



TOWN OF WAKEFIELD

DEPARTMENT OF PUBLIC WORKS

Engineering Division

Permittee-Owned Land Identified for Potential BMP and Reduction of Impervious Area

NPDES MS₄ Year 4 Report



September 2022



Introduction

The Town of Wakefield Engineering Division has reviewed the permittee-owned properties within the Town's MS₄ to identify and prioritize a minimum of 5 permittee-owned properties for the potential to modify or retrofit 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 (IA). This report identifies 9 projects that are at varying stages of planning, design, and construction. Many of the projects listed in this report were identified in the planning stages of other projects and reports such as the *Phosphorus Source Identification Report* (part of the MS₄ permit year 4 requirements) and the Town's annual roadway improvements program. The projects were then prioritized based on schedules for related projects i.e. roadway improvements, park improvements, current stormwater system level of service, and discharges to water quality limited waters.

Lake Quannapowitt has been identified on the MassDEP 303(d) list as a water body impaired for harmful algal blooms, DDT in fish tissue, and turbidity. Additionally, studies completed by boards recognized by the Town, including the Friends of Lake Quannapowitt (FOLQ) and the Clean Lake Committee, have noted the need to decrease the pollution within Lake Quannapowitt ("the Lake") to make the Lake more usable for recreational activities. Lake Quannapowitt is a destination for recreational use and plays a large role in the community for fundraiser walks and other events. As such, reduction of IA and installation of BMPs on properties within catchments with outfalls to the Lake have been given higher priority.

During the planning and design stages of the Town's annual roadway improvements program, the project design team reviews the roadways included in the program to determine if there are any opportunities to reduce IA and install BMPs. Intersection alignment, roadway alignment and width, topography and potential locations for curb bumpouts are reviewed to determine constructability and estimate associated costs. Any opportunities that are determined to be feasible are included as part of the roadway improvements construction contract. The Lowell Street/Salem Street Intersection realignment (described below) is an example of a project identified through this process.

The Clean Lake Committee developed a list of over 20 projects in and around the Lake that would contribute to improving the water quality of the Lake through BMPs, reduction of IA, direct treatment of the Lake, and public outreach. The identified projects are at various stages of planning, design, and construction, including a completed project at the Gertrude Spaulding Park. Of the 24 projects identified, 11 were projects that include construction of BMPs. Of the 11 BMP construction projects, 6 of have been included in the list below, the Envision Wakefield Project is a major project town wide project, and the remaining 4 projects either need more investigation or have been determined to be unfeasible. Attachment 1 shows the list of projects compiled by the Clean Lake Committee and overall map of project locations.

The next section is the list of prioritized list of projects on permittee-owned properties identified as having potential to modify or retrofit with BMPs.

Description of Potential BMP Sites

1. Veterans Field Tennis Courts & Pathway

Veterans field was identified as the top priority for retrofitting a BMP because there was a capital improvement project already planned for the site and the runoff discharged to Lake Quannapowitt untreated. The condition of the site was such that there weren't any BMPs treating any of the stormwater runoff from the pathway or a portion of the Church Street roadway entering through a catch basin system and discharging directly into Lake Quannapowitt. The project included the installation of a bioretention area and grass swale to treat stormwater runoff from the contributing portion of the roadway and a portion of the pathway as well as replacing the failing pavement for the tennis courts and the stone dust pathway, that were eroding into the lake, with new hot mixed asphalt surfaces. The project will be substantially complete within the 2023 Fiscal Year. Proposed Site Improvement Plans for the project included in *Attachment 2*

2. Lowell Street/Salem Street Intersection Realignment

This project was identified in the *Phosphorus Source Identification Report* because it is within a catchment that outlets to the Saugus River which is impaired for phosphorus. Lowell Street and Salem Street were both included in the 2022 Roadway Improvements program and during the design phase the Lowell Street and Salem Street intersection was evaluated for constructability and included as part of the construction project. The construction plans include realigning the roadway to "tee up" the intersection. The realignment will include treating runoff from Lowell Street and Salem Street by reduction of the IA within the roadway and installation of a bioretention area. The project is expected to be constructed in the 2023 construction season. Plan of the proposed realignment and bioretention in *Attachment 3*.

3. Main Street – Lake Quannapowitt Water Quality Improvement Project

The Main Street – Lake Quannapowitt project has been given priority as there are over ten untreated outfalls outletting to Lake Quannapowitt and most of the funding for the project has been secured through developer contributions. Additionally, this segment of Main Street has been included in the Town's Bicycle and Pedestrian master plan as needing major reconstruction to meet the access demands for the number of cyclists and pedestrians that traverse the area. The overall project will include reduction of impervious area through reconfiguration of the roadway cross-section and construction of multiple BMPs to treat runoff. This project is in the design phase and a construction schedule hasn't been developed. Conceptual Plan for the project included in *Attachment 4*.

4. Veterans Field Parking Lot

The Veterans Field parking lot was identified by the Clean Lake Committee in a list compiled to determine locations within the Lake Quannapowitt watershed that can be retrofitted to treat stormwater runoff. The parking lot discharges to Lake Quannapowitt without being treated. Proposed treatments have included options for a bioretention area in the middle between the parking spaces, and reduction of aisle width and consideration of pervious pavers for the parking spaces to reduce IA. Project is in the design phase and a schedule hasn't been determined. Map showing location of planned improvements is shown in *Attachment 5*.

5. Elm Street/North Emerson Street/Cedar Street Improvements

The Elm Street area from the intersection with Prospect Street to the intersection with Winn Street was identified by the Clean Lake Committee as an area that had potential for a water quality improvement project. There are currently two grass islands at the intersection of Elm St, Prospect St, Cedar St, and North Emerson St that have potential to be retrofitted for structural BMPs.

Additionally, it appears paved surface of Elm Street can be reduced and water quality improvement swales and bioretention cells can be added along the sides of a Elm Street. Elm Street is in the Town's 5-year paving plan and the area will be investigated to determine the feasibility of constructing the noted improvements. Project is currently in the planning phase. Map showing location of planned improvements is shown in *Attachment 6*.

6. Line Road Bioretention Area

The Town owned property at o Line Road (intersection of Line Road and Track Road) was identified as a potential location for the installation of a structural BMP such as a bioretention area as part of the *Phosphorus Source Identification Report*. Currently all of Line Road within the Town drains untreated to the wetlands northwest of Line Road into the Town of Reading. While Line Road isn't currently in the Town's 5-year roadway paving list, the potential improvements are mostly outside of the right-of-way and wouldn't have major impacts to the roadway. Project is currently in the evaluation and planning phase. Concept plan for improvements is shown as Concept Plan 1 in *Attachment 7*.

7. Lakeview Circle/King Street Cul-de-sac Retrofits

The cul-de-sacs on Lakeview Circle and King Street were identified as areas to potentially reduce IA and install structural BMPs as part of the *Phosphorus Source Identification Report*. The catchments draining to these areas currently discharge untreated to the surrounding wetlands which are tributary to the Saugus River. There aren't any capital improvement projects planned for this neighborhood. Project is currently in the evaluation and planning phase. Concept plan for improvements is shown as Concept Plan 3 in *Attachment 7*.

8. Indian Lane Bioretention Area

The Town-owned property at o Vernon Street (intersection of Indian Lane and Vernon Street) was identified as a potential location for a bioretention area as part of the *Phosphorus Source Identification Report*. The majority of Indian Lane drains towards this property and currently is piped to the Saugus River untreated, therefore this would be an opportunity to treat the runoff from this area. There is currently a water main improvement project in the area that was previous permitted through a request for determination (RDA) with the Conservation Commission so it's unlikely this work can be tacked on given the current status of the project. Project is currently in the evaluation and planning phase. Concept plan for improvements is shown as Concept Plan 4 in *Attachment 7*.

9. Audubon Road BMP Retrofit

The potential to reduce IA on Audubon Road was identified as part of the *Phosphorus Source Identification Report* which includes catchments draining to the Saugus River. There is a cul-de-sac near the end of the road that appears to be unnecessary. As such, the additional pavement included in the unused portion of the cul-de-sac can be removed and replaced with a structural BMP. Audubon Road is not currently part of the Town's 5-year roadway paving list so this improvement would likely

be a standalone project. Project is currently in the evaluation and planning phase. Concept plan for improvements is shown as Concept Plan 5 in *Attachment 7*.



