

A Creative Solution for Green Infrastructure Implementation in an Urban Area

NEWEA 2023 Annual Conference

Tuesday, January 24, 2023

Boston, MA

Presenters: Emma Page, EIT, Boston Water and Sewer Commission

Kelsey Kern, EIT, Nitsch Engineering

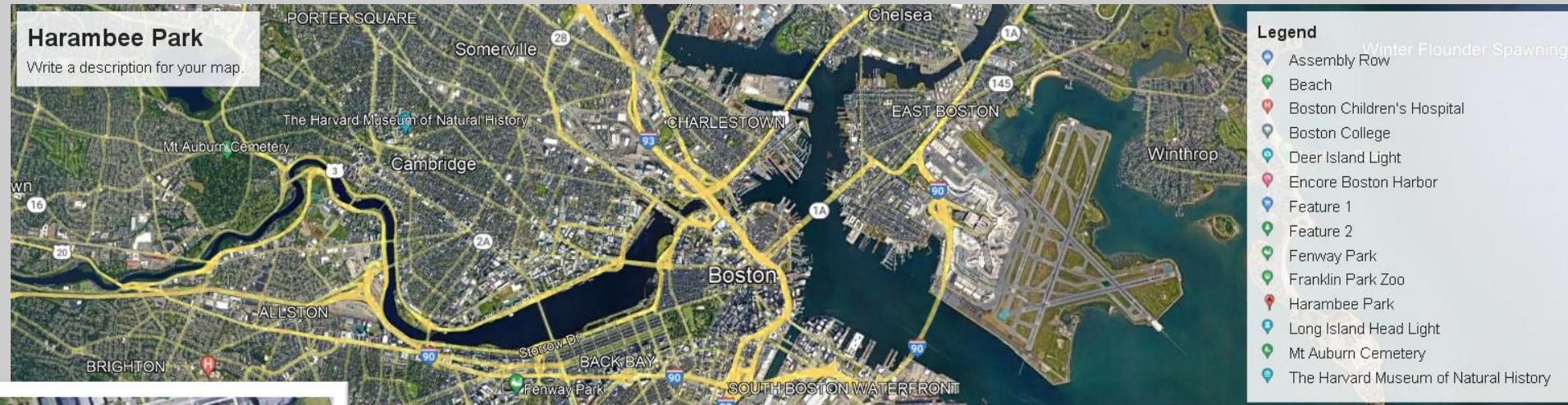


Overview

- **Introductions**
- **Project Background & History**
- **Project Goals**
- **Feasibility Study & Alternatives**
- **Vault Design & Implementation**
- **Partnerships & Grant Award**
- **Next Steps - Construction in 2023**



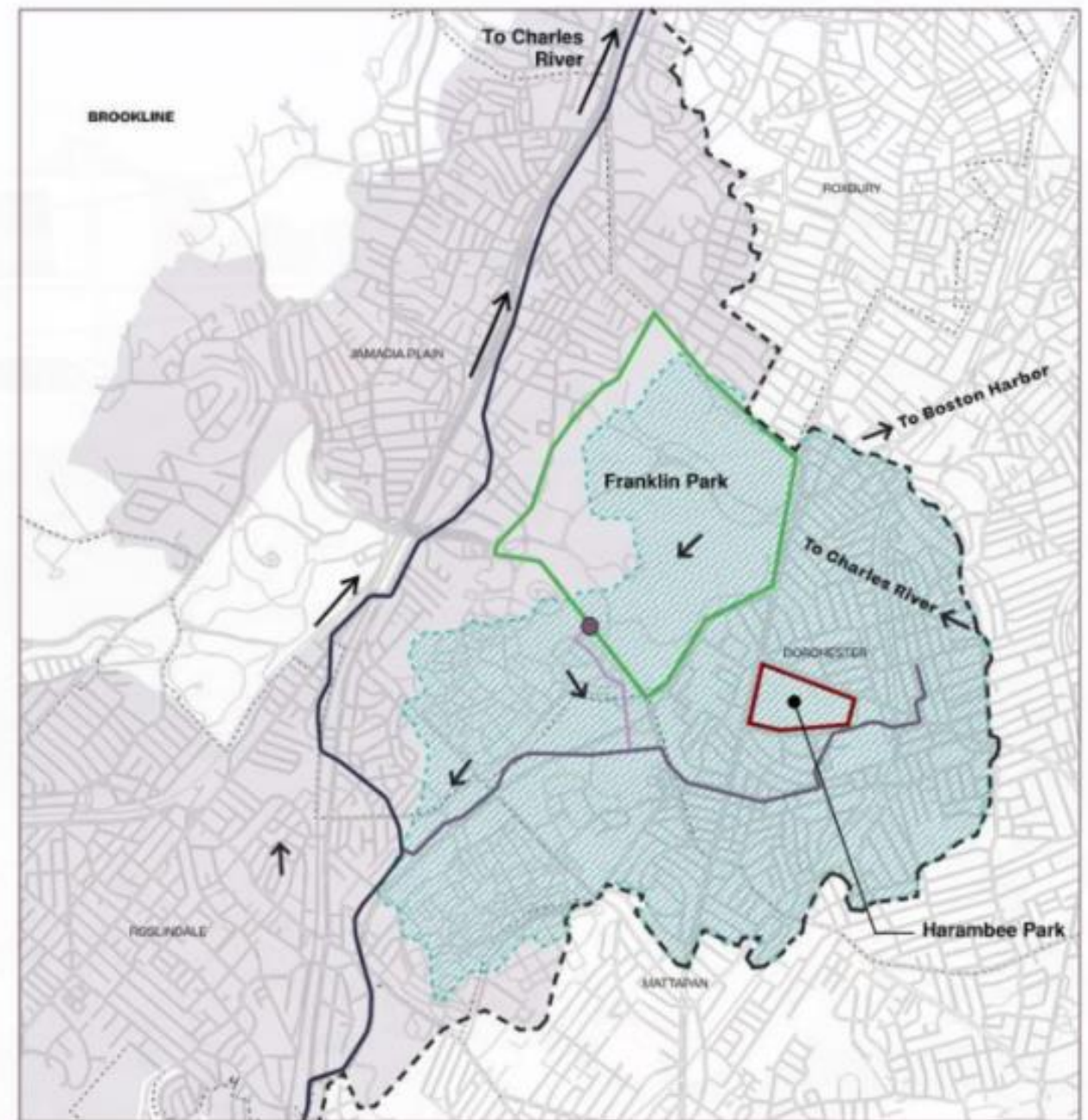
Project Background & History



Project Background & History

Watershed Context

- Canterbury Brook to Stony Brook to Charles River
- BWSC Consent Decree (goals for Charles River)



