

FRESH POND IN-WATERBODY NUTRIENT CONTROL FEASIBILITY STUDY & ENGINEERING REPORT - EXECUTIVE SUMMARY

Shelter Island's Fresh Pond in-waterbody nutrient control feasibility study and engineering report determined that the

Pond's impaired water quality is due to sediment phosphorus (P) release

(primarily iron-phosphate being solubilized) during anaerobic conditions caused by Hypolimnetic Oxygen Demand (HOD), that is primarily from Sediment Oxygen Demand

Based upon field measurements,

- ✓ **HOD was estimated at 65 kg of oxygen / day**
- ✓ **Sediment Phosphorus Release was estimated at 31.7 kg/year with 125 kg of available P in the surficial sediment**

The recommended solution to restore the Pond's water quality is to remove phosphorus from Pond sediments by the following methods, as illustrated on Figures ES-1, ES-2 and ES-3:

1. **Withdraw 100,000 gallons per day (gpd) from bottom waters (hypolimnion)**
2. **Filter and aerate water to remove P from the water**
 - ✓ By precipitating iron-phosphate
 - ✓ Iron will be added, if needed/desired, to maximize phosphorus removal
3. **Return treated water to Fresh Pond hypolimnetic layer far from withdrawal facilities**
 - ✓ Nitrogen removal likely to occur
4. **Operate withdraw / treatment system - approximately March through November**
 - ✓ Remove 32 +/- kg P / year, recognizing that removal will decrease as P is removed
5. **Operate withdraw / treatment system for estimated 7 – 10 +/- years**
 - ✓ Remove the 125 +/- kg of available P in the Pond sediments.

The project will be implemented in the following phases:

- I. **Proof of Concept** – to document the scientific validity of the proposed process
- II. **Pilot Project** - to obtain data to optimize the full-scale design.
- III. **Full-Scale System - Restore Pond's water quality !**

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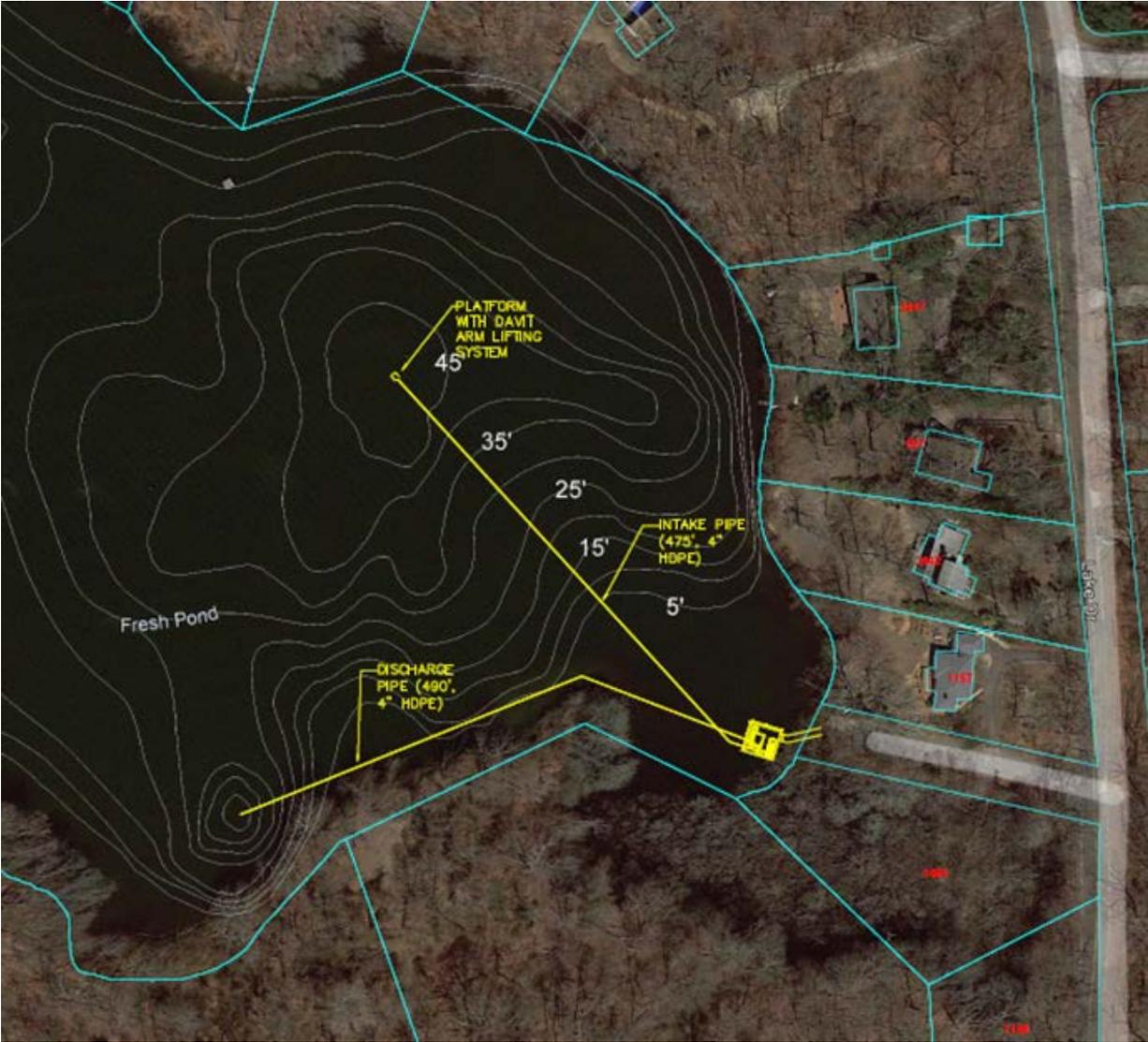