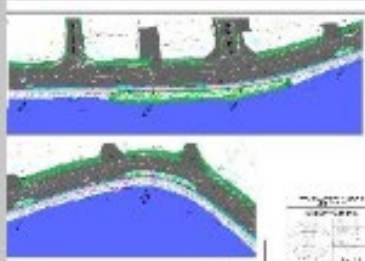
TOWN OF WAKEFIELD

DEPARTMENT OF PUBLIC WORKS

Engineering Division

Attachment 1 – Clean Lake Committee Project List





1 Main Street Improvements (Carriag...



2 Veteran's Field Parking Area



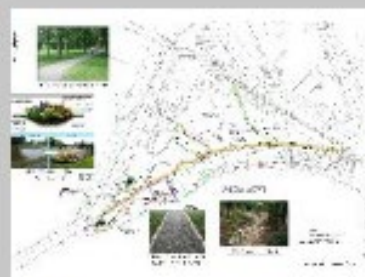
3 Tennis/Pickle Ball Court Area



4 The Lower Common



5 Create Watershed Overlay Zone



6 Gertrude Spaulding Improvements



7 Outfalls near Gertrude Spaulding Park



8 Lakeside Office Park



9 Lakeside Avenue



10 Envision Wakefield - Downtown Revitalization



11 Wakefield Office Park (200 Quannapowitt...)



12 Plant Street Trees



13 North Emerson Street –
Convert grass island to...



14 Lawn Care



15 Cedar Street – Convert
grass island to bio-...



16 Elm Street
Improvements



17 Yacht Cub



18 Lids for Trash Bins



19 Rain Garden



20 Bio-retention Island –
Saugus River Dam



21 Beacon Street



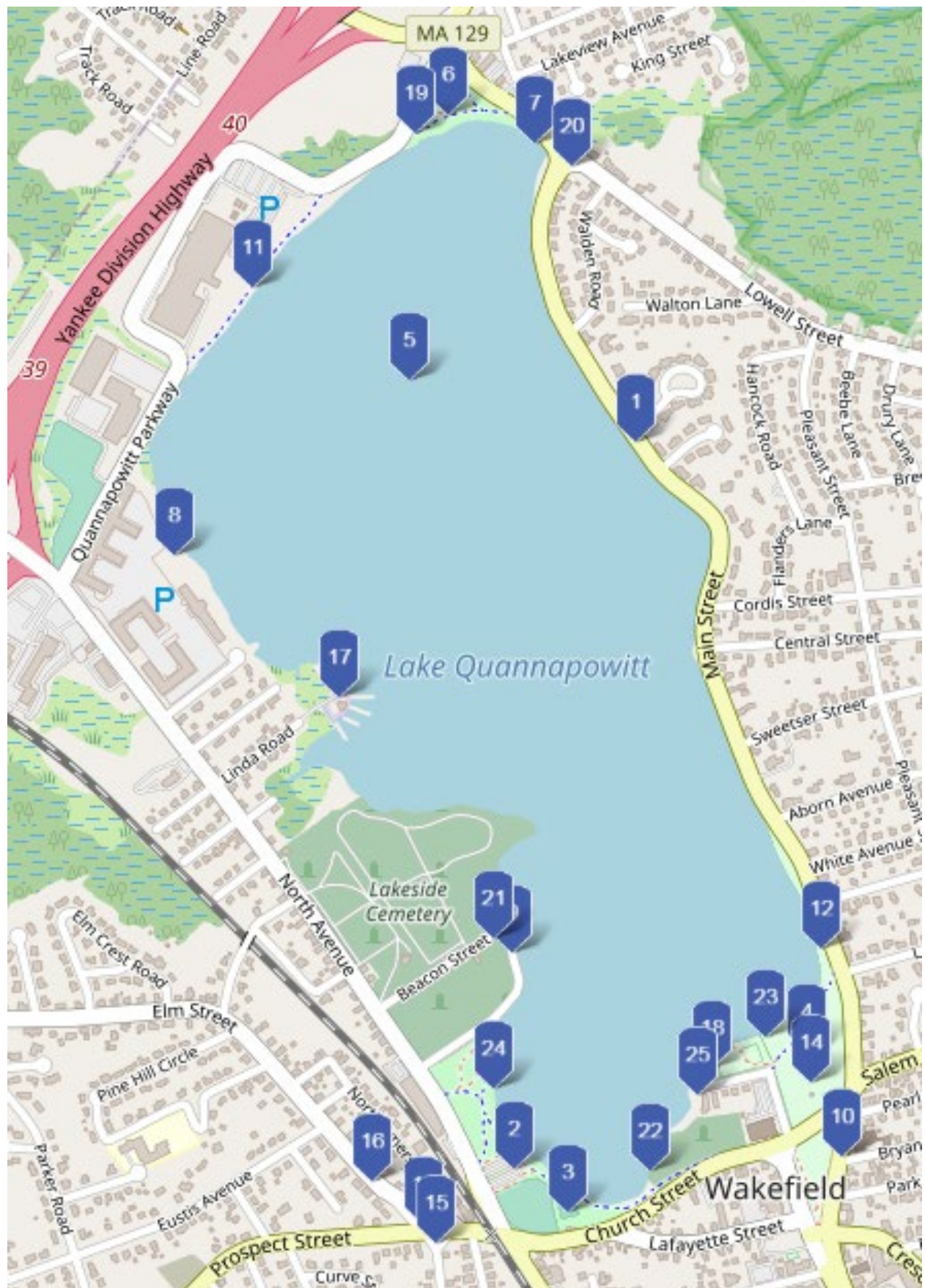
22 Removal of Invasive
Species



23 Waterfowl Signage



24 Lake Quannapowitt
interior projects





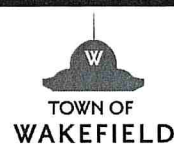
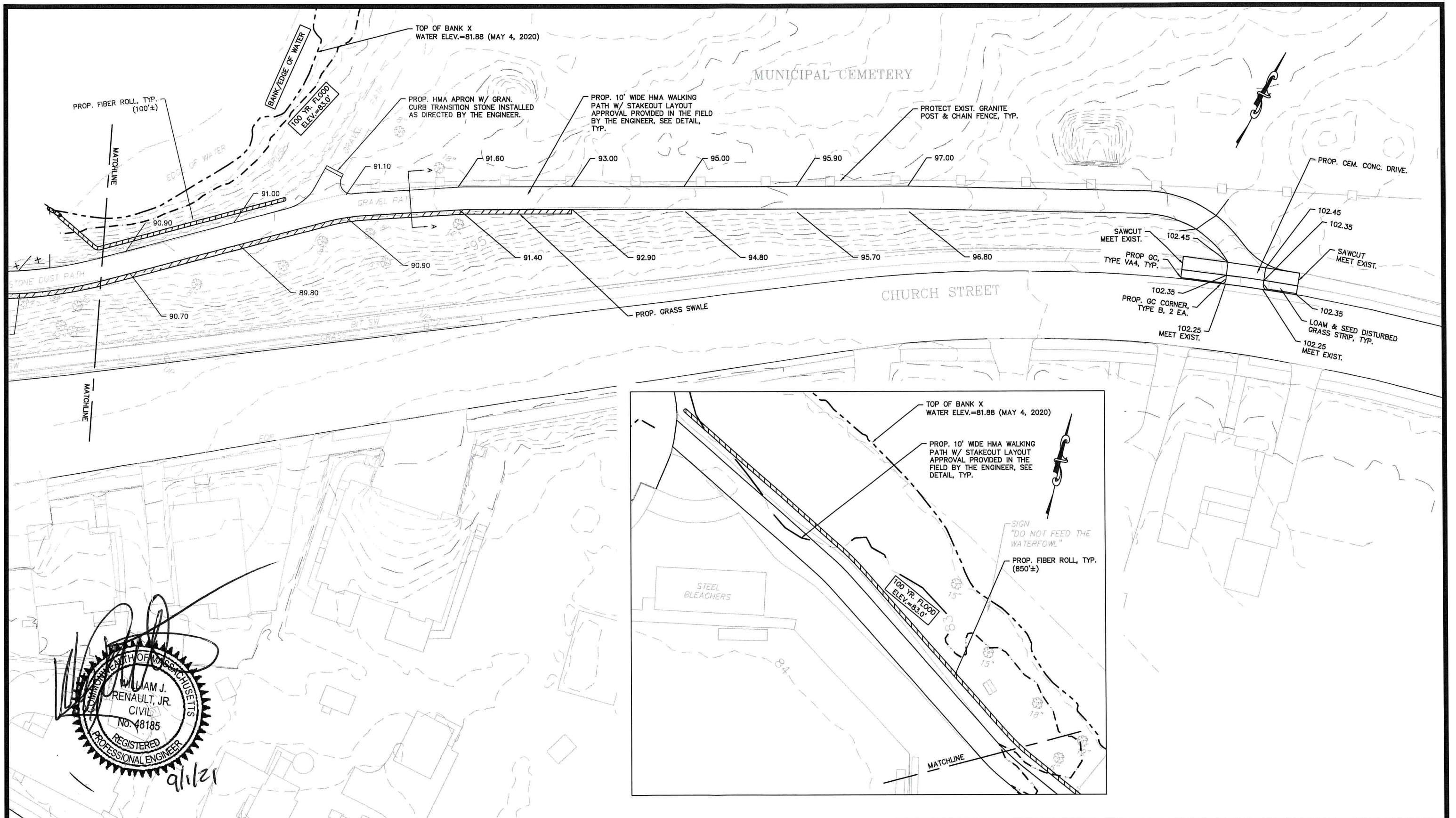
TOWN OF WAKEFIELD