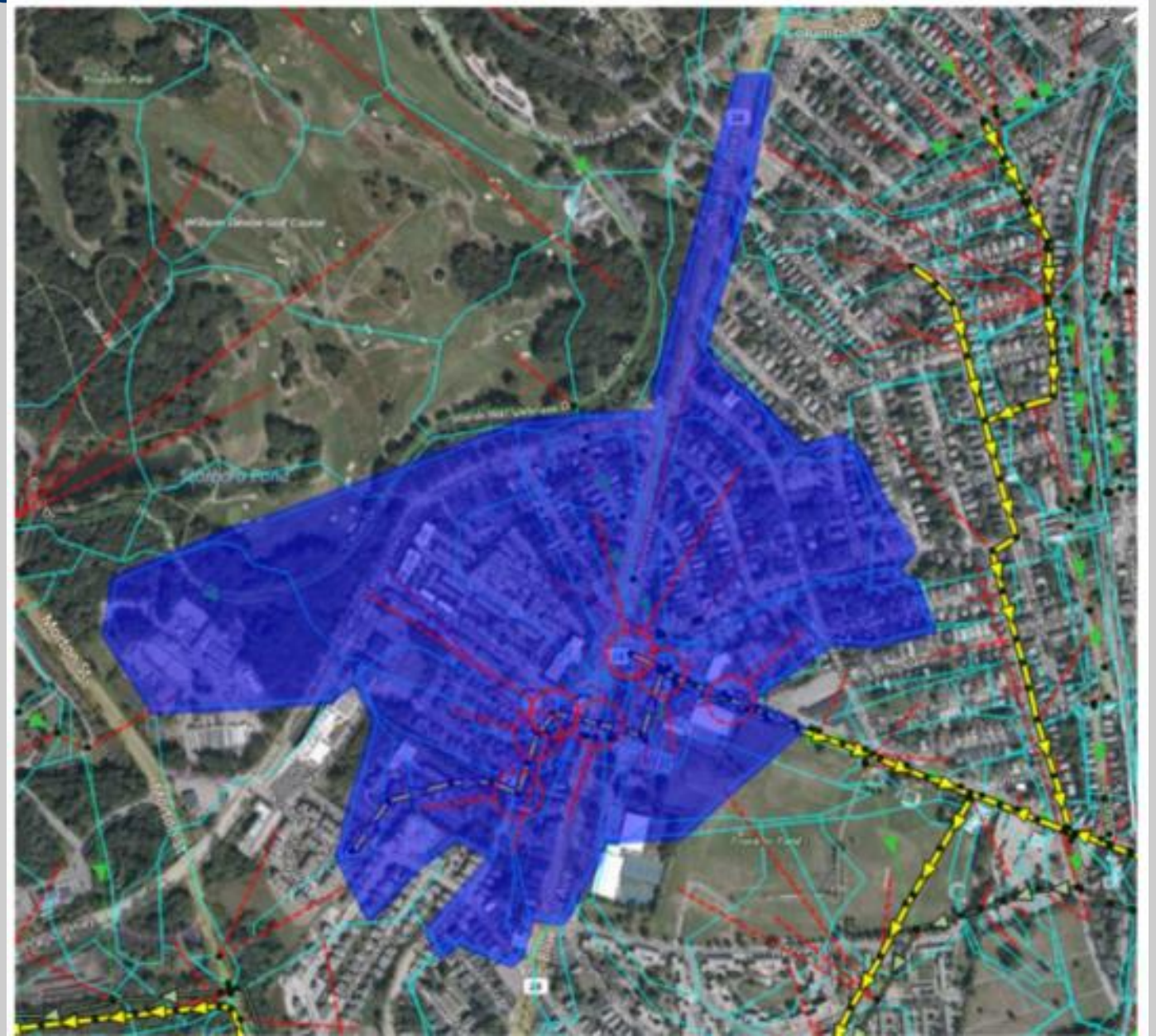
Watersheds

- Stony Brook Conduit
- Canterbury Brook Conduit
- Canterbury Brook Connector
- Stony Brook Watershed
- ▨ Canterbury Brook Watershed
- Flow Direction

Project Background & History

Watershed Context

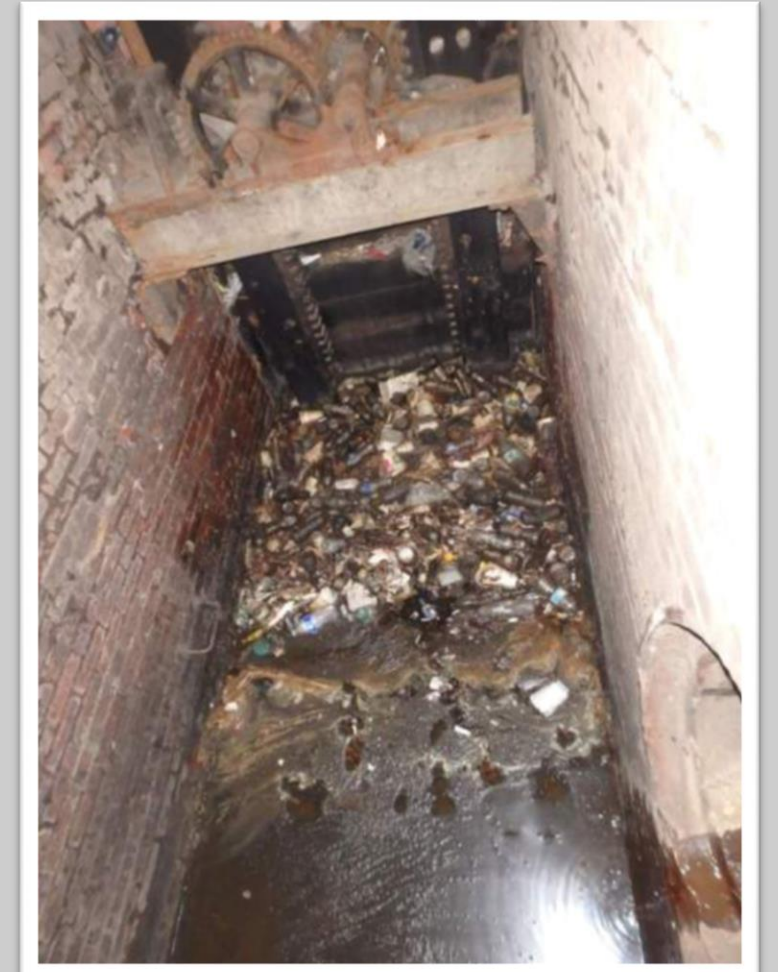
- 122-acre urban watershed flows to existing, 100-year-old drainage vault
- Watershed contains 65% impervious area, includes high density residential & commercial areas



