YR2/1	100					Organic	
0-18	10YR2/1	95	10YR4/6	5			FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

APPENDIX B

Site Photographs



Photo 1: Culvert Under Stony Brook Road

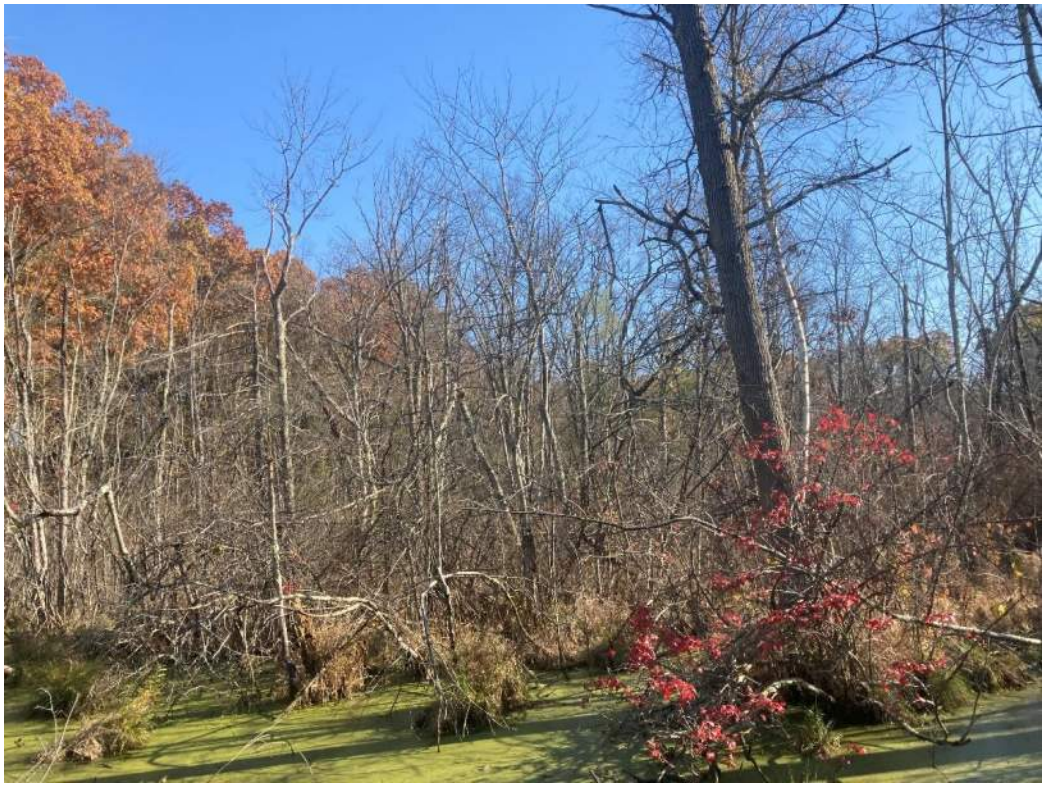


Photo 2: BVW Located On Site



Photo 3: Walking Path At Southern Extent of Investigation Area



