GREEN INFRASTRUCTURE ENHANCES CSO CONTROL PROJECT AND BEAUTIFIES NEIGHBORHOOD

The City of Elyria East Avenue
Green Infrastructure Project

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The City of Elyria East Avenue Green Infrastructure Project

- Project Background
- Project Design
- Project Construction
- Lessons Learned

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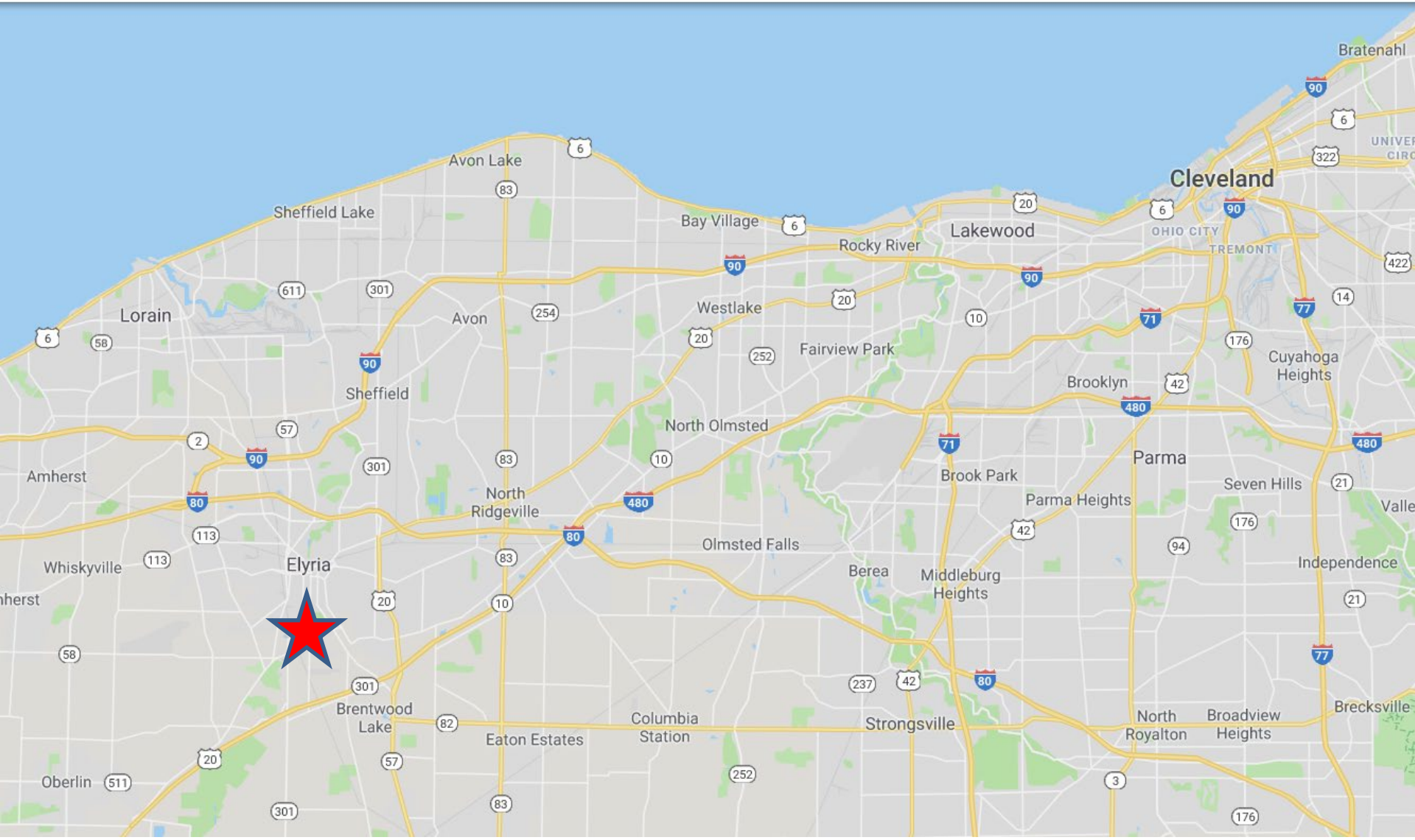
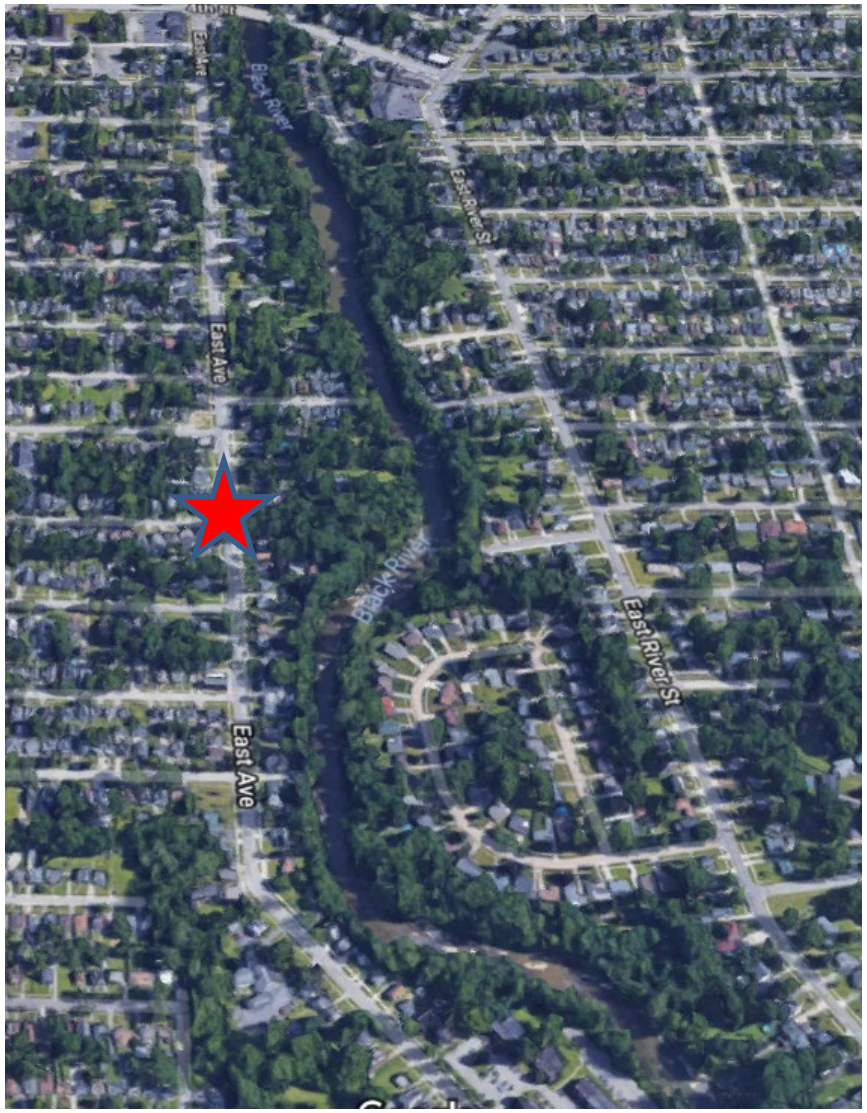
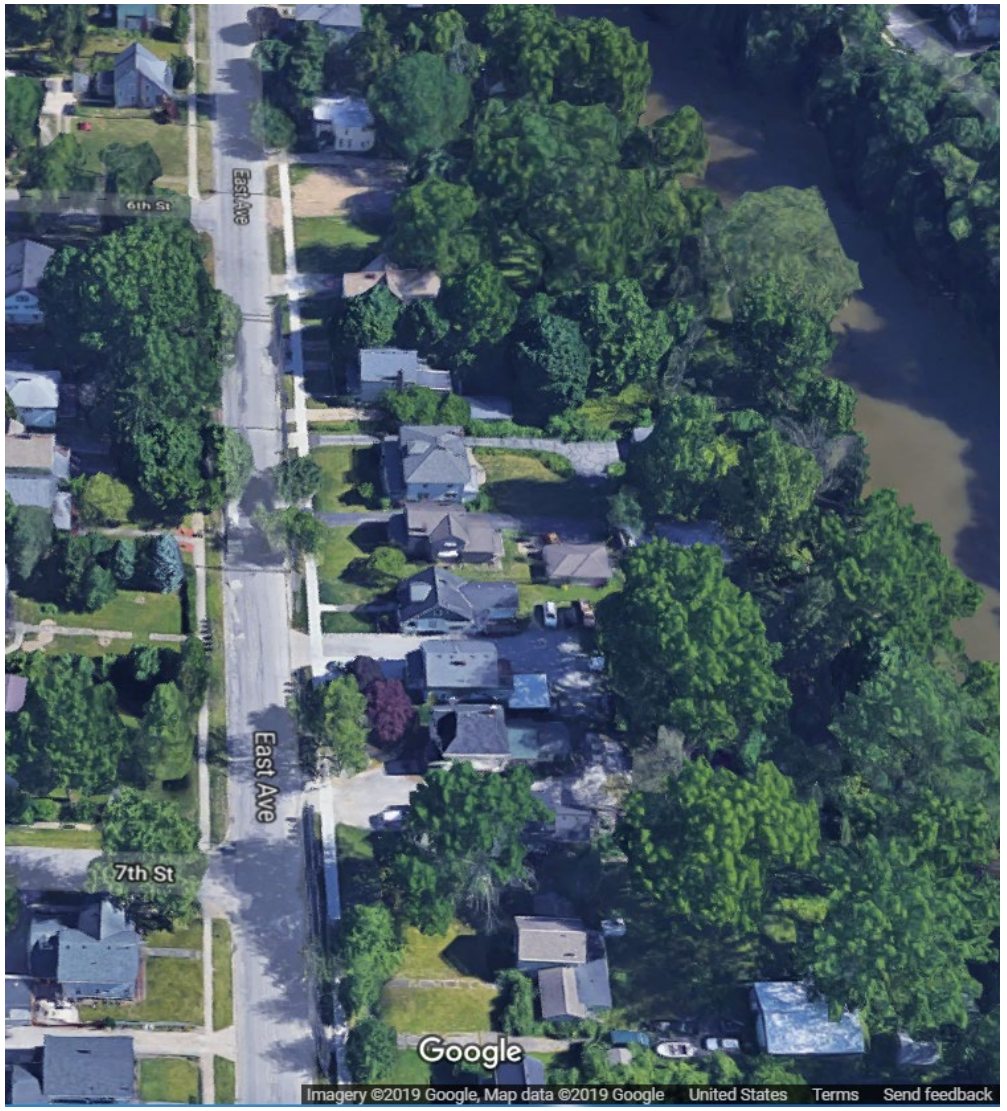