Project Background & History

Existing Stormwater Vault

- 100-year-old drainage vault
- 57-inch brick drainage main
- Inoperable slide gate



Project Background & History

Existing Stormwater Vault

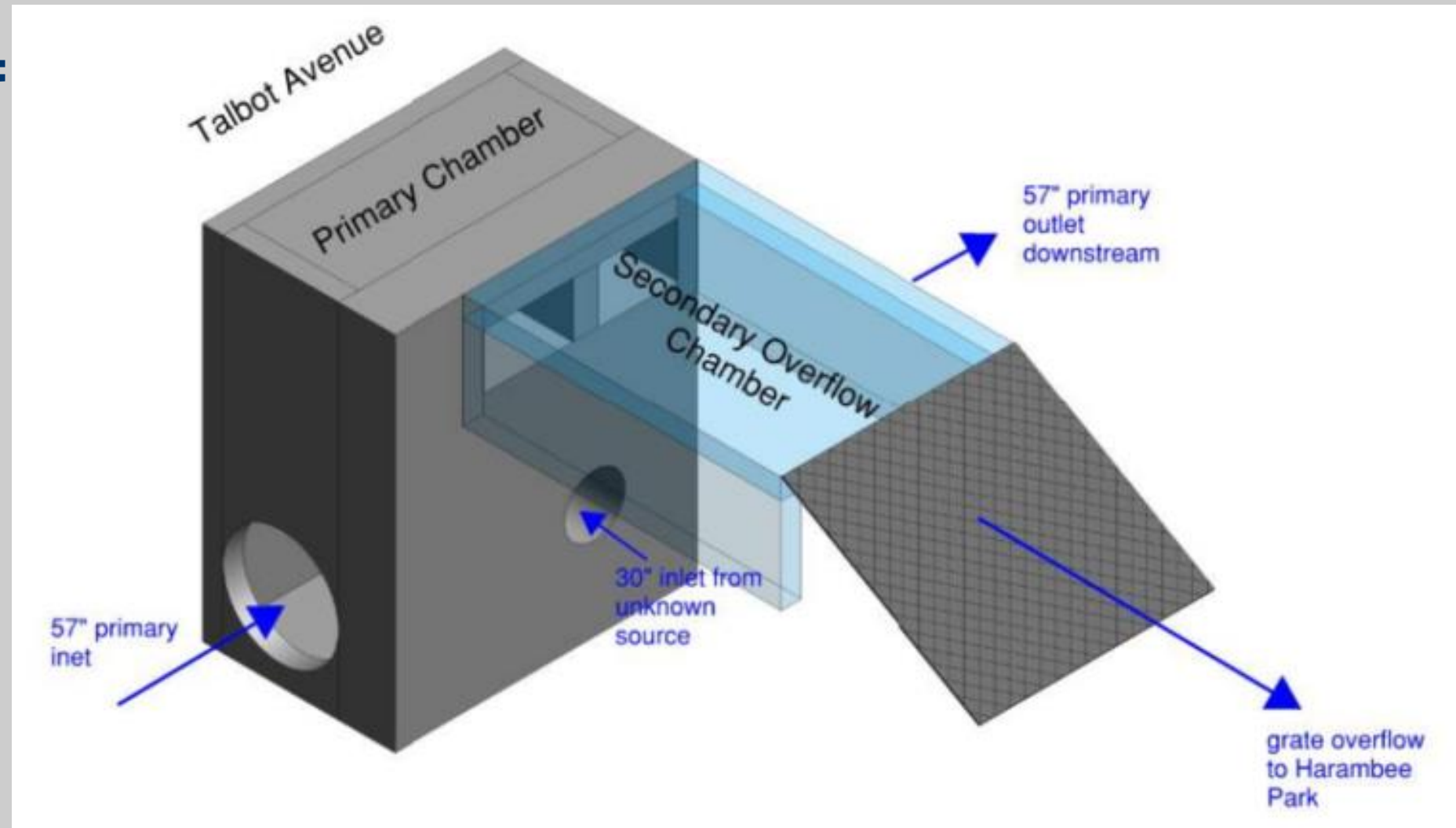
- Secondary overflow chamber
- Outlet to Harambee Park
- History of flooding or purposeful overflow for ice skating



Project Background + History

Existing Vault Chambers

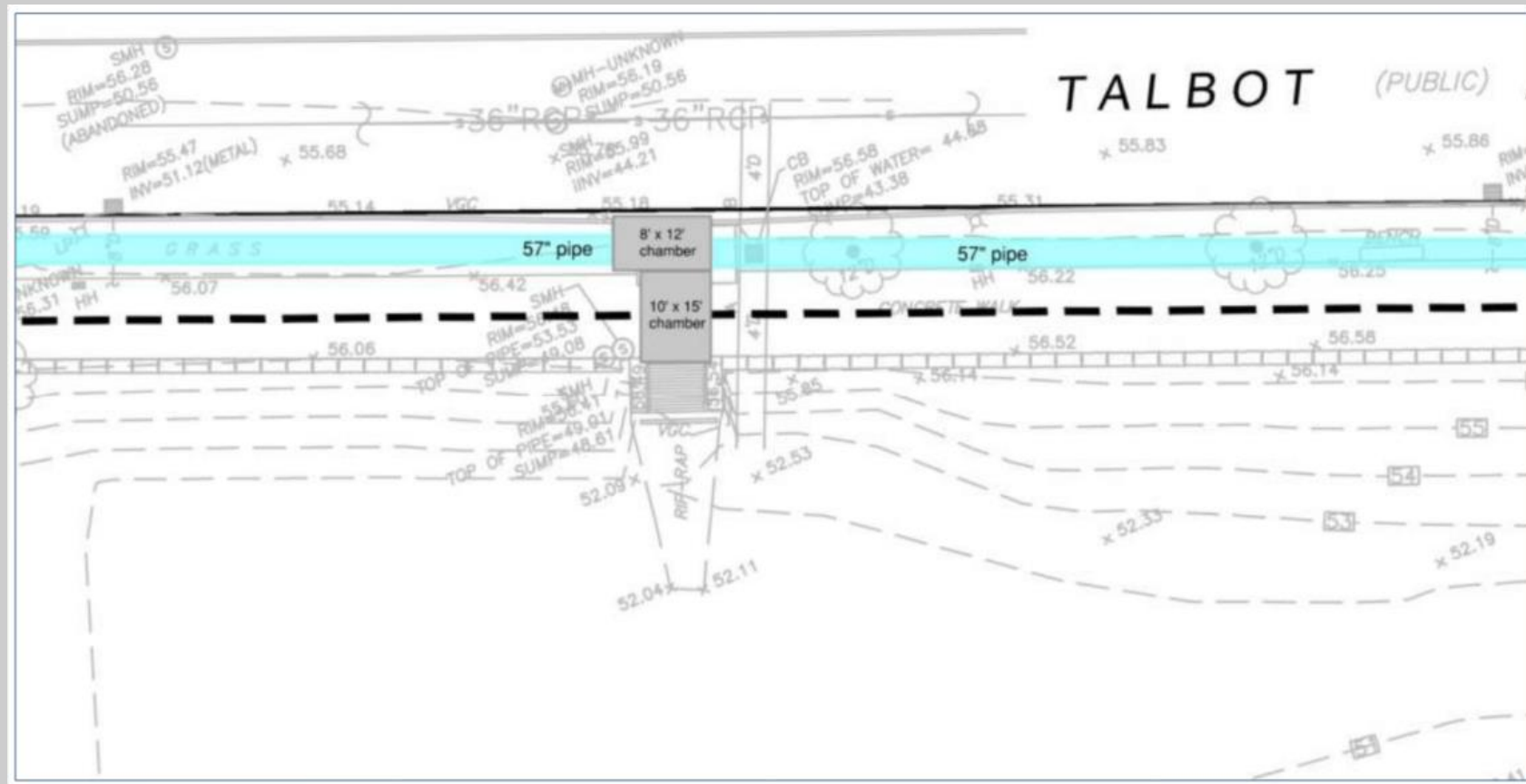
- Estimated flows entering vault:
 - 1-inch: 17.8 CFS
 - 10-year: 124.5 CFS
- Estimated Annual Phosphorus Load: 177 lbs/year