Photo 4: Perennial Stream 1



Photo 5: Intermittent Stream 2



Photo 6: Hydric Soils Located On Site



Photo 7: Google Earth Aerial Image Dated 4.22.2018

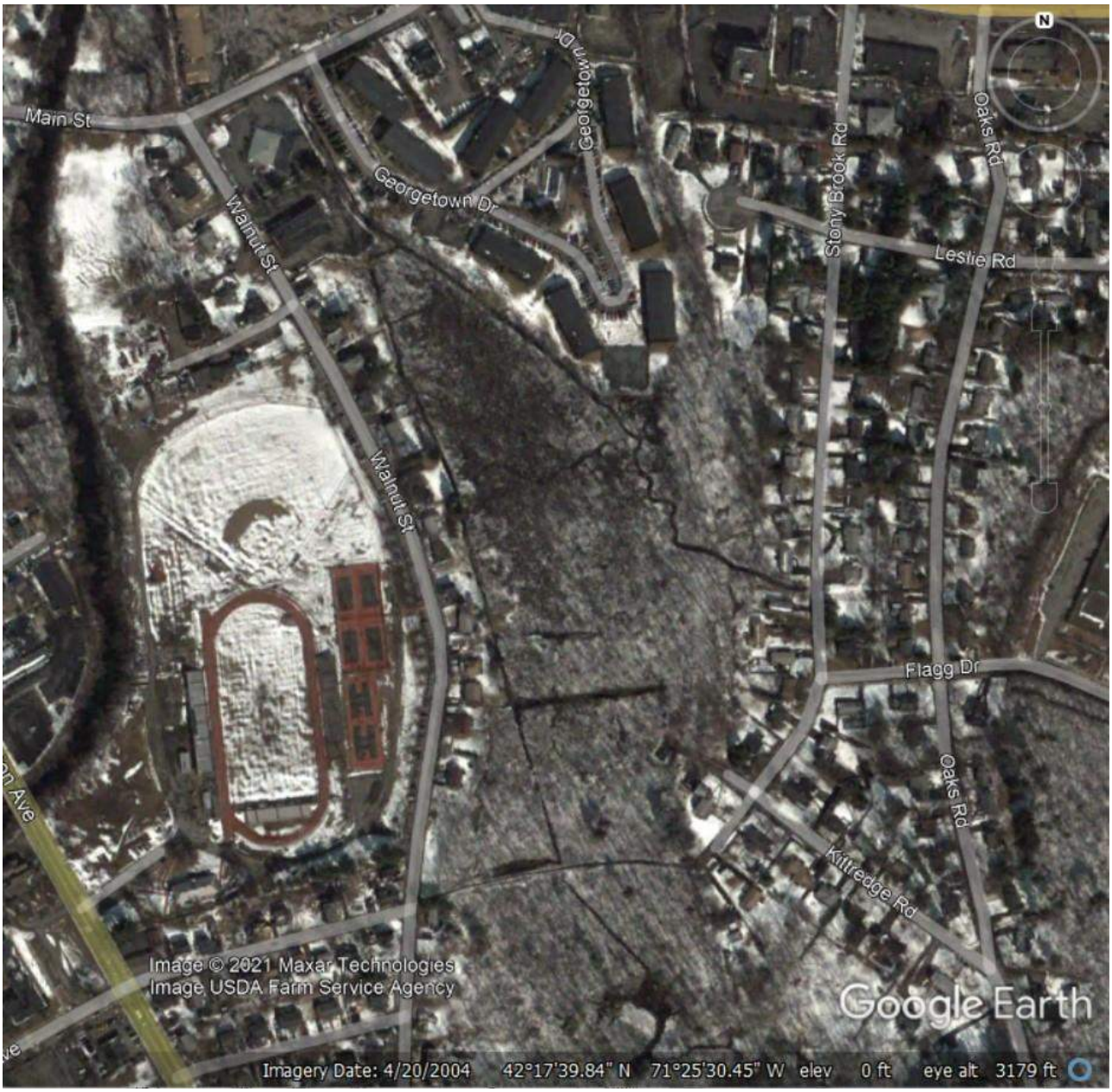


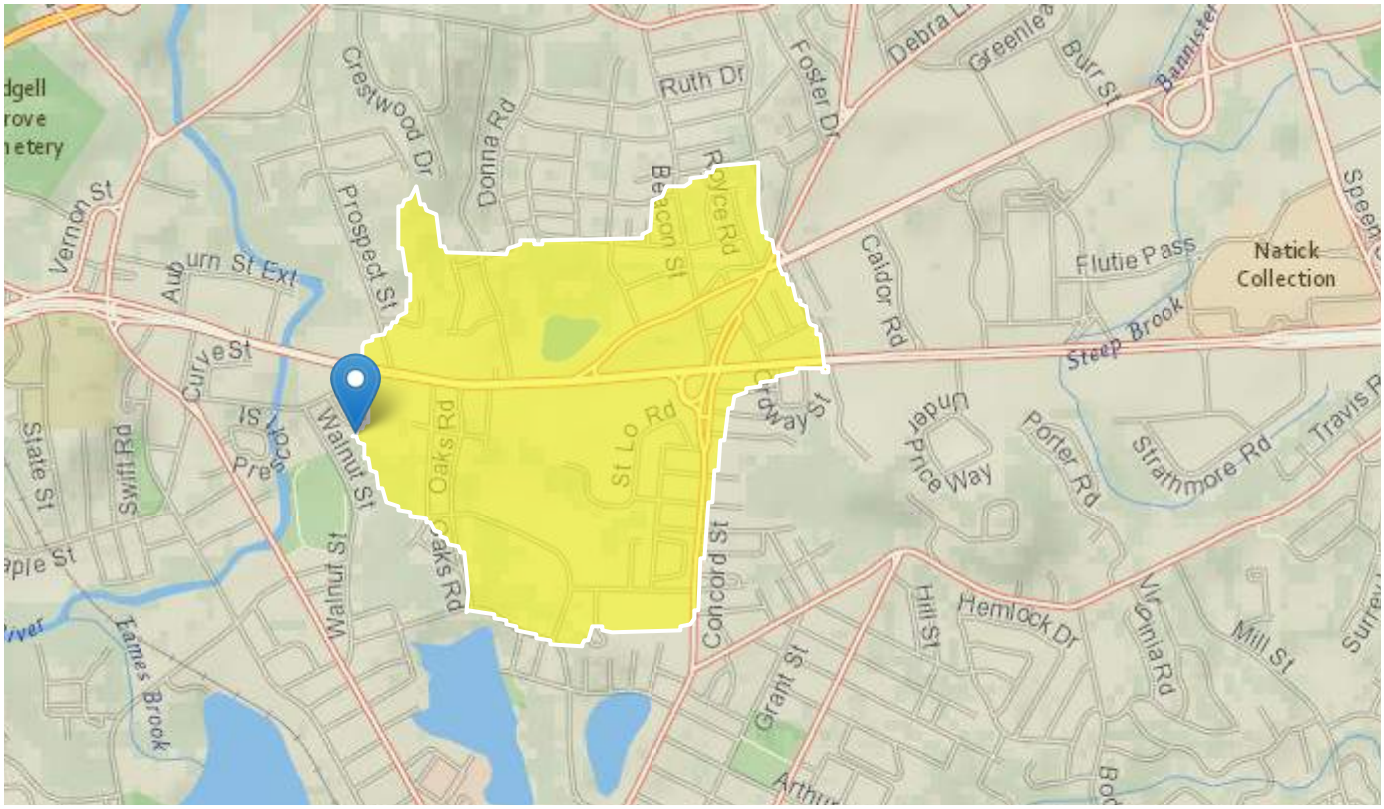
Photo 8: Google Earth Aerial Image Dated 4.20.2004