Figure ES-1 Hypolimnion Withdraw, Treatment and Discharge Return to Pond - Plan View

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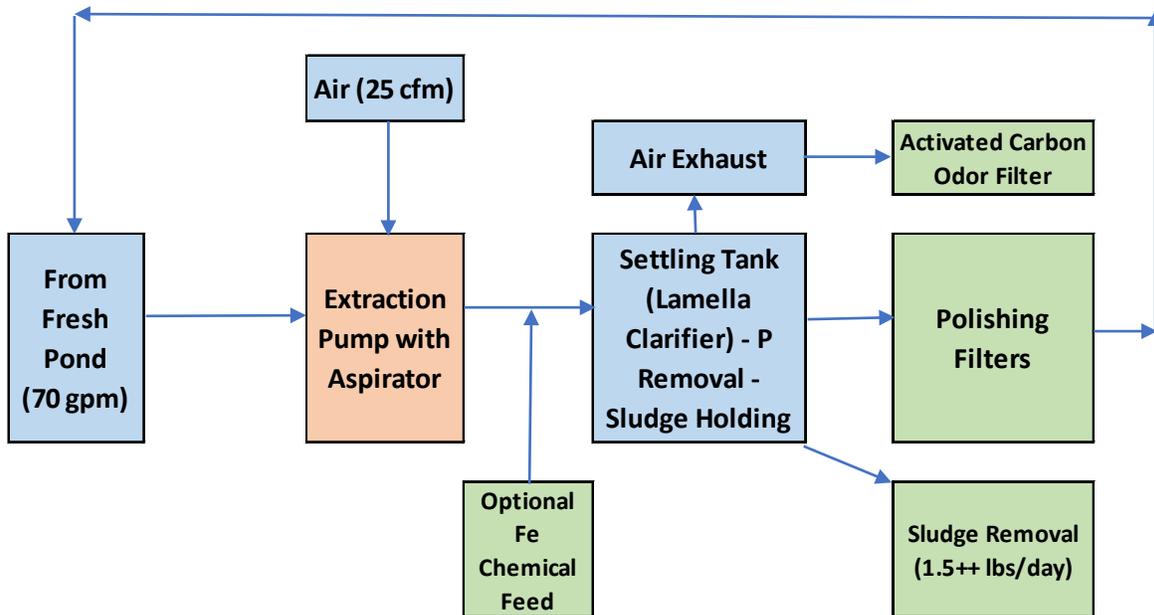