DEPARTMENT OF PUBLIC WORKS

Engineering Division

Attachment 2 - Veterans Field Tennis Courts & Pathway





Public Works • Engineering Division • 1 Lafayette Street Wakefield, MA 01880

REVISIONS
7/30/21 - RELOCATED BIO RETENTION BASIN

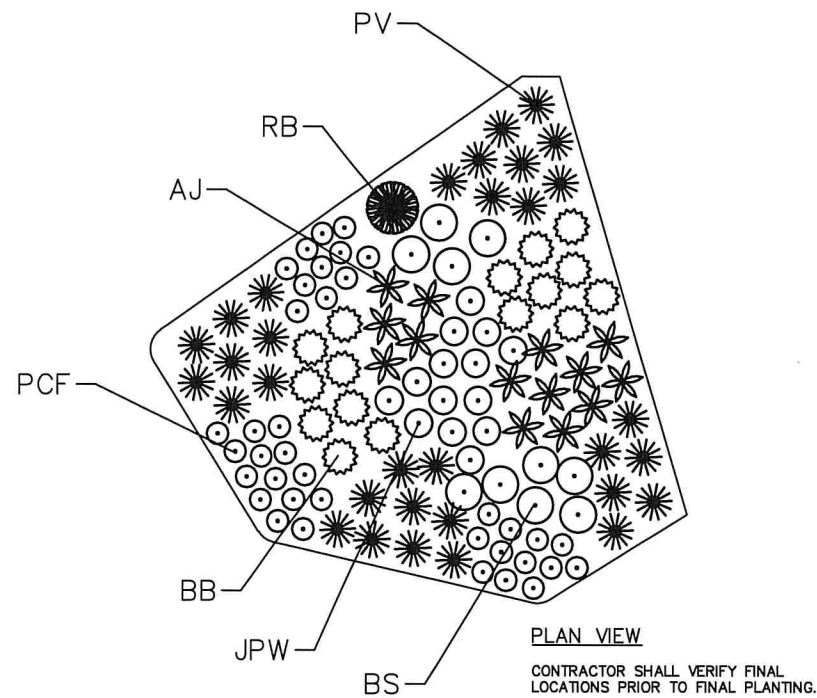
DESIGNED
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SCALE
1" = 40'

PROPOSED SITE IMPROVEMENTS
41 CHURCH STREET
VETERAN'S FIELD PARK REHABILITATION PROJECT
JULY 2021

SHEET
2021-9

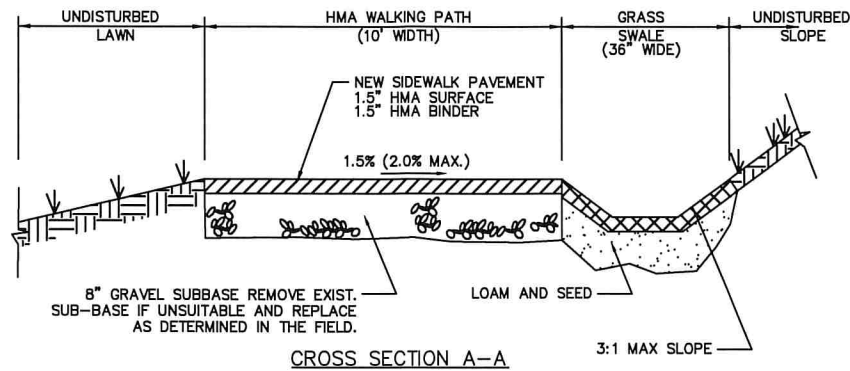
SHEET
2 OF 5

P-2

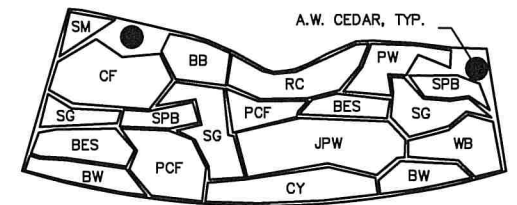


ABBREVIATION	QTY.	BOTANICAL NAME	COMMON NAME	SIZE
LANDSCAPE AREA (BIORETENTION AREA)				
BS	10	RUDBECKIA	BLACK-EYED SUSAN	9" POT
AJ	14	SEDUM	AUTUMN JOY	1 GAL
PCF	37	ECHINACHIA PURPUREA	PURPLE CONE FLOWER	9" POT
JPW	14	EUPATORIUM PURPUREUM	JOE PYE WEED	1 GALLON
PV	34	PANICUM VIRGATUM	SWITCH GRASS	3 GALLON
BB	16	MONARDA	BEE BALM	9" POT
RB	1	BETULA NIGRA	RIVER BIRCH (TREE)	2" CAL.

BIO RETENTION AREA PLANTING SCHEDULE
N.T.S.

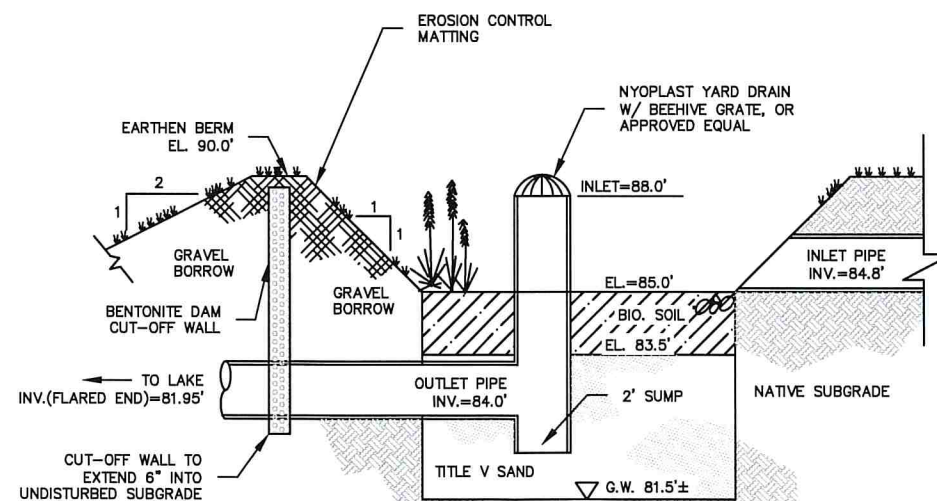


HMA WALKING PATH & SWALE
NOT TO SCALE



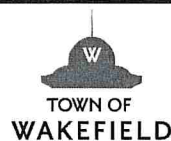
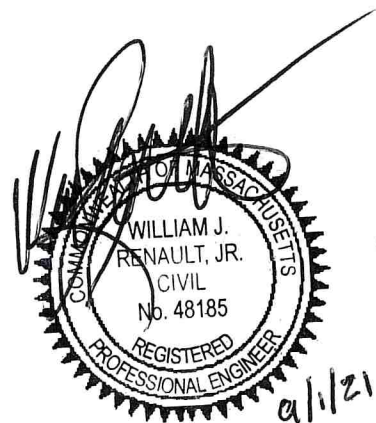
PLANTING SCHEDULE - POLLINATOR AREA					
CODE	COMMON NAME	SCIENTIFIC NAME	HEIGHT	SPACING	QUANTITY
BB	Buttonbush	<i>Cephalanthus occidentalis</i>	3'-4'	3'-4'	7
SPB	Sweet pepperbush	<i>Clethra alnifolia</i>	3'-4'	4'-6'	10
RC	Red Chokeberry	<i>Photinia pyrifolia</i>	3'-4'	4'-6'	5
OW	Pussy Willow	<i>Salix discolor</i>	3'-4'	5'-10'	3
AWC	Atlantic White Cedar	<i>Chamaecyparis thyoides</i>	4'-6'	6'-8'	2
SM	Swamp milkweed	<i>Asclepias incarnata</i>	2"	1.5'	200
JPW	Joe Pye Weed	<i>Eutrochinium fistulosum</i>	2"	1'-2'	45
CF	Cardinal Flower	<i>Lobelia cardinalis</i>	2"	1'-2'	75
CY	Common Yarrow	<i>Archillea millefolium</i>	2'-4'	1'-2'	30
PCF	Purple Coneflower	<i>Echinacea purpurea</i>	2"	1.5'-2'	100
BES	Black-eyed Susan	<i>Rudbeckia hirta</i>	2'	1.5'-2'	75
SG	Switchgrass	<i>Panicum virgatum</i>	2"	1'-1.5'	125
WB	Wild Bergamot	<i>Monarda fistulosa</i>	2"	1'-1.5'	100
WL	Wild Lupine	<i>Lupinus perennis</i>	2"	1-1.5'	25
BW	Butterfly Weed	<i>Asclepias tuberosa</i>	2"	1.5'	125

POLLINATOR AREA PLANTING SCHEDULE
N.T.S.



- BIO-RETENTION NOTES:
1. THE SOIL MIX FOR BIO-RETENTION AREAS SHOULD BE A MIX OF SAND, COMPOST AND SOIL
 - 40% SAND
 - 20% TO 30% TOPSOIL AND
 - 30% TO 40% COMPOST
 AND SHALL CONFORM TO THE SPECIFICATIONS IN THE STORMWATER HANDBOOK VOL. 2 CH.2 PAGE 26.
 2. REMOVE NATIVE SOILS TO ELEVATION 81.5 AND INSTALL WASHED SAND (TITLE V SAND).