APPENDIX C

Stream Stats

StreamStats Report - East Stream (Stream 1)

Region ID: MA
Workspace ID: MA20211223113328142000
Clicked Point (Latitude, Longitude): 42.29615, -71.42392
Time: 2021-12-23 06:33:47 -0500



Eastern Stream

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.68	square miles
DRFTPERSTR	Area of stratified drift per unit of stream length	0.44	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless
BSLDEM250	Mean basin slope computed from 1:250K DEM	1.216	percent

Flow-Duration Statistics Parameters [Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.68	square miles	1.61	149
DRFTPERSTR	Stratified Drift per Stream Length	0.44	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1
BSLDEM250	Mean Basin Slope from 250K DEM	1.216	percent	0.32	24.6

Flow-Duration Statistics Disclaimers [Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Flow-Duration Statistics Flow Report [Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
50 Percent Duration	0.644	ft^3/s
60 Percent Duration	0.472	ft^3/s
70 Percent Duration	0.322	ft^3/s
75 Percent Duration	0.257	ft^3/s
80 Percent Duration	0.228	ft^3/s
85 Percent Duration	0.16	ft^3/s
90 Percent Duration	0.128	ft^3/s
95 Percent Duration	0.0656	ft^3/s
98 Percent Duration	0.0431	ft^3/s
99 Percent Duration	0.0298	ft^3/s