Project Goals

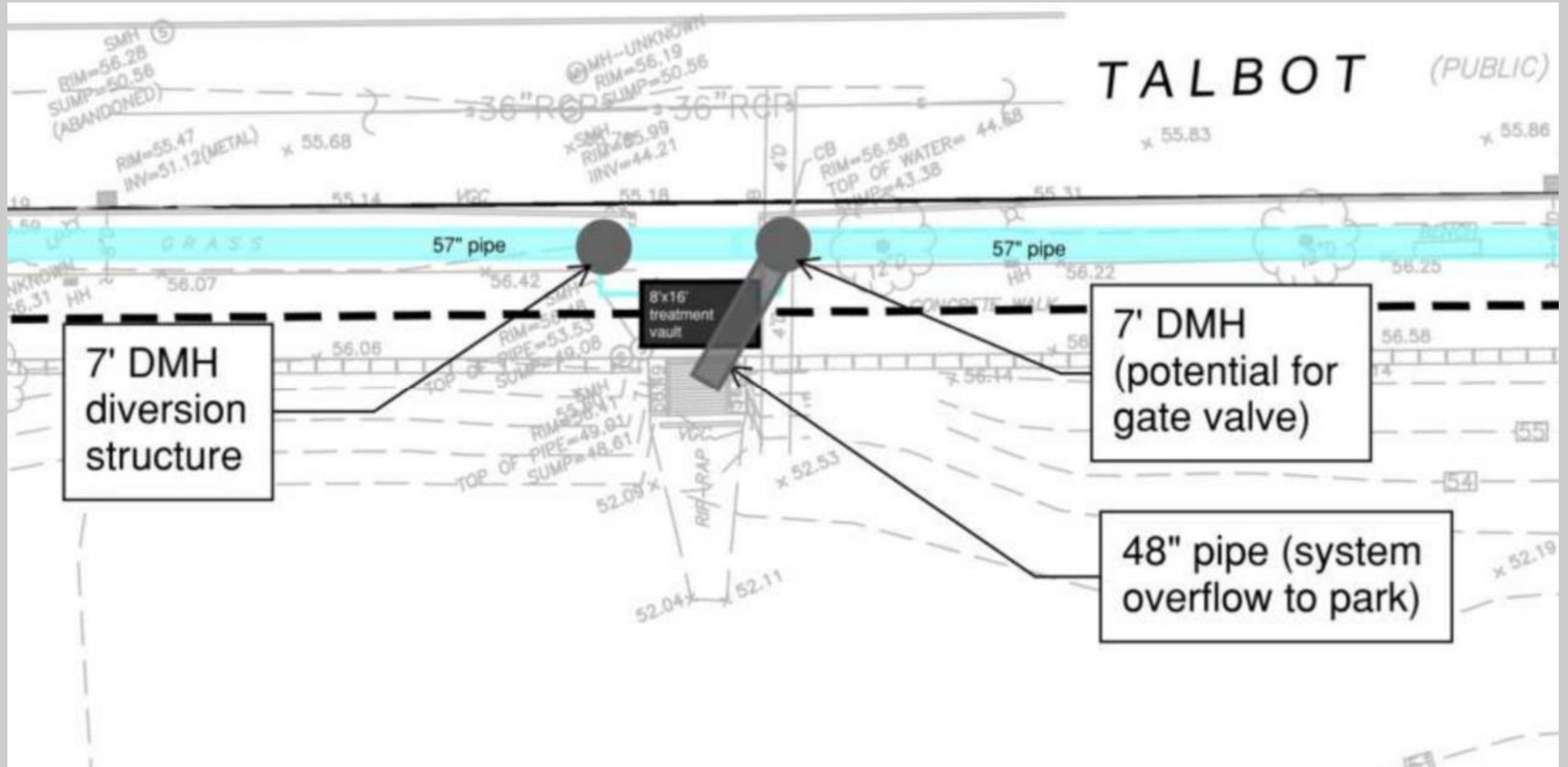
Water Quantity + Water Quality

- 1) Mimic hydraulic performance of existing vault, including operation of sluice gate
- 2) Provide in-line water quality treatment, removing approx. 62% of Total Phosphorus Load (110-114 lb/yr and 75-90% TSS (total suspended solids))
- 3) Provide dedicated capacity for trash/debris removal