Location Plan

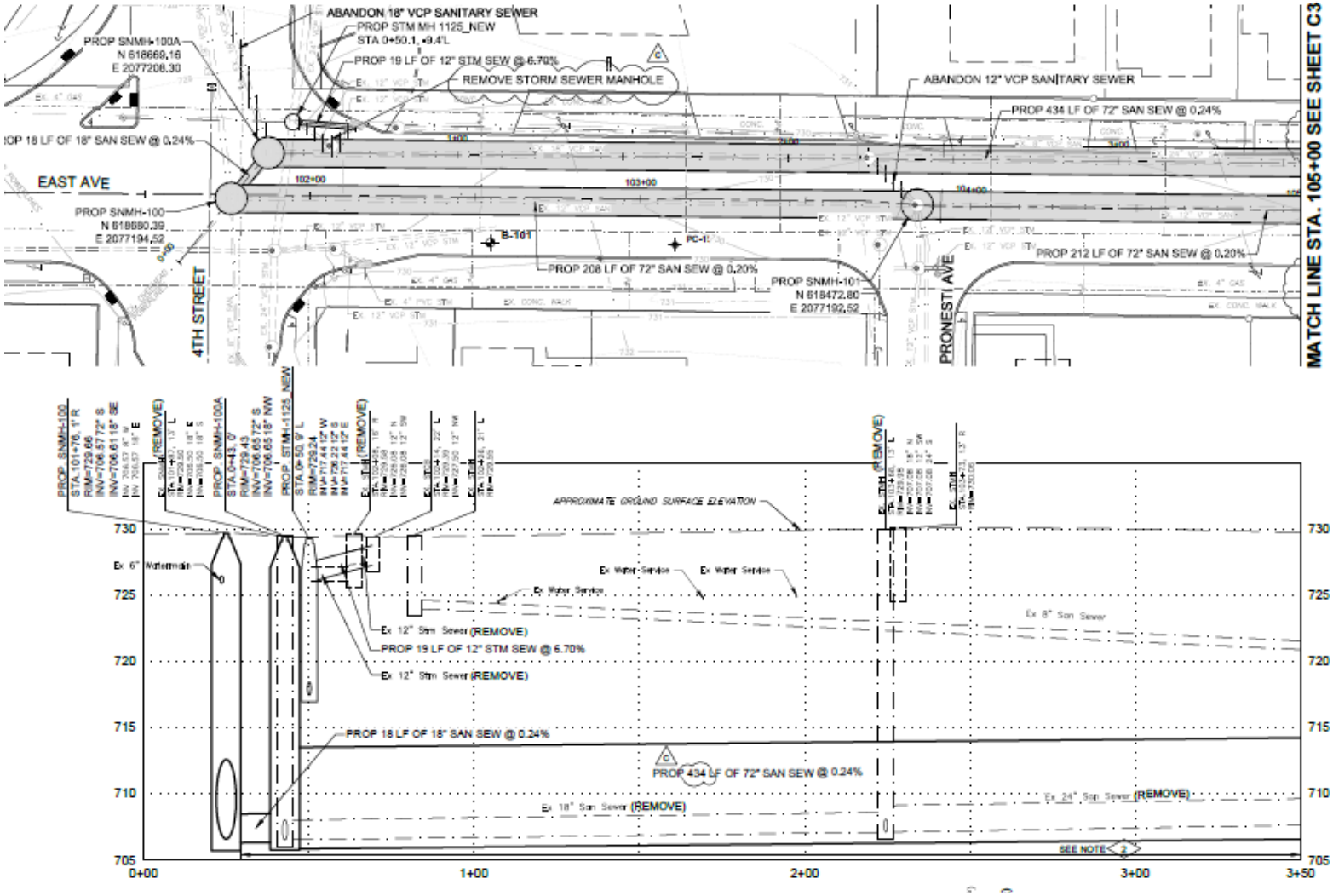




Neighborhood Birdseye View

East Avenue Relief Sewer Project

- CSO Control Project
- Dual 72 inch dia Sewer Provides In-Line Storage
- Project Expedited in Schedule due to Roadway Grant

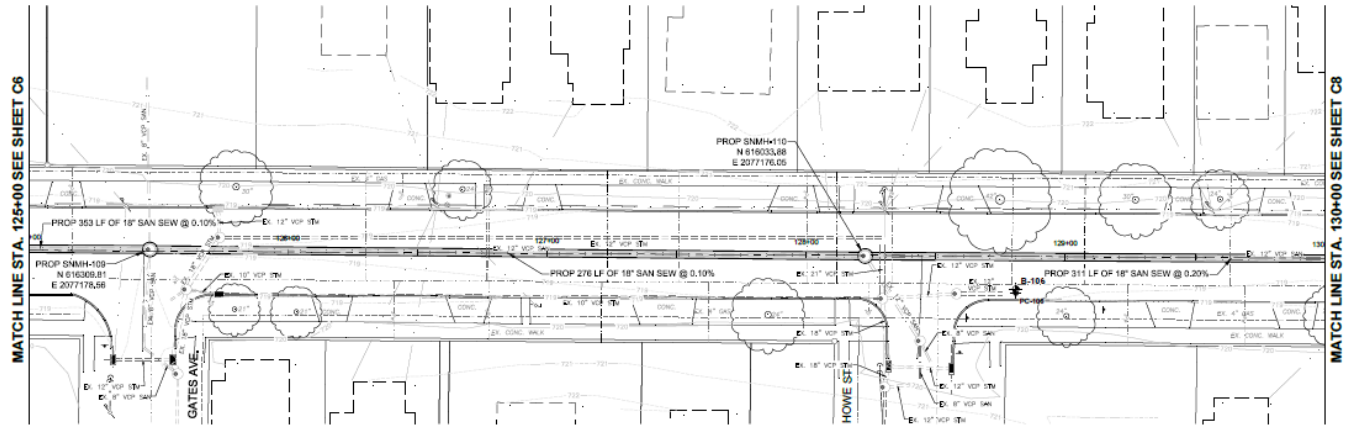


CSO Sewer Plan

In-Line Storage at Downstream End

CSO Sewer Plan

In-Line Storage at Downstream End



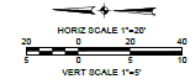
B:

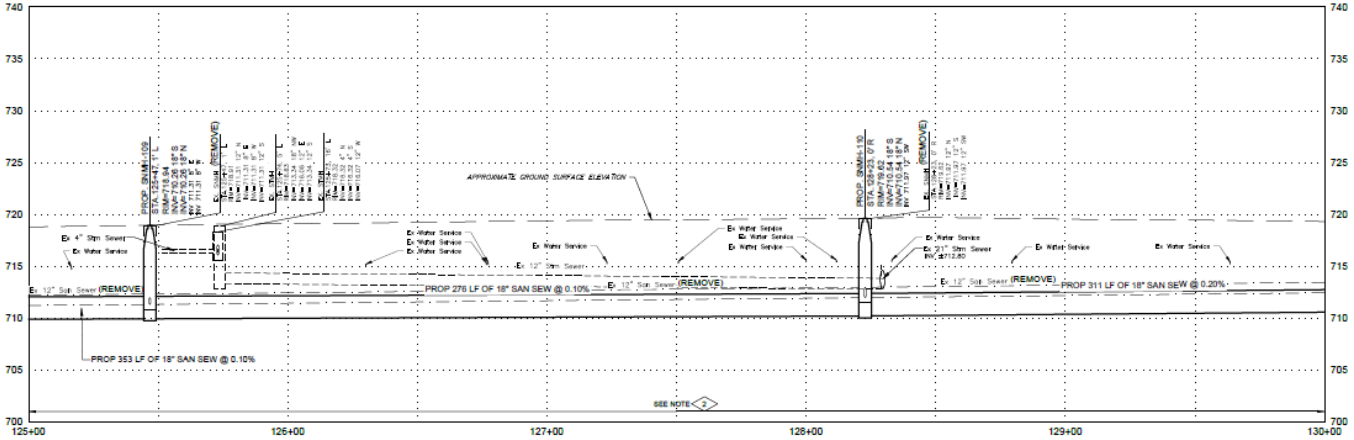
COORDINATES ARE GIVEN FOR THE CENTER OF THE STRUCTURE.

COMPACTED GRANULAR LIMESTONE BACKFILL PER ODOT CMS ITEM 304 AND TRENCH UNDER PAVEMENT DETAIL ON SHEET CD3.

NOTE THAT THE PROFILE SHOWS ONLY THOSE UNDERGROUND UTILITIES IMMEDIATE TO THE PROPOSED SEWER. THE CONTRACTOR IS RESPONSIBLE TO LOCATE ALL UTILITIES AND SERVICES PRIOR TO CONSTRUCTION WHETHER SHOWN IN PROFILE OR NOT. UTILITIES OR SERVICES DAMAGED OR DISTURBED DURING CONSTRUCTION SHALL BE REPLACED IN KIND. COST TO BE INCLUDED IN THE LINEAR FOOT PRICE FOR SEWER INSTALLATION.

ALL SANITARY LATERALS TO BE CONNECTED TO NEW SEWER.