Flow-Duration Statistics Citations

Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

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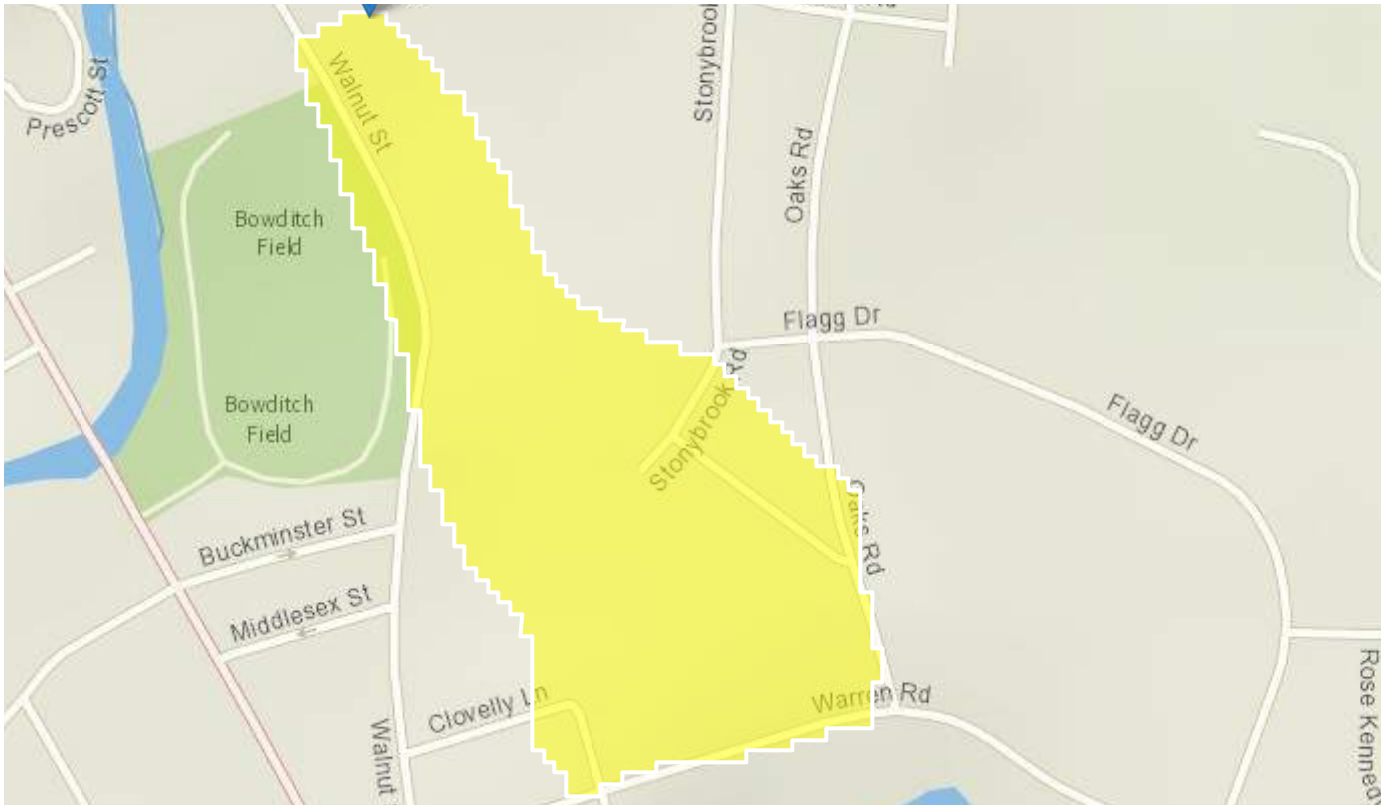
USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report - West Stream (Stream 1)

Region ID: MA
Workspace ID: MA20211223115921688000
Clicked Point (Latitude, Longitude): 42.29617, -71.42452
Time: 2021-12-23 06:59:41 -0500



Western Stream

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0614	square miles

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

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Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

Attachment F – Vernal Pool Assessment Report

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Vernal Pool Assessment



June 2022

Walnut Street
Framingham, MA

Field Observations Conducted By:
Devin Herrick, CWS on 4/26/2022



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2.2 MassGIS Potential Vernal Pools 2-1
2.3 Vernal Pool Identification 2-2
2.5 Vernal Pool Certification and Regulations 2-3

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FIGURES

Figure 1 ..... USGS Topographic Map
Figure 2 ..... Aerial Locus Map
Figure 3 ..... Pool Specific Map

APPENDICES

Appendix A ..... Vernal Pool Field Observation Forms
Appendix B ..... Site Photographs

1.0 SITE DESCRIPTION

On April 26th, 2022, the presence of two potential vernal pools was investigated near 105 Walnut Street in Framingham MA. This property is an undeveloped, wooded parcel owned by the City of Framingham. Please see Figure 1 (USGS Topographic Map), Figure 2 (Aerial Locus Map) and Figure 3 (Pool Specific Map) of this report for the investigation area.

Potential vernal pool resource areas were identified in the field by a Weston & Sampson employee who is trained in the vernal pool identification process. Further description of the vernal pool identification process is presented in the following sections.

2.0 IDENTIFICATION OF VERNAL POOLS

2.1 Vernal Pool Biology

Vernal pools are seasonal pools of freshwater water which often originate in the autumn or winter and dry up during the summer months. These pools are normally formed from rising fall/winter groundwater levels or spring rainfall/snowmelt. Ranging in size from a few yards to a few acres, vernal pools are critical habitat for many species which rely on these ephemeral water bodies for their lifecycle. Per 310 CMR 10.04 "Vernal Pool Habitat" means:

> *"confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during the spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, § 40 as specified in 310 CMR 10.02(1). These areas are essential breeding habitat, and provide other extremely important wildlife habitat functions during non breeding season as well, for a variety of amphibian species such as wood frog (Rana sylvatica) and the spotted salamander (Ambystoma macultum), and are important habitat for other wildlife species."*

2.2 MassGIS Potential Vernal Pools

Two potential vernal pools were identified near 105 Walnut Street in Framingham MA, see Figure 2 Aerial Locus Map. These potential vernal pools were initially identified utilizing the Natural Heritage & Endangered Species Program (NHESP) "Potential Vernal Pools" data layer found on the Massachusetts Geographic Informational System (MassGIS) data repository and on MassMapper (MassGIS's Online Mapping Tool).