BIORETENTION AREA & INLET CONTROL STRUCTURE
NOT TO SCALE





TOWN OF WAKEFIELD

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Attachment 3 - Lowell Street/Salem Street Intersection Realignment





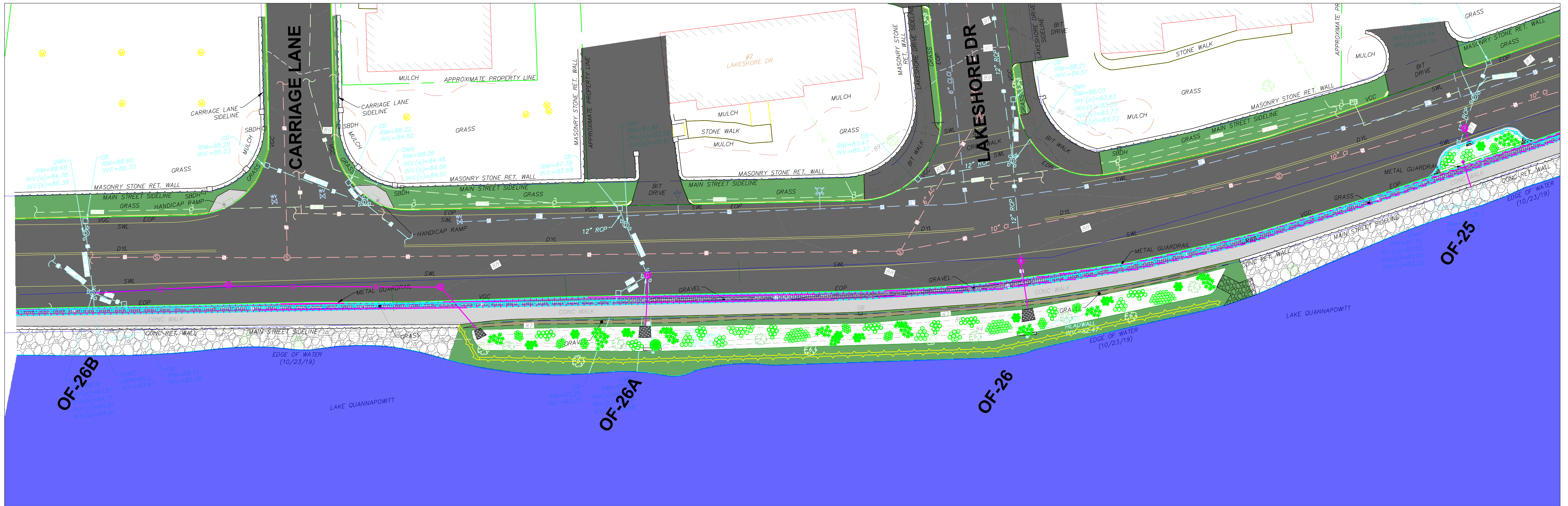
TOWN OF WAKEFIELD

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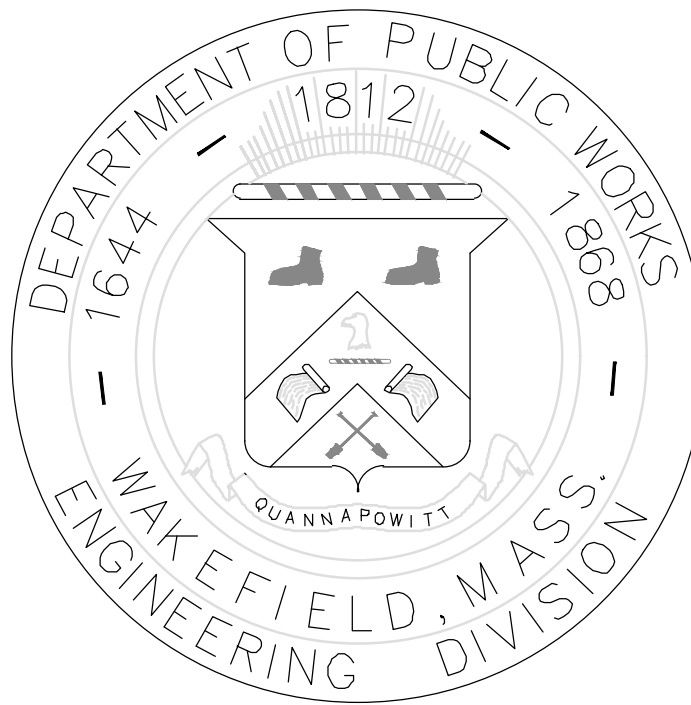
Attachment 4 - Main Street - Lake Quannapowitt Water Quality Improvement Project



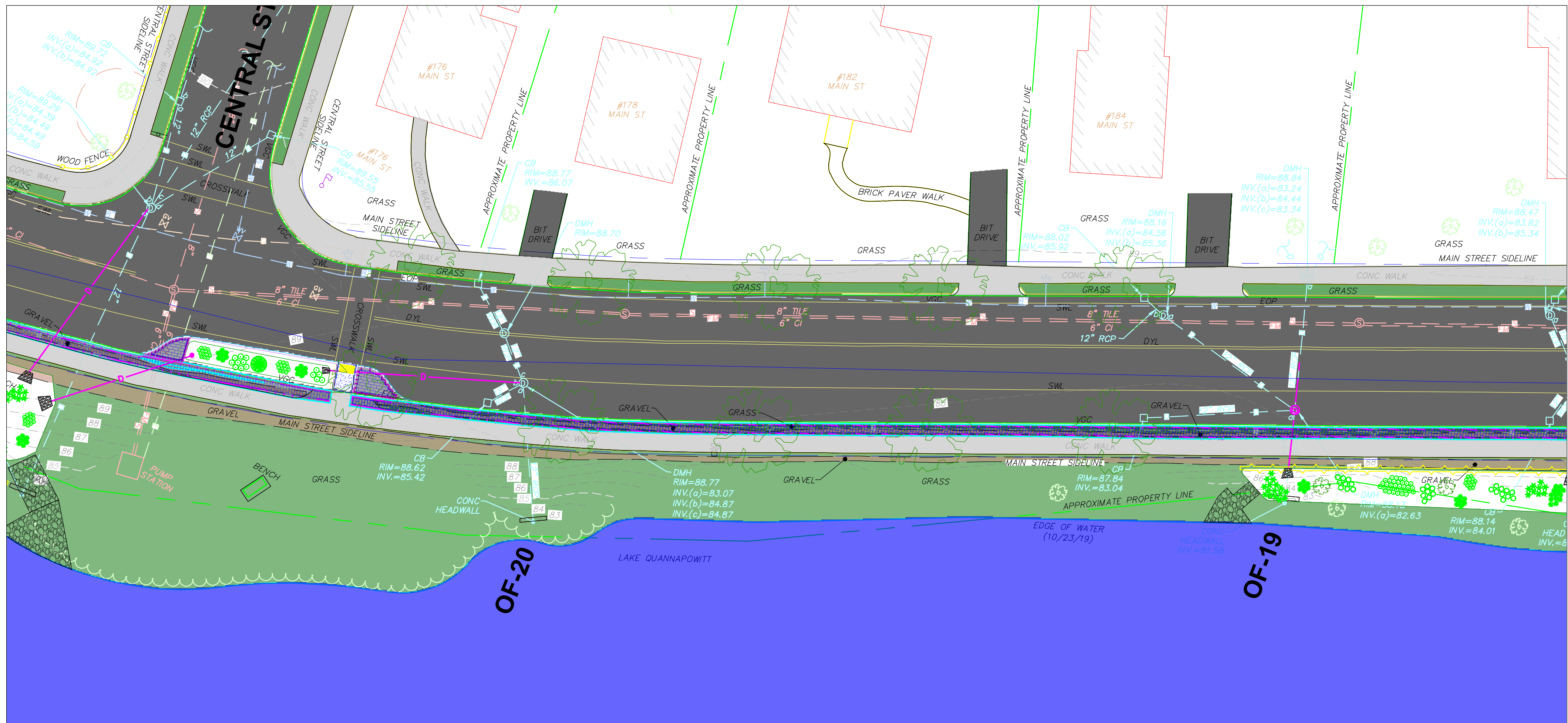
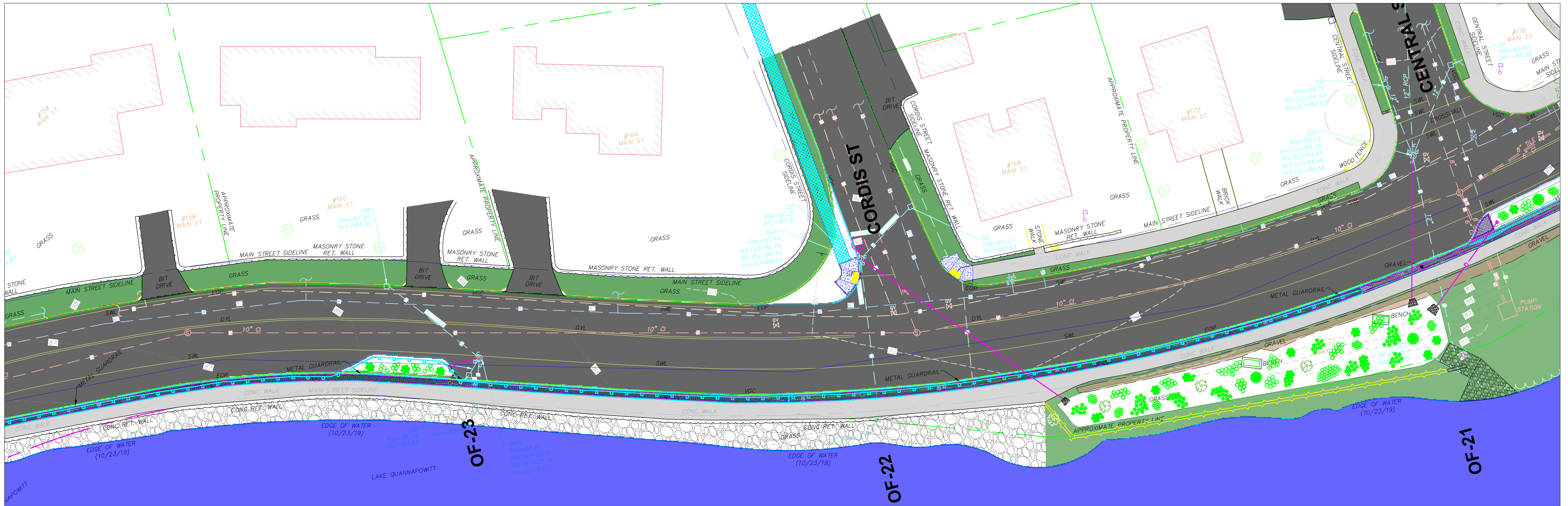