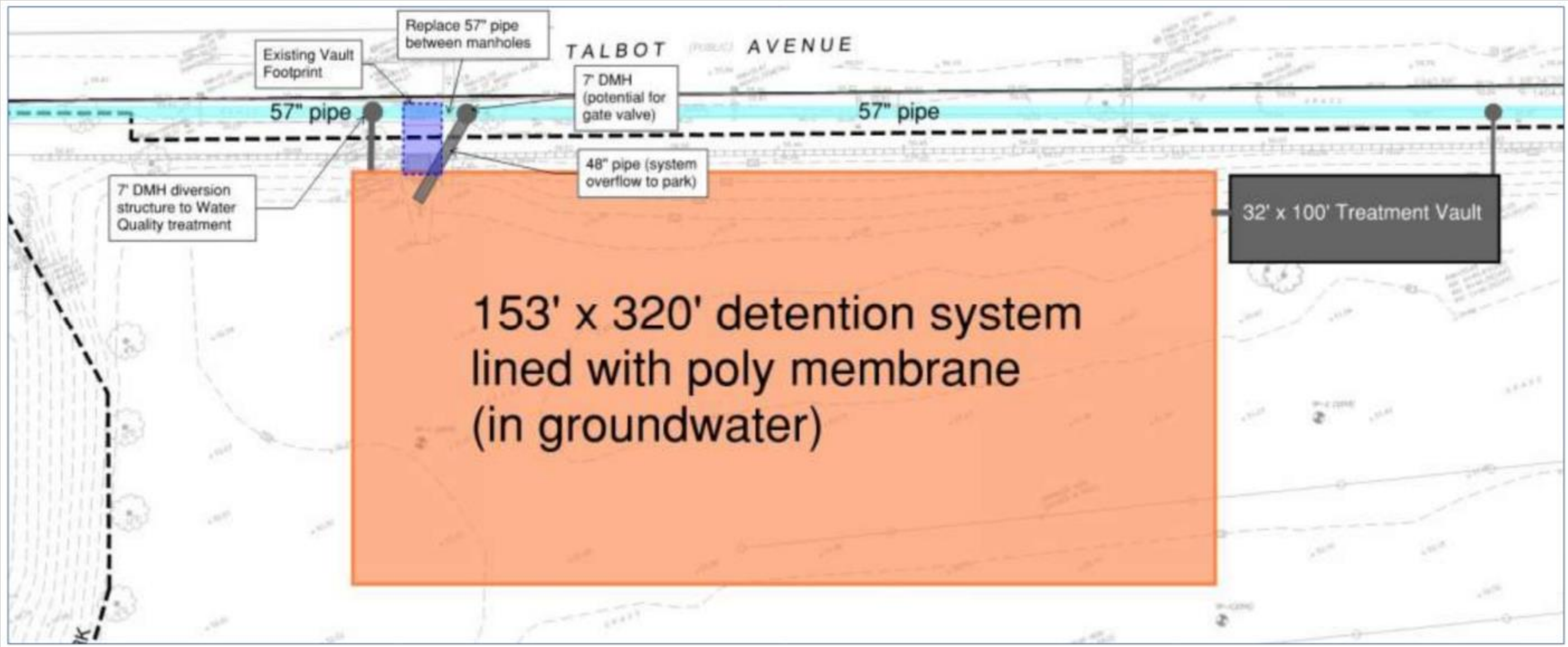
Feasibility Study + Alternatives

Alternative A - would not meet 65% annual TP removal target



Feasibility Study + Alternatives

Alternative B - would not match existing footprint