Based on the Massachusetts Document Repository website (https://docs.digital.mass.gov/), this data layer was created by MassGIS, in conjunction with the Department of Fish & Game and NHESP, in the following manner:

> *"NHESP staff identified potential vernal pools from 1:12,000 scale, color infrared (CIR), leaf- off aerial photographs flown between late March and Early May. Statewide coverage included photos taken in 1993 (Bristol, Barnstable, Nantucket and Dukes Counties), 1999 (Plymouth, northern and*

southern Worcester, and eastern Franklin, Hampshire and Hampden Counties), and 2000 (Essex, Middlesex, Suffolk, Norfolk, central Worcester, western Franklin, Hampshire and Hampden, and Berkshire Counties). Using stereo pairs under a mirror stereoscope, the approximate centers of pools were located. These points were digitized in a heads-up manner onto the MassGIS black and white digital orthophotos at a scale of approximately 1:12,000."
https://docs.digital.mass.gov/dataset/massgis-data-nhesp-potential-vernal-pools

According to the Massachusetts Document Repository website, the NHESP Potential Vernal Pools data layer was last updated on July 12, 2018.

2.3 Vernal Pool Identification

A field investigation was conducted on April 26th, 2022 in order to locate the two potential vernal pools identified on MassGIS and confirm if vernal pools are present. Observed information was recorded on NHESP Vernal Pool Field Observation Forms and can be found in Appendix A.

The biological criteria needed to certify a vernal pool includes breeding evidence of and obligate amphibian species or breeding evidence of two or more facultative amphibian species. Certain wildlife species are classified as obligate or facultative based on how critical vernal pool habitat is for the completion of their life cycles. Obligate species are those that "require vernal pools for all or a portion of their life cycle and are unable to successfully complete their life cycle without vernal pools" while facultative species are those that that "frequently use vernal pools for all or a portion of their life cycle, but are able to successfully complete their life cycle in other types of wetlands". A list of these obligate and facultative vernal pool species can be found in the NHESP guidance document. Breeding evidence differs based on the species observed but can include a chorus of frog calls, egg masses, transforming juveniles (tadpoles), larvae and spermatophores.

Potential Vernal Pool #1 (PVP #1)

The first potential vernal pool (PVP #1) within the investigation area is shown on MassGIS in the southeast corner of the investigation area (approximate location: 42°17'29.08"N, 71°25'19.08"W). This area was searched, and no evidence of a pool was observed. There is a large wetland complex present with deep standing water, however this complex does not dry up seasonally and given the direct connectivity to an intermittent and perennial stream there is the potential for fish presence.

Potential Vernal Pool #2 (PVP #2)

The second potential vernal pool (PVP #2) within the investigation area is shown on MassGIS in the northeast corner of the investigation area (approximate location: 42°17'40.66"N, 71°25'17.59"W). During the investigation a pool was observed in this location. The outer limits of the pool were GPS located and can be seen on Figure 3 Pool Specific Map. This pool was initially observed during a wetland delineation effort on site conducted on November 9, 2021. The pool is 2,327 square feet in size and had a maximum depth of 18 inches. Evidence of an intermittent channel connection to the adjacent wetland was observed in the northeast corner of the pool.

Eight egg masses were found and based on morphology identified to be from the spotted salamander (*Ambystoma maculatum*). The spotted salamander is an obligate vernal pool species. According to NHESP "obligate species serve as direct indicators of vernal pool habitat because they require at least two months of flooded conditions and the absence of established, reproducing fish populations." The presence of egg masses is evidence that breeding has occurred which is a biological criteria for vernal pool identification. Based on these observations a vernal pool is present in this location.

2.5 Vernal Pool Certification and Regulations

Based on the observations made on April 26th, 2022 a vernal pool is located in the northeast corner of the investigation area (PVP #2). This vernal pool is currently classified by NHESP as a Potential Vernal Pool. In order to become a Certified Vernal Pool that is subject to additional regulations, the vernal pool must undergo the NHESP certification process that is outlined in the Division of Fish and Wildlife *Guidelines for the Certification of Vernal Pool Habitat* document. This report serves as documentation of the presence of a vernal pool however, the official certification process has not been completed by NHESP. As a result, the vernal pool is not yet considered to be a Certified Vernal Pool. Additional information may be required in order to complete the certification process. It should be noted that the observed vernal pool was located on private property. Prior to the certification process a discussion with the landowner should be initiated to receive permission and discuss the implications.