TOWN OF WAKEFIELD PUBLIC WORKS
MAIN STREET

LAKE Q IMPROVEMENTS

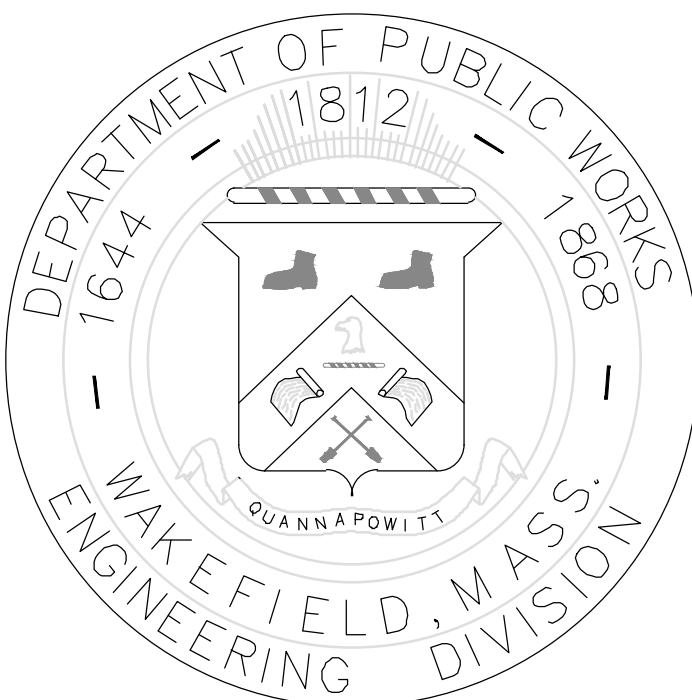


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DESIGNED BY: TWW
REVIEWED BY: WJR
APPROVED BY: WJR
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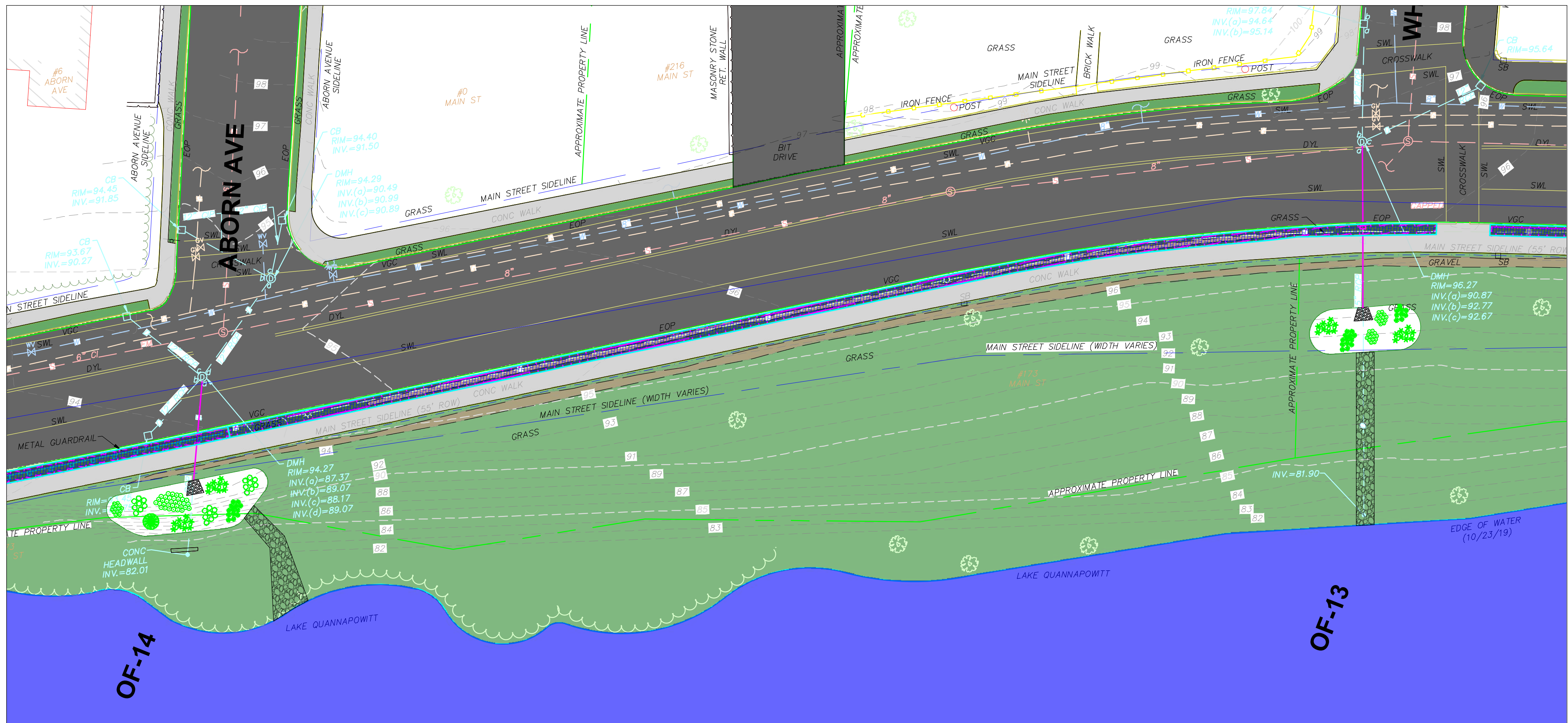
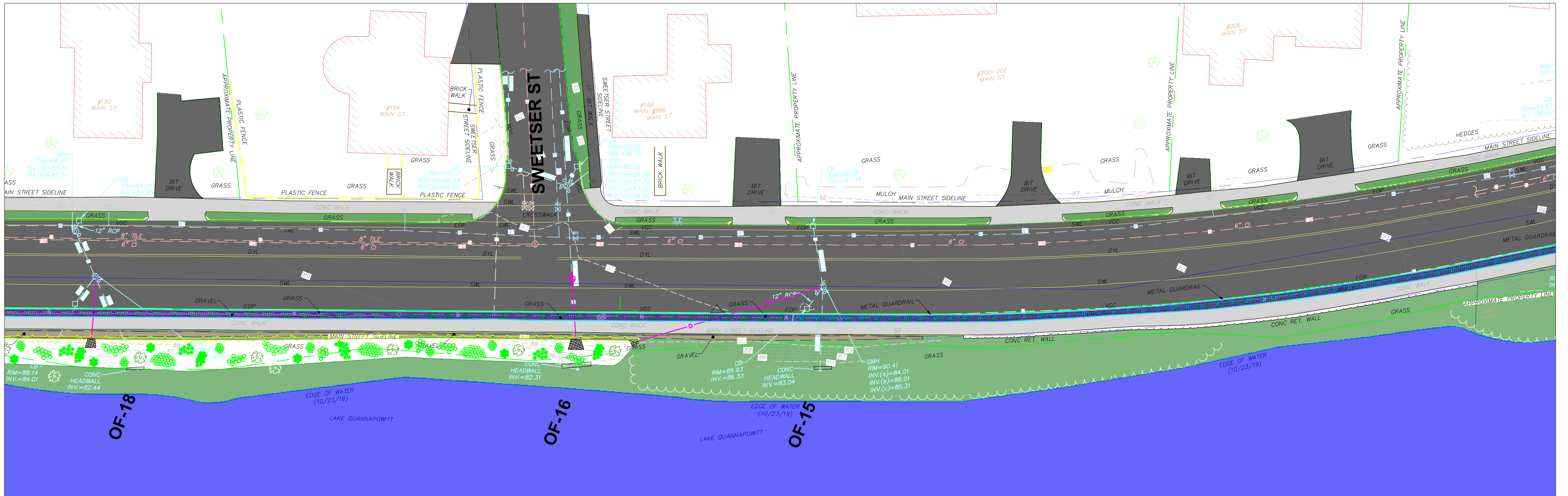