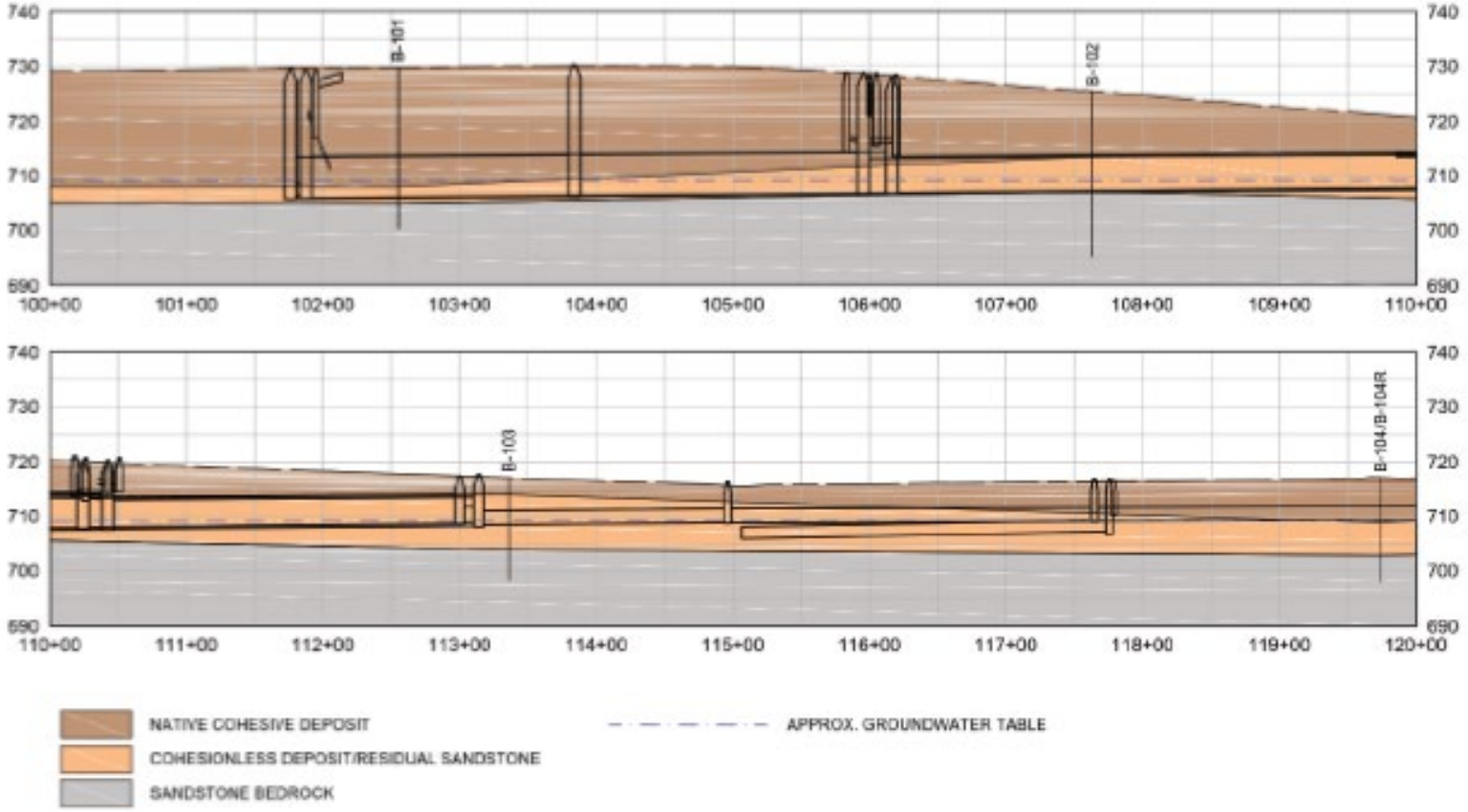


CONFORMED TO ADDENDA

CSO Sewer Plan

Sewer Replacement at Upstream End

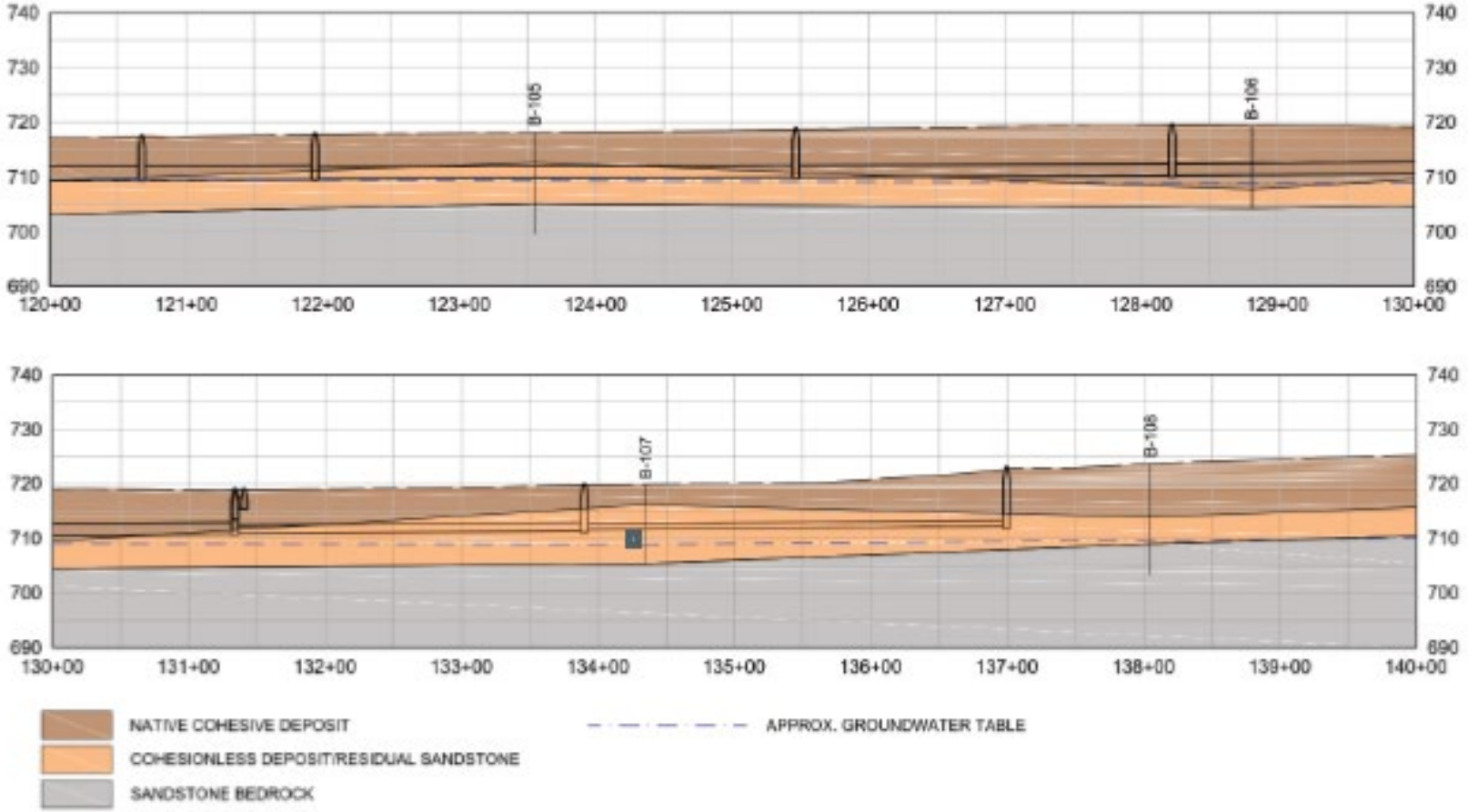
Figure 4-1: Generalized Subsurface Profile
(Sta. 100+00 to 120+00)



Soil Boring Profile

x

Figure 4-2: Generalized Subsurface Profile
(Sta. 120+00 to 140+00)



Soil Boring Profile

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Site Analysis Summary

- 4000 LF Street Corridor
- One side parking lane