The vernal pool is located within a wetland complex which is jurisdiction under the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00). Certified Vernal Pools and up to a 100-foot buffer zone, receive additional protections under several state and federal laws. Potential Vernal Pools do not

receive these special protections. The City of Framingham local Wetland Protection Regulations offers extended protections to any vernal pool even if it is not certified. The local regulations have incorporated a 125-Foot Vernal Pool No-Alteration Zone which extends 125 feet horizontally outward from the Mean Annual High Water line of the pool. Any proposed work in this area would require permitting with the local Conservation Commission.

3.0 SUMMARY

On April 26th, 2022, the presence of two potential vernal pools was investigated near 105 Walnut Street in Framingham MA. Based on the observations a vernal pool is located in the northeast corner of the investigation area (PVP #2). This vernal pool is currently classified by NHESP as a Potential Vernal Pool.

This report serves as documentation of the presence of a vernal pool however, the official certification process has not been completed by NHESP. As a result, the vernal pool is not yet considered to be a Certified Vernal Pool. The City of Framingham local Wetland Protection Regulations offers extended protections to any vernal pool even if it is not certified. The local regulations have incorporated a 125-Foot Vernal Pool No-Alteration Zone which extends 125 feet horizontally outward from the Mean Annual High Water line of the pool. Any proposed work in this area would require permitting with the local Conservation Commission.

4.0 REFERENCES

"Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services"

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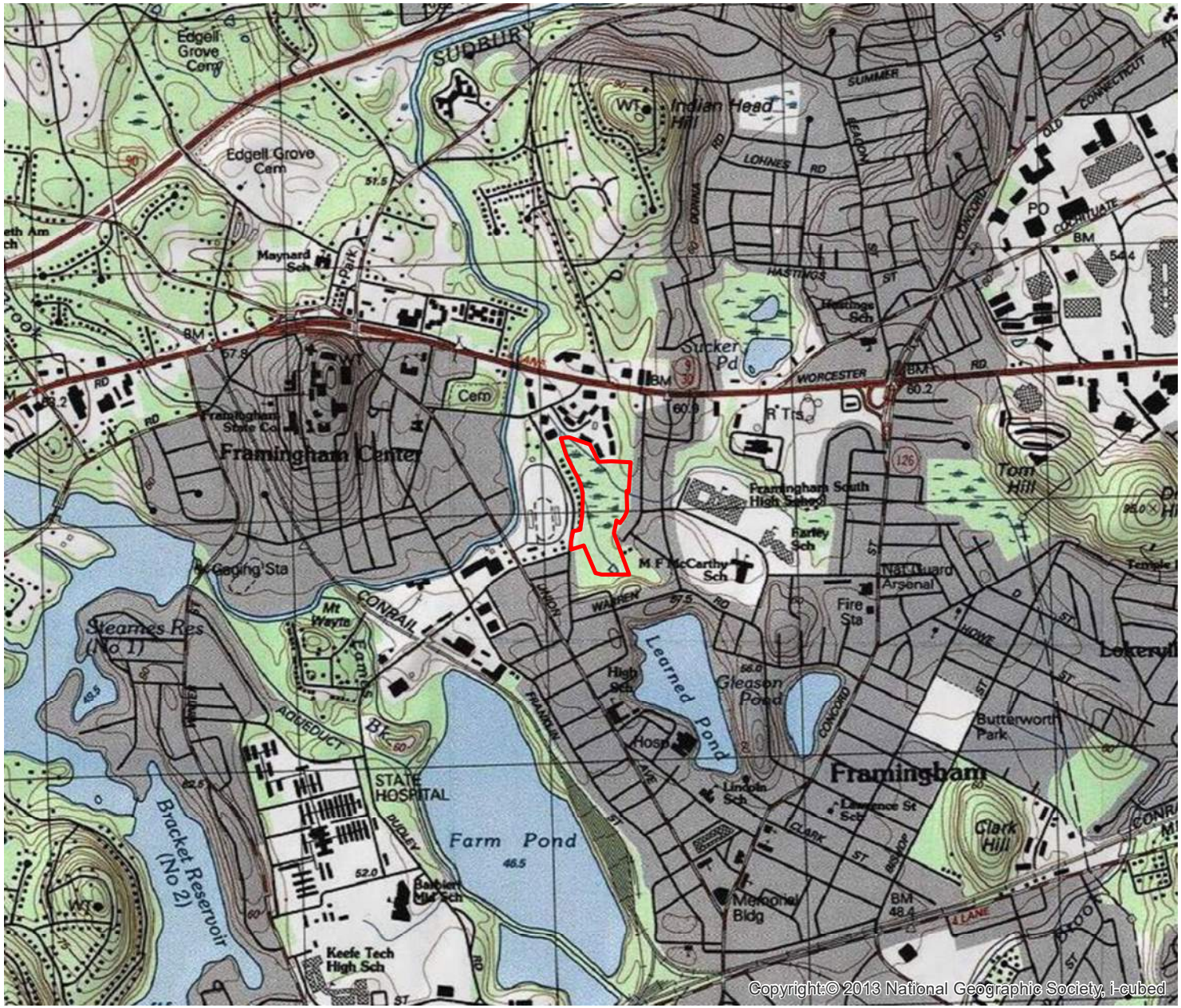