TOWN OF WAKEFIELD PUBLIC WORKS MAIN STREET

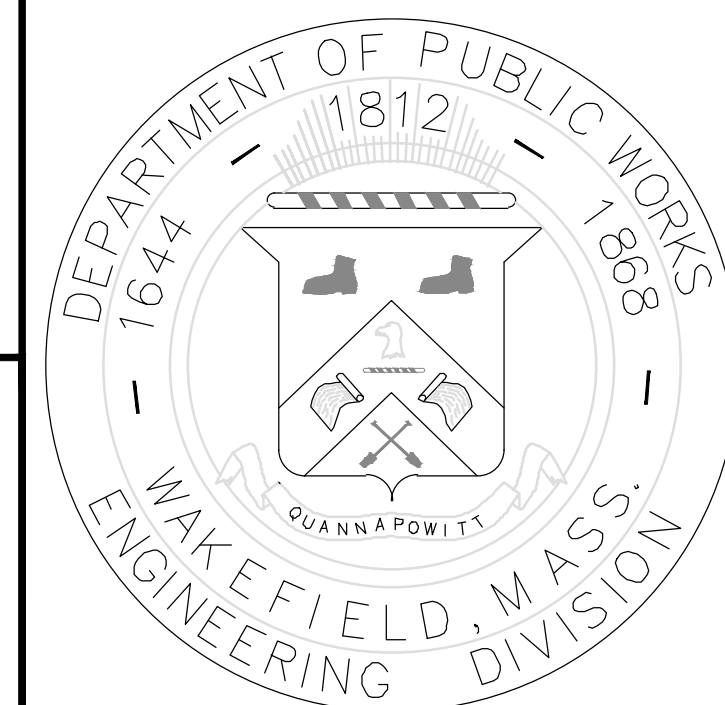
LAKE Q IMPROVEMENTS



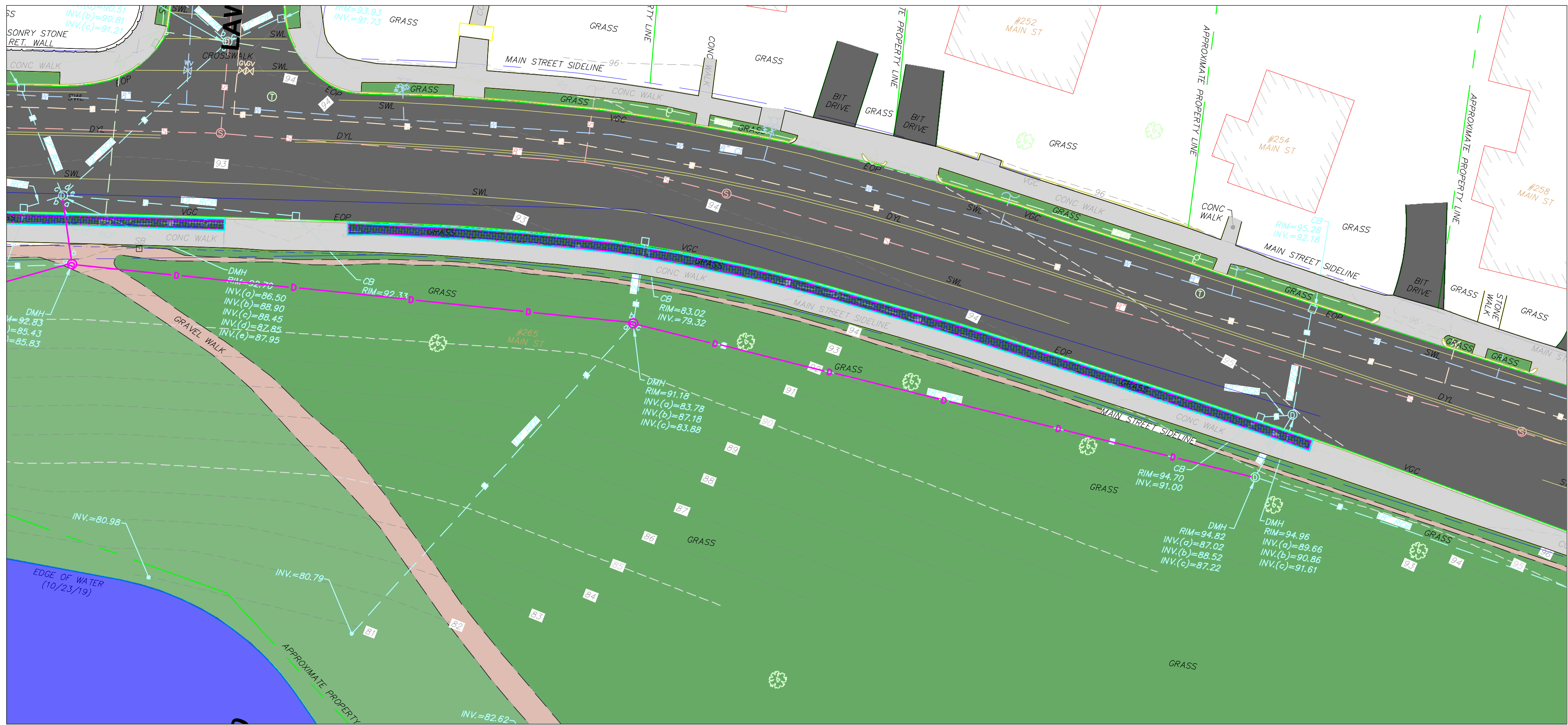
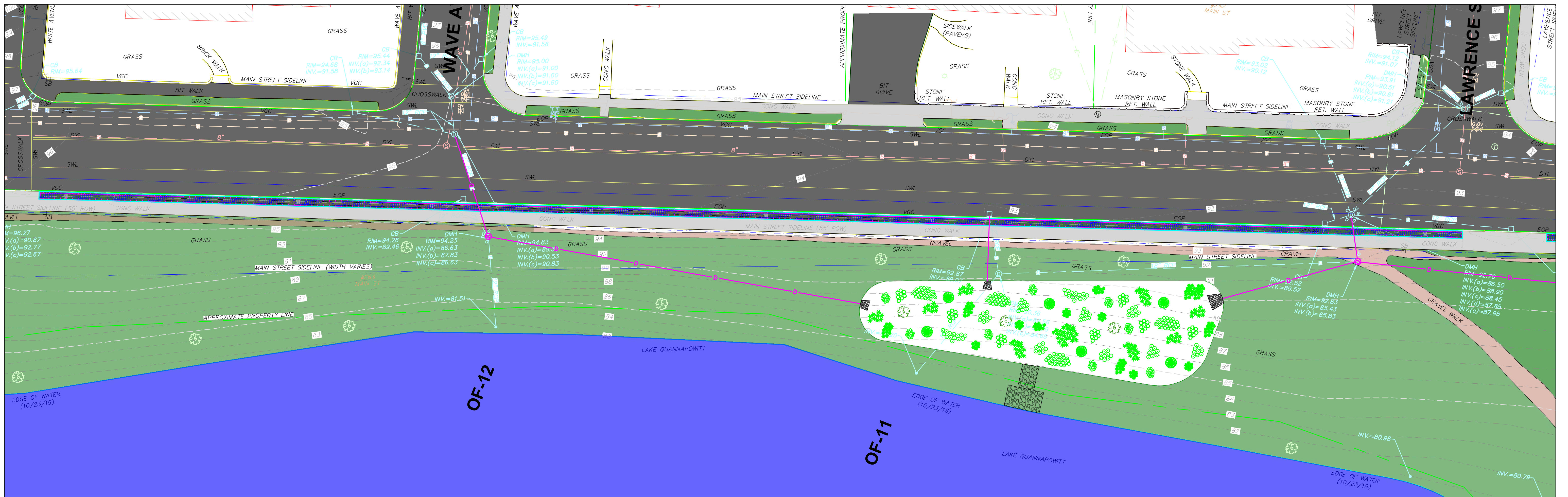
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TOWN OF WAKEFIELD PUBLIC WORKS MAIN STREET LAKE Q IMPROVEMENTS