- Residential Neighborhood, Lots of Driveways
- Sand Layer at 5’ depth, 5’ thick

GI Design Summary

- Maximize Stormwater Capture, Infiltration, and Runoff Reduction
- Utilize Parking Lane
- Bioretention Bumpouts, sited to avoid driveway conflicts, minimize parking reduction, maximize runoff capture.
- Take advantage of sandy subsoils

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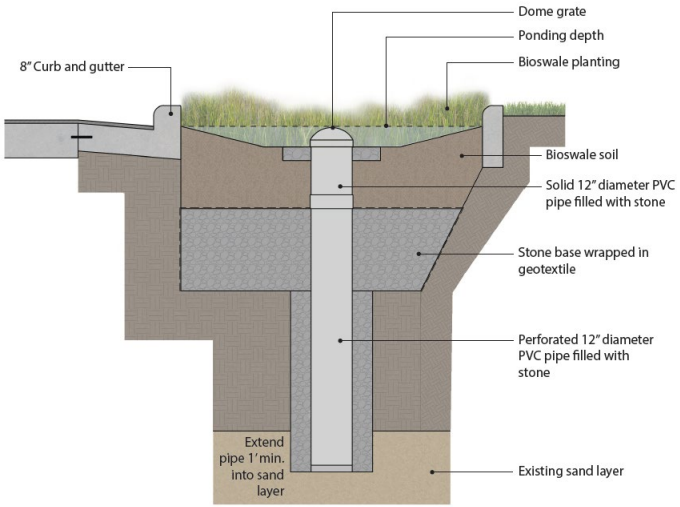
GI Design Details