N
W E
S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 1

105 Walnut Street
Framingham MA

USGS Topographic Map

Weston & Sampson

Path: C:\Users\Herrick.Devin\Desktop\Vernal Pool\GIS\Maps\Aerial Locus.mxd **User:** Herrick.Devin **Saved:** 6/29/2022 2:18:30 AM **Opened:** 6/29/2022 2:20:08 AM



N
W E
S

200 100 0 200
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Investigation Area
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

FIGURE 2

105 Walnut Street
Framingham MA

Aerial Locus Map

Weston & Sampson



N
W E
S

30 15 0 30
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- GPS Points
- Pool Boundary

FIGURE 3

105 Walnut Street
Framingham MA

PVP #2
Pool Specific Map

Weston & Sampson

APPENDIX A

Vernal Pool Field Observation Forms

Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife

III. Vernal Pool Field Observation Form

For use with the *Guidelines for the Certification of Vernal Pool Habitat, March 2009.*

For Office Use Only

THE NHESP STRONGLY RECOMMENDS THAT LANDOWNER PERMISSION BE OBTAINED PRIOR TO COLLECTING CERTIFICATION DOCUMENTATION. IT IS THE SOLE RESPONSIBILITY OF AN INDIVIDUAL PROVIDING VERNAL POOL CERTIFICATION INFORMATION TO ENSURE THAT ALL ACTIVITIES ASSOCIATED WITH GATHERING SAID INFORMATION COMPLY WITH THE LAW.

INSTRUCTIONS:

Please provide all information requested. Attach additional pages if needed. All required biological & physical evidence must be documented by photos, video, or audio of suitable quality (resolution, focus, indicators of scale) so species ID can be confirmed & pool features assessed. Documentation must be labeled. Sign/date the form; incomplete forms will be returned.

Additional Instructions for *Specific* Numbered Boxes:

1. Include an identifying name or tracking # for your pool & use it to label photos, maps, & any other documentation. If you used the Potential Vernal Pool (PVP) datalayer (available at MassGIS), include the PVP #. Written directions must be included with landmarks to help navigate to the pool.

3. 3A & 3B are for certification by the Obligate Species Method. Provide photos, video, or audio (chorusing) of the required breeding evidence or fairy shrimp **AND** photo(s) or video of the pool holding water.

1. Pool Location (Please complete a separate form for each pool).

Town Framingham Potential Vernal Pool # (if known) 8058

Pool Name or Tracking # (e.g., Elm St. VP, VP#1) PVP #2

Written Directions to Pool (required): Starting on Stoney Brook Road there is a culvert outlet into a stream located between #87 and #113 Stoney Brook Road. Follow the stream channel west for 250 feet. The pool is located 50 feet north of the stream channel.

2. Pool/Species Observation Dates (month/day/year):

First date pool observed 11/9/2021 Last date pool observed 4/26/2022

First date species observed 4/26/2022 Last date species observed 4/26/2022

3B. Biological Evidence: *Fairy Shrimp*

Date Observed (m/d/y) N/A

3A. Biological Evidence: *Obligate Amphibians*

Indicate breeding evidence and date observed for each species. Evidence must include ≥1 of the following for certification: congressing salamanders **OR** ≥5 pairs wood frogs in amplexus **OR** salamander spermatophores **OR** a full wood frog chorus (calls constant, continuous, & overlapping) **OR** a total of ≥5 egg masses, regardless of species **OR** ≥1 MESA-listed salamander egg mass(es). Each individual egg mass or mated pair required for certification (e.g., all 5 wood frog egg masses) must be photographed or videotaped. If more than the minimum required number is observed, photo the required number, and count or estimate the total number and indicate in the table below.