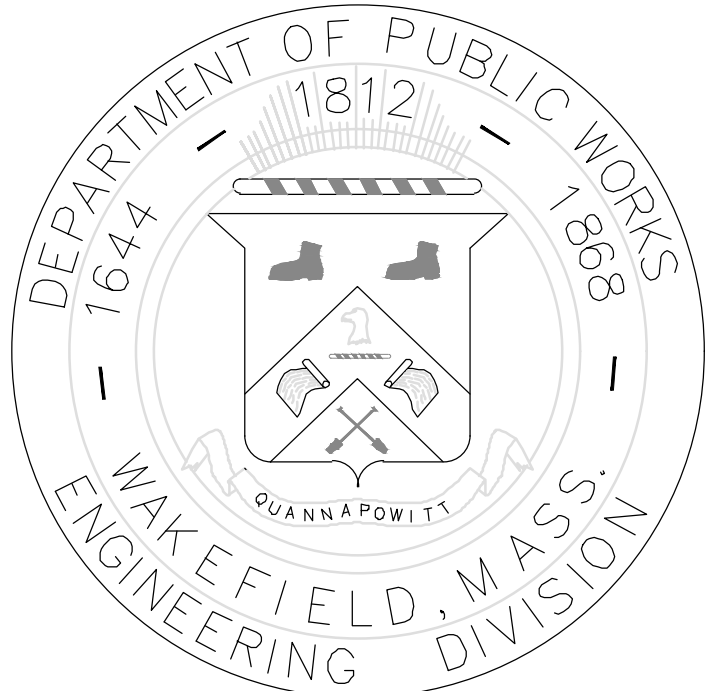


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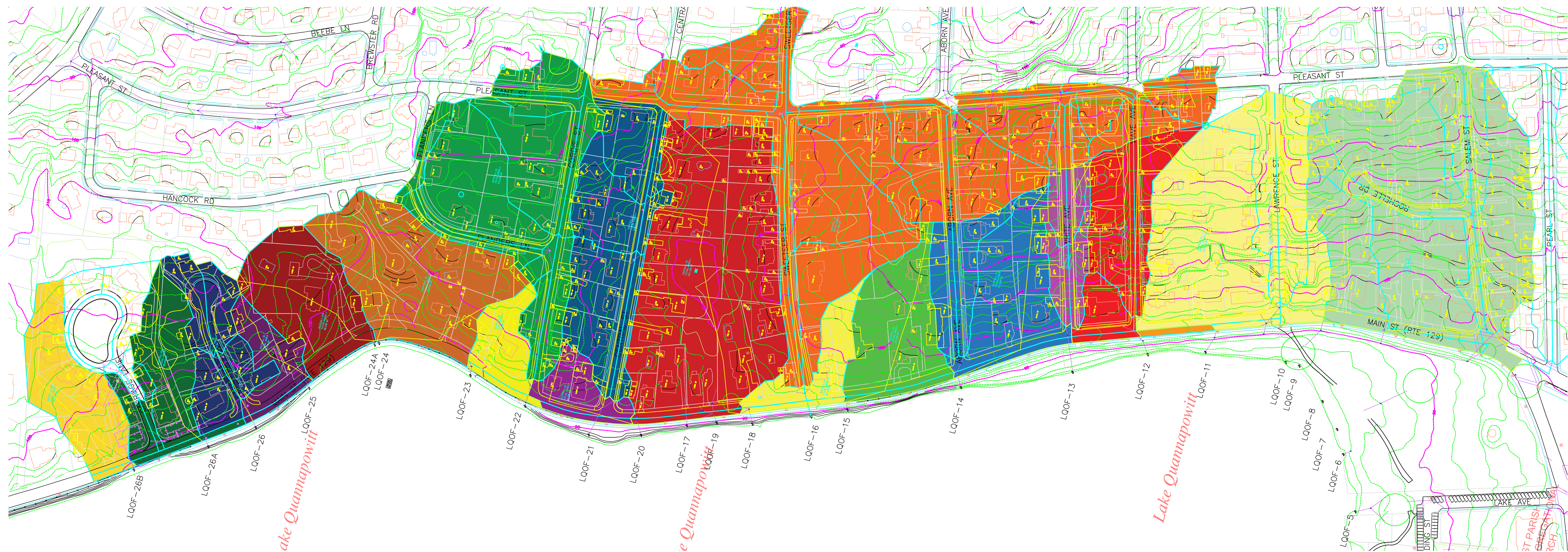
TOWN OF WAKEFIELD PUBLIC WORKS MAIN STREET

LAKE Q IMPROVEMENTS



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 REVIEWED BY: WJR
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Catchments for Outfalls 9-26B





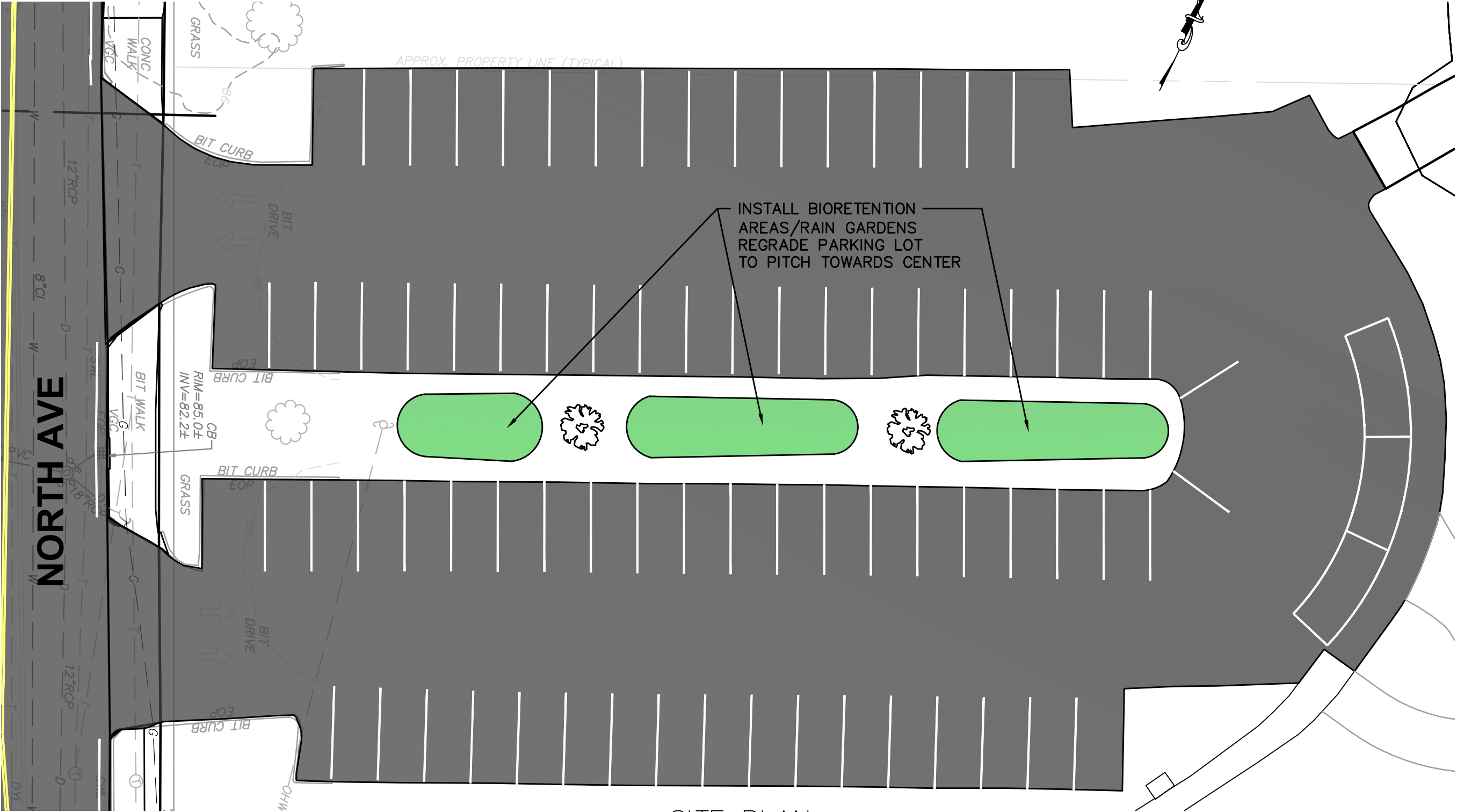
TOWN OF WAKEFIELD

DEPARTMENT OF PUBLIC WORKS

Engineering Division

Attachment 5 - Veterans Field Parking Lot





SITE PLAN

 TOWN OF WAKEFIELD Public Works • Engineering Division • Lafayette Street • Wakefield, MA 01880		REVISIONS	
VETERANS FIELD PARKING LOT IMPROVEMENTS SITE PLAN SEPTEMBER 2021		SURVEY: WBS DRAWN: TWW CHECKED: WJR	SCALE 1" = 20'
0027	CON	I SHEETS	