Typical Bioswale Bumpout



Typical Vertical Drain Detail to Connect to Sand Layer

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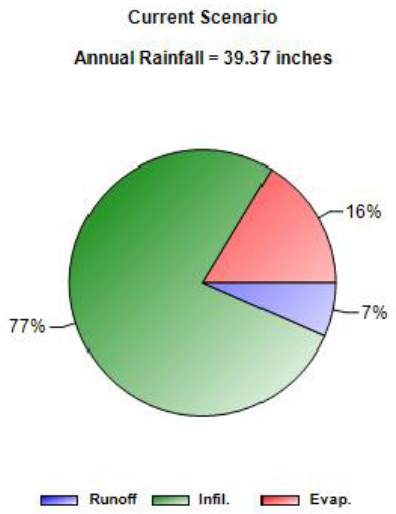
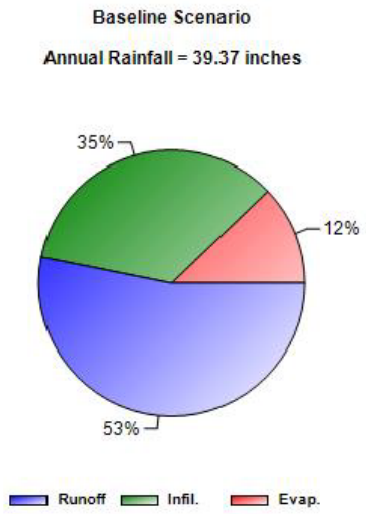
Stormwater Calculations Summary

Statistic	Current Scenario	Baseline Scenario
Average Annual Rainfall (inches)	39.37	39.37
Average Annual Runoff (inches)	2.59	20.99
Days per Year With Rainfall	87.39	87.39
Days per Year with Runoff	2.60	55.06
Percent of Wet Days Retained	97.03	36.99
Smallest Rainfall w/ Runoff (inches)	0.91	0.10
Largest Rainfall w/o Runoff (inches)	1.65	0.28
Max. Rainfall Retained (inches)	3.28	2.02





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Green Infrastructure Runoff Reduction Estimate

- 4400 LF ROW, capture area is one half ROW
- Capture Area = 3.3 ac
- Runoff Reduction estimated at 1.65 MG/year (avg . annual).
- Using USEPA Stormwater Calculator , Average Annual Reduction
- Stormwater trees may add 0.2 MG/year

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Stormwater Reduction Benefits of Street Trees

- Over 120 stormwater trees planted
- Stormwater Literature on urban trees and gallons reduction is variable
- A US Forest Service Fact sheet cites that a medium sized tree can intercept 2380 gallons per year at maturity,
- Say 1100 gallons per year at mid point of growth,
- Cost per tree is typically $500
- **Cost/Gallon Reduction is $0.45; an economical GI measure**
- **120 trees equals the potential for over 200,000 Gal/year runoff reduction**.

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GI Construction

Vertical Drain Construction

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GI Construction

Vertical Drain Construction

Subgrade Construction

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GI Construction

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Construction Completion

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Green Infrastructure Co Benefits

- Neighborhood Beautification
- Traffic Calming
- Parking Protection
- Air Quality Enhancement
- Tree Canopy Increase
- Reduction of Urban Heat Island

Before and After

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Before and After

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LESSONS LEARNED

- Pubic Outreach
- Signage
- Resident Perception, “Aqua swales”
- Winter Operations
- Streets with Parking Lanes are an ideal GI location for multiple reasons
- Availability of sandy soils presented large cost savings vs. installation of reservoir stone.

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Lessons Learned

Winter Impacts

Markers and Plowing

New Regulations

Recently Passed HR 7279, Water Infrastructure Improvement Act

- Encourages communities to use integrated planning. Encourages green Infrastructure options.
- Allows local gov't to incorporate integrated plan into NPDES permits rather than a federal consent decree.
- Allows more flexibility in how local funds are spent.

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Any Questions ?

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