SPECIES *State-listed species	Dates	COURTING ADULTS	Dates	SPERMATOPHORES	Dates	# EGG MASSES	Dates	SALAMANDER LARVAE	Dates	TRANSFORMING JUVENILES
Spotted salamander					4/26/2022	8				
Blue-spotted salamander *										
Jefferson salamander *										
Marbled salamander *										
Unidentified Mole salamander										

SPECIES	Dates	# MATED PAIRS (≥ 5 pairs)	Dates	Full Chorus (calls continuous & overlapping)	Dates	# EGG MASSES	Dates	TADPOLES	Dates	TRANSFORMING JUVENILES
Wood frog										
TOTAL(S)										

Instructions (continued)

4. Certification by the Facultative Amphibian Method - provide photo, video, or audio (chorusing) of the required breeding evidence and photo(s) or video of the pool holding water **AND** dry.
6. Provide information to help distinguish the pool & assess its features.
7. All required biological & physical evidence must be documented by good quality photos, video, or audio.
8. Indicate the 3 required maps submitted.

4. Biological Evidence: *Facultative Amphibians*

Breeding evidence[1] of ≥ 2 species must be documented by photos, video, or audio.

BREEDING AMPHIBIANS	DATE OBSERVED month/day/year	BREEDING EVIDENCE[1] OBSERVED
Spring peeper		
Gray treefrog		
American toad		
Fowler's toad		

Breeding evidence[1] includes: full breeding choruses (call constant & overlapping), ≥ 5 adults in amplexus, any # of egg masses, tadpoles, and/or transforming juveniles in pool.

5. Rare Wetland Species

Were MESA-listed species observed using this pool?

☐ Yes ☒ No

If yes, please submit a Rare Animal Observation Form with photo & map to the NHESP (available at www.nhesp.org).

6. Description of Pool and Surroundings ~ Please describe to the best of your ability and knowledge.

Dimensions (please include measurements or estimates):

Approx. Length: 85' Approx. Width: 40' Approx. Maximum Depth: 18"

Describe distinctive features (roads, structures, boulders, foot trails, vegetation types, etc.) which are visible from or near the pool that would help someone recognize it.

Located behind #87 Stoney Brook Road. Perennial Stream (Sucker Brook) located 50 feet to the south.

Origin of the pool (check): ☒ Natural depression ☐ Human-made pool/ditch ☐ Created wetland/pool ☐ Other or Unknown (describe)_____

The pool's hydroperiod is most likely: ☐ Seasonal (drying out in most years) ☒ Semi-permanent (drying partially in most years) ☐ Permanent

Describe any inlet or outlets to/from the pool and their permanence (e.g., streams, culverts, etc).

Intermittent outlet channel observed in northeast corner of pool which leads to adjacent wetland. No flowing water observed in natural channel during investigation.

Land use in vicinity of pool (approx. 100 ft from pool edge – check all that apply): ☒ upland forest ☒ forested wetlands ☒ emergent marsh/scrub-shrub wetland ☐ agricultural/grassland/meadow ☒ residential/commercial ☐ other_____

7. Documentation Submitted – Label with pool name or tracking #, town, date taken, observer's name.

☒ Photo(s) ☐ Video ☐ Audio
☒ Obligate Species ☐ Facultative Species ☒ Pool Holding Water ☐ Dry Pool

8. Maps Submitted

Pool locus must be delineated & identified with your pool name or tracking #.

3 REQUIRED MAPS:

☒ USGS Topographic Map - 1:24,000 or 1:25,000 or better

☒ Color orthophoto - 1:12,000 or better

and ≥1 of the following:

☐ Assessor's map (Map and Plot #)

☐ Professional survey

☐ Sketch map - with directions and distances from permanent landmarks

☒ GPS longitude/latitude coordinates:

Latitude = 42°17'40.66"N
Longitude = 71°25'17.59"W

9. Property Owner Information - Landowner information is optional & is available from local tax assessor's offices.

Name_____

Address_____

Town_____ State_____ Zip_____ Assessors Map/Pcl#_____ (if known)

10. Observer Information & Signature – Must be filled out & signed.

Name Devin Herrick - Weston & Sampson

Address 55 Walkers Brook Drive, Suite 100

Town Reading State MA Zip 01867

Telephone 978-532-1900 E-mail herrick.devin@wseinc.com

I hereby certify under the pains and penalties of perjury that the information contained in this report is true and complete to the best of my knowledge.

Signature_____ Date_____

Signature of Adult, if Observer is under 18 years of age_____

All submissions and supporting documents will be retained by the NHESP and, with the exception of information for MESA-listed species and the identity of minors, are available to interested parties under the Public Records Law.

SEND COMPLETED, SIGNED FORM & SUPPORTING DOCUMENTATION TO:

NHESP - Vernal Pool Certification
MA Division of
Fisheries & Wildlife
1 Rabbit Hill Rd.
Westborough, MA 01581

For questions call 508-389-6360

APPENDIX B

Site Photographs



Photo 1: PVP #1 Wetland Complex



Photo 2: PVP #2 Pool



Photo 3: Spotted Salamander Egg Mass Observed