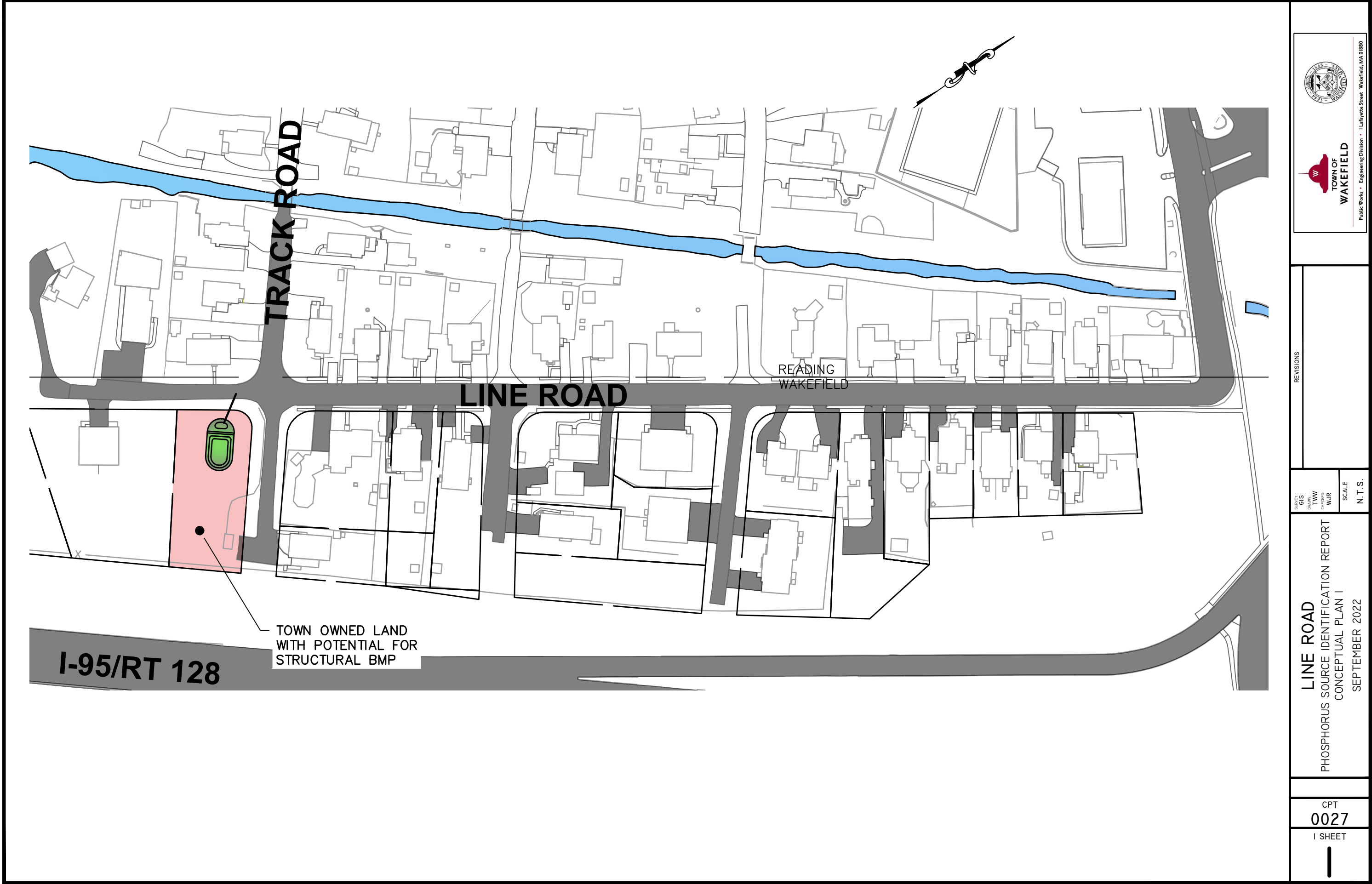
TOWN OF WAKEFIELD

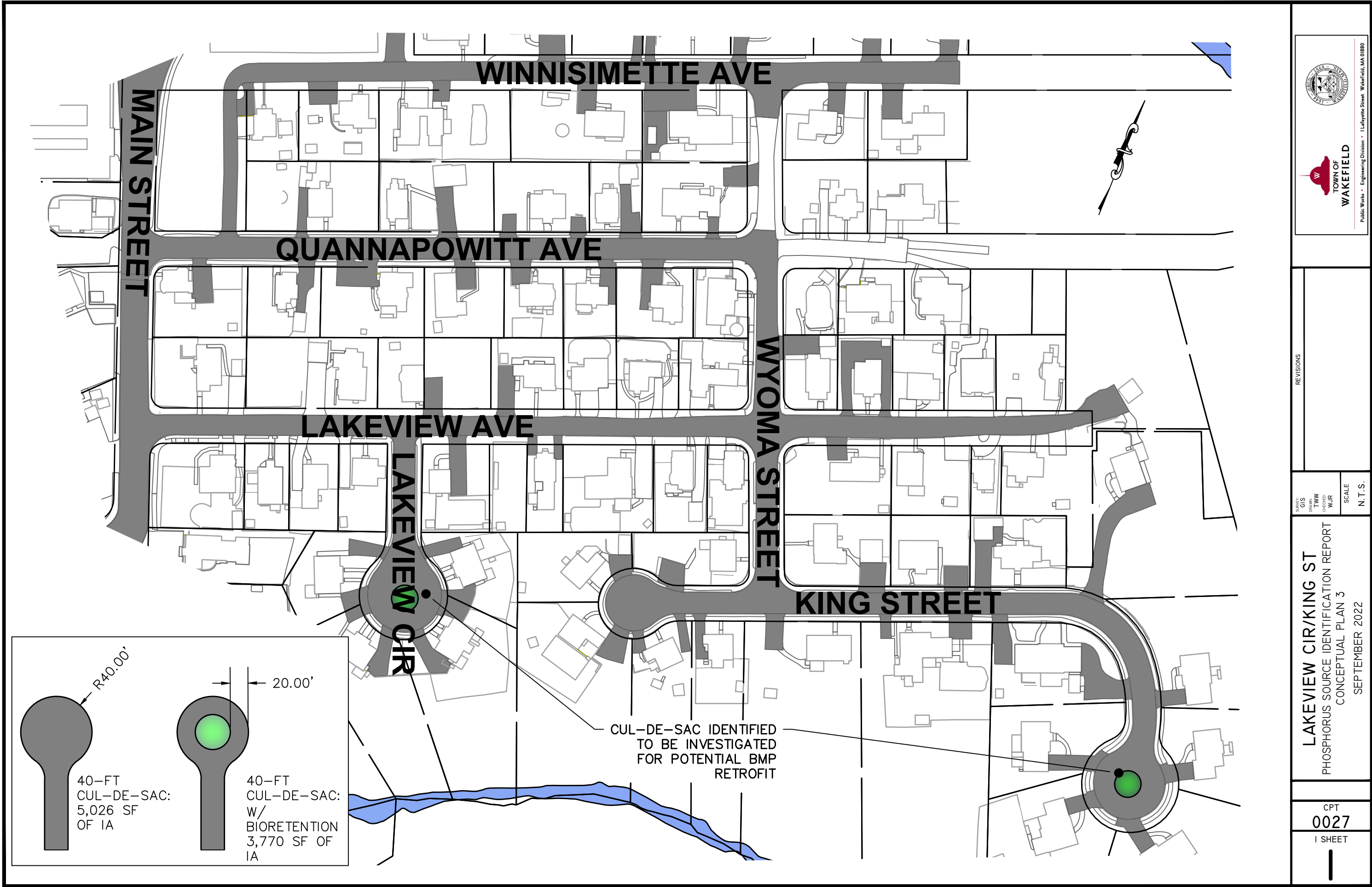
DEPARTMENT OF PUBLIC WORKS

Engineering Division

Attachment 6 - Concept Plans

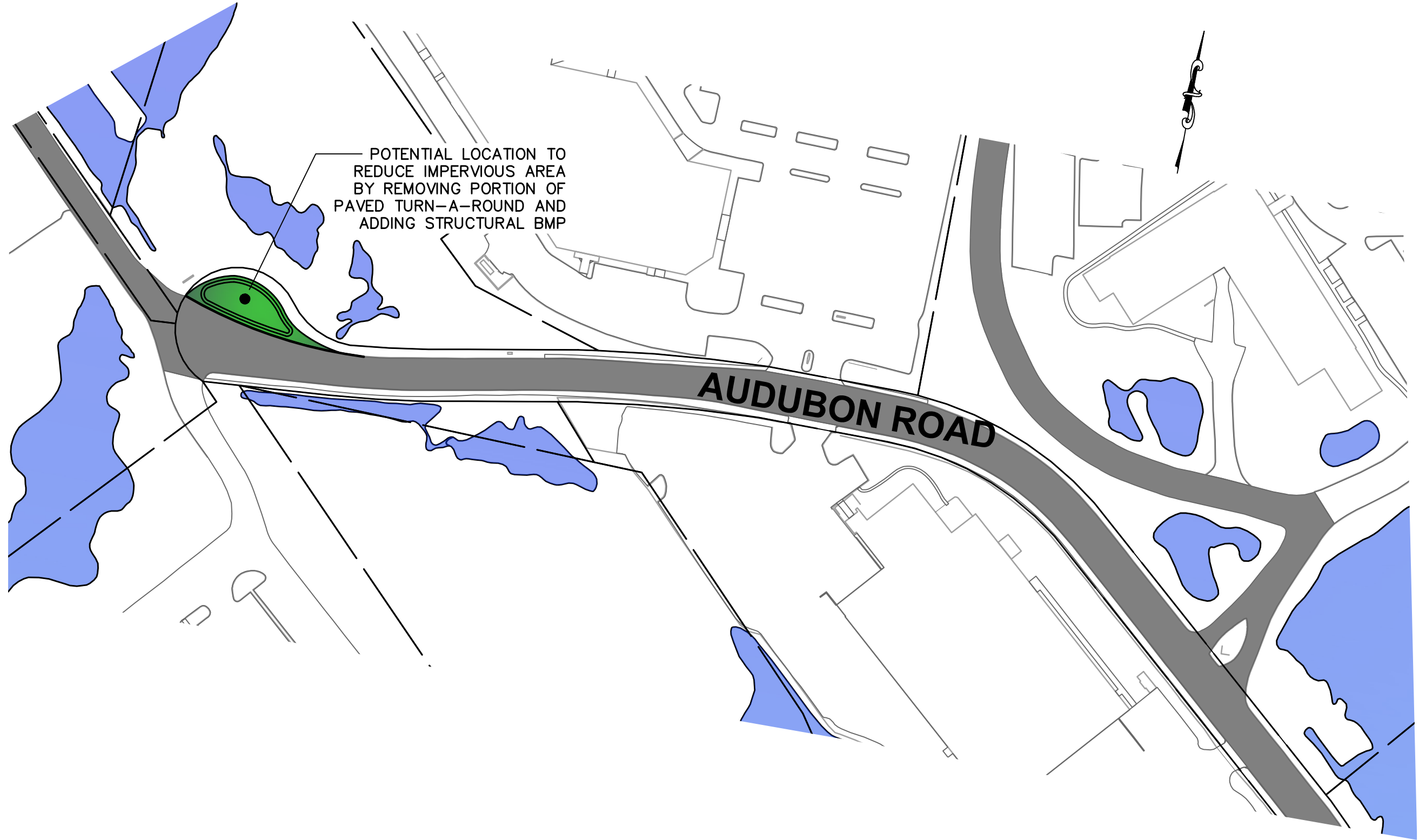








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REVISIONS	
SURVEY GIS DATE TWW CHECKED WJR	SCALE N.T.S.
INDIAN LANE PHOSPHORUS SOURCE IDENTIFICATION REPORT CONCEPTUAL PLAN 4 SEPTEMBER 2022	
CPT 0027	I SHEET



AUDUBON ROAD
PHOSPHORUS SOURCE IDENTIFICATION REPORT
CONCEPTUAL PLAN 5
SEPTEMBER 2022

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