Feasibility Study + Alternatives

Alternative C - EcoSense's "DeNitra" Vault

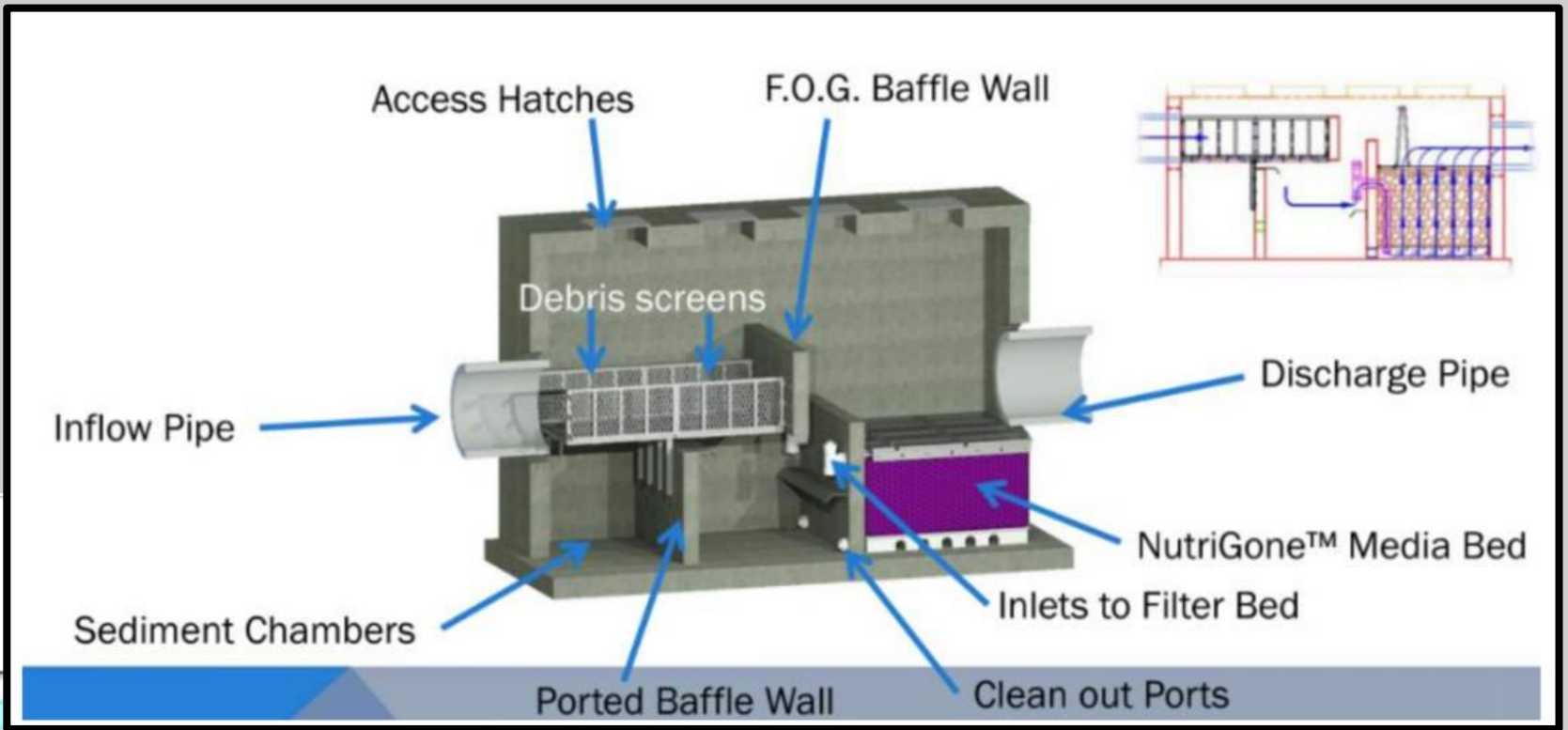
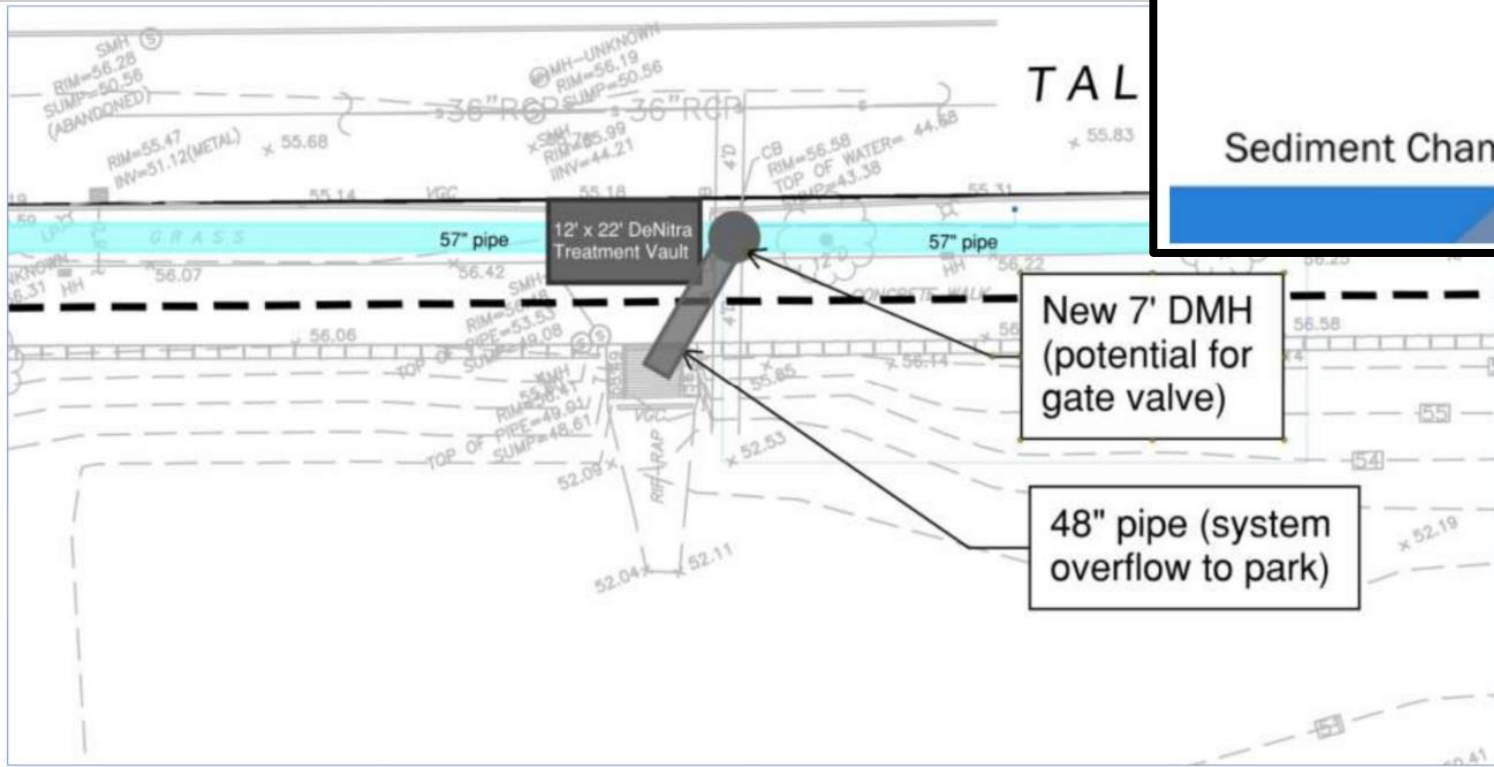
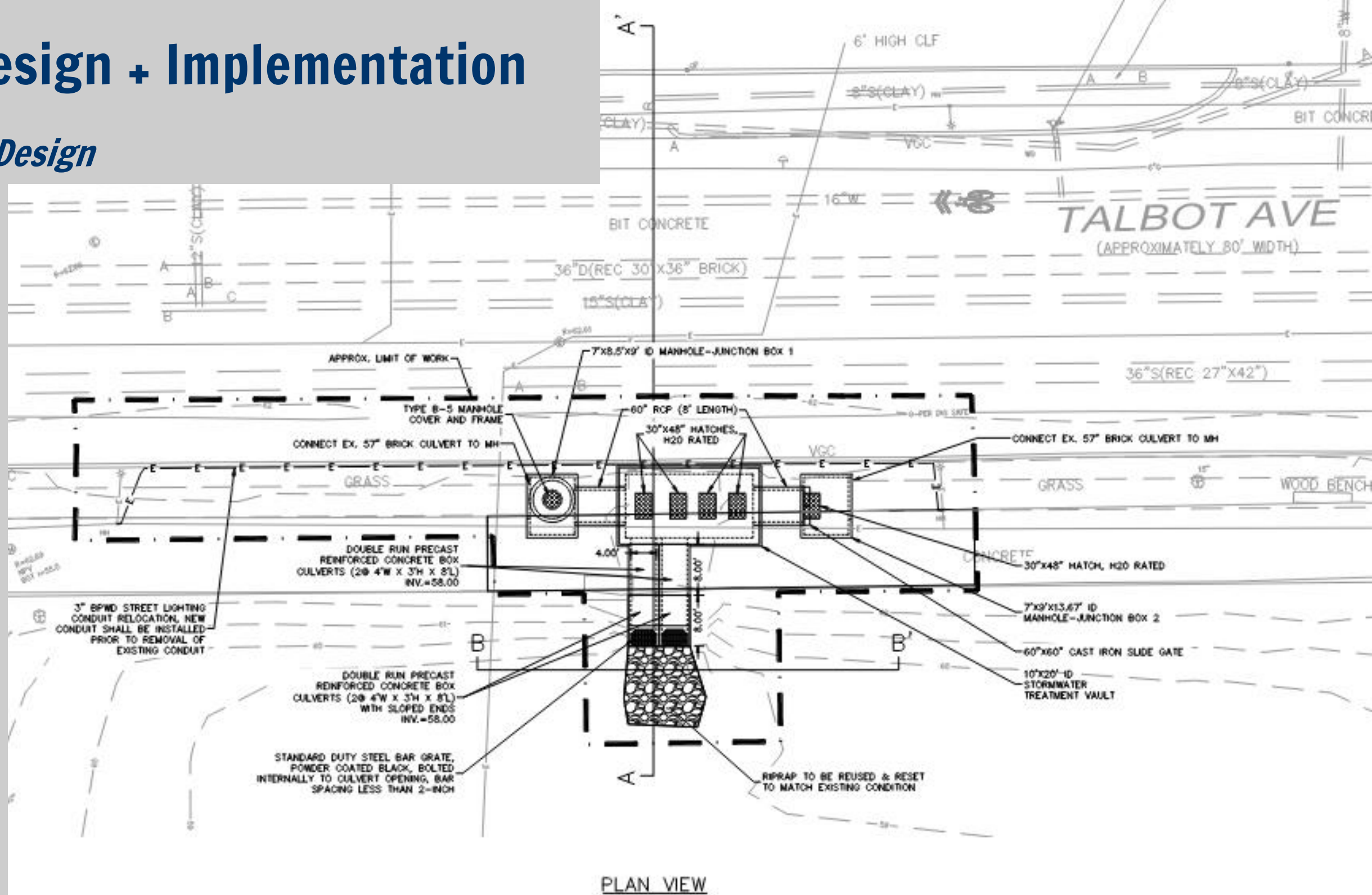


Image Credit: EcoSense,
<http://ecosenseint.com/>

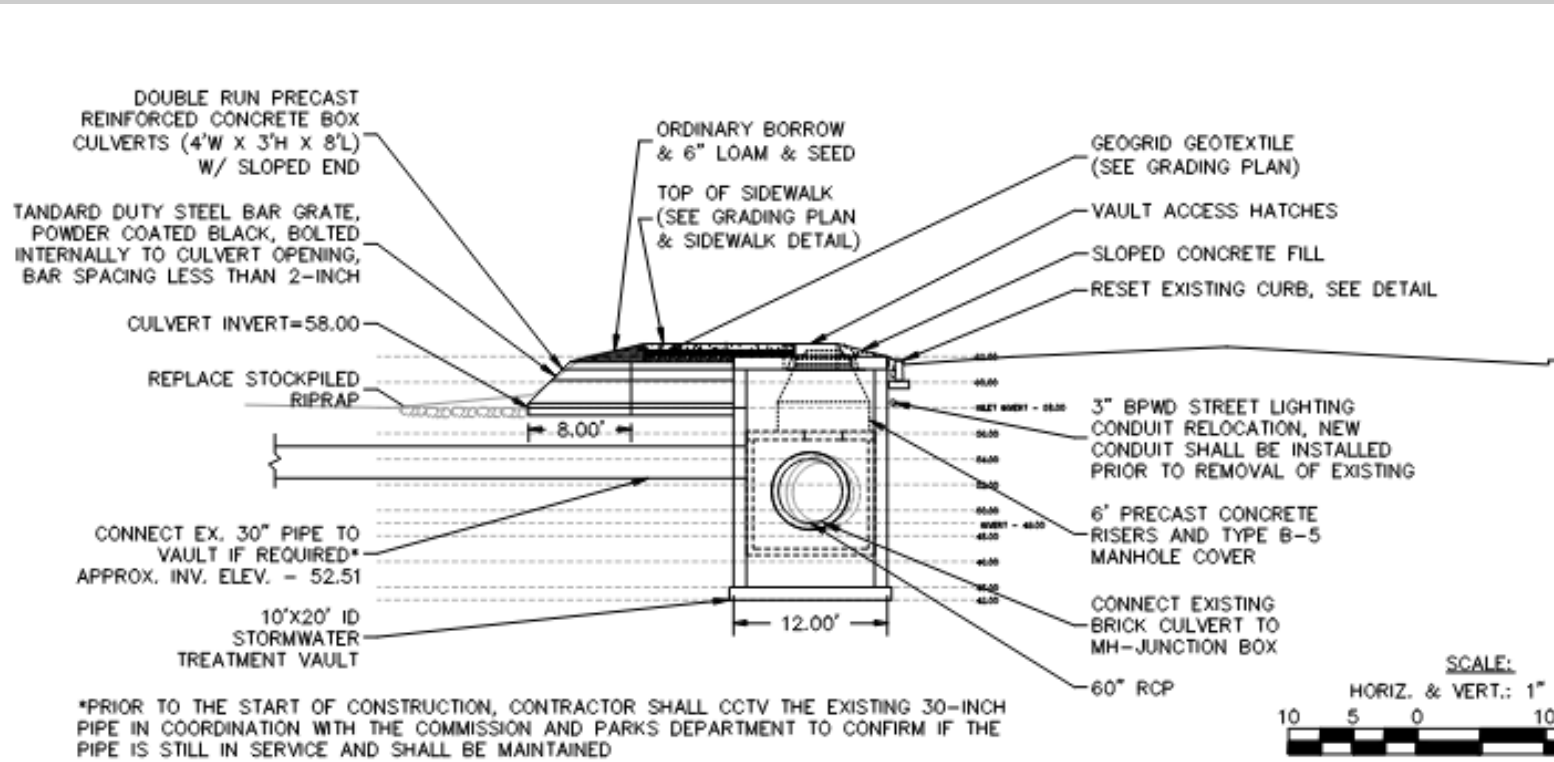
Vault Design + Implementation

Final Vault Design

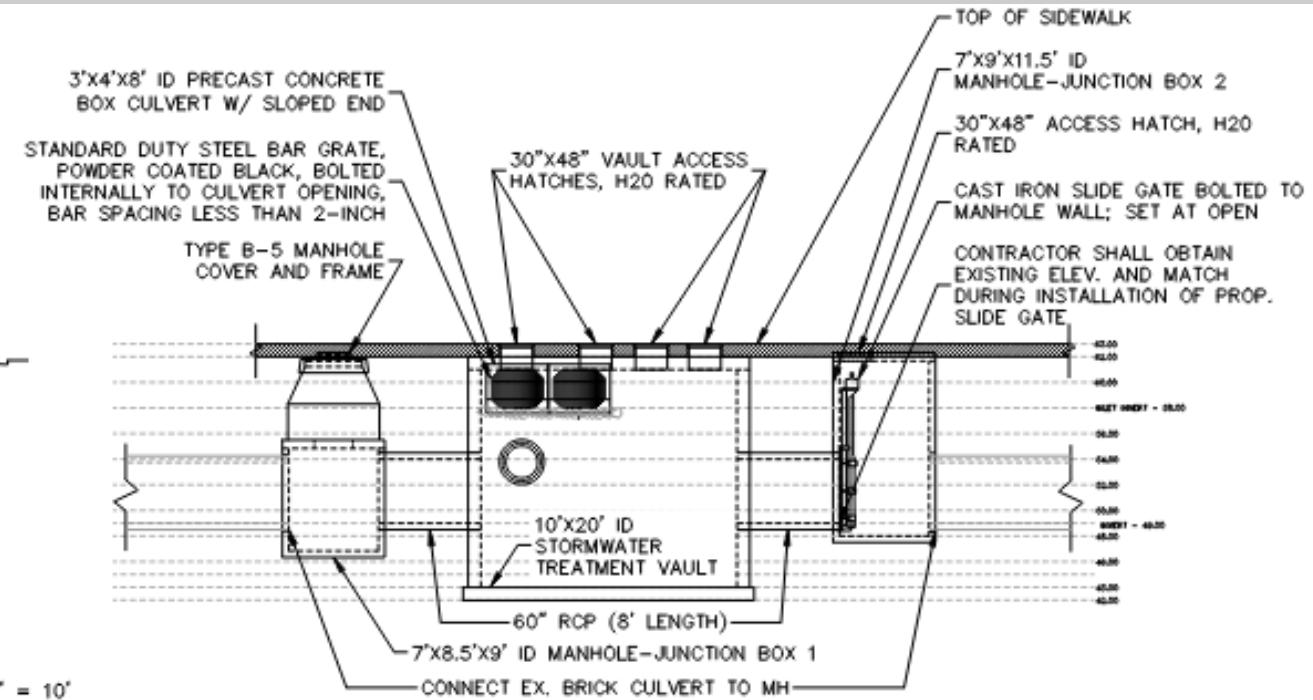


Vault Design + Implementation

Final Vault Design



SECTION A-A'
PROPOSED STORMWATER VAULT AND OVERFLOW



SECTION B-B'
PROPOSED STORMWATER VAULT AND OVERFLOW

Vault Design + Implementation

EcoSense's DeNitra Vault

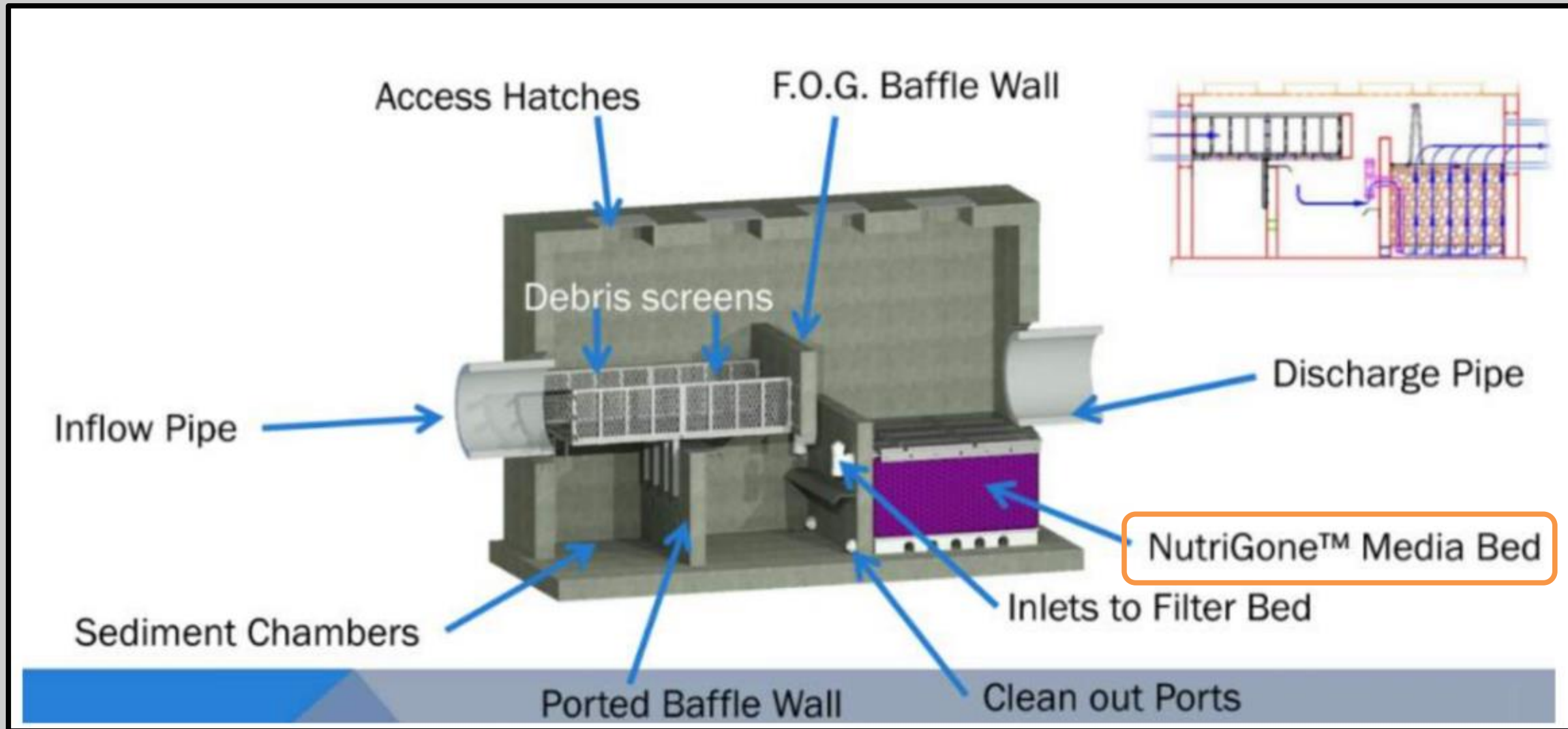


Image Credit: EcoSense, <http://ecosenseint.com/>

Vault Design + Implementation

Final Vault Design - Anticipated Maintenance

Easy Access Hatches

Better access means safer, easier maintenance and better performance!



Servicing and maintenance of the DeNitra-Vault™ requires a vacuum truck and is EASY with the proper access hatches!



Partnerships + Grant Award

Awarded a Coastal Habitat and Water Quality Grant for FY2023

- Grant administered by Massachusetts Office of Coastal Zone Management (CZM) & Office of Energy and Environmental Affairs (EEA)
- Partnering with City of Boston Public Works & Parks and Recreation
- Northeastern University & UMass Amherst will conduct Water Quality Monitoring Studies
- Codman Square Neighborhood Development Council (CSNDC) will share monitoring results and host public education opportunities

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Next Steps

To be continued...

- Construction beginning 2023
- Water quality study results



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Nitsch Engineering



**Boston Water and
Sewer Commission**

Thank you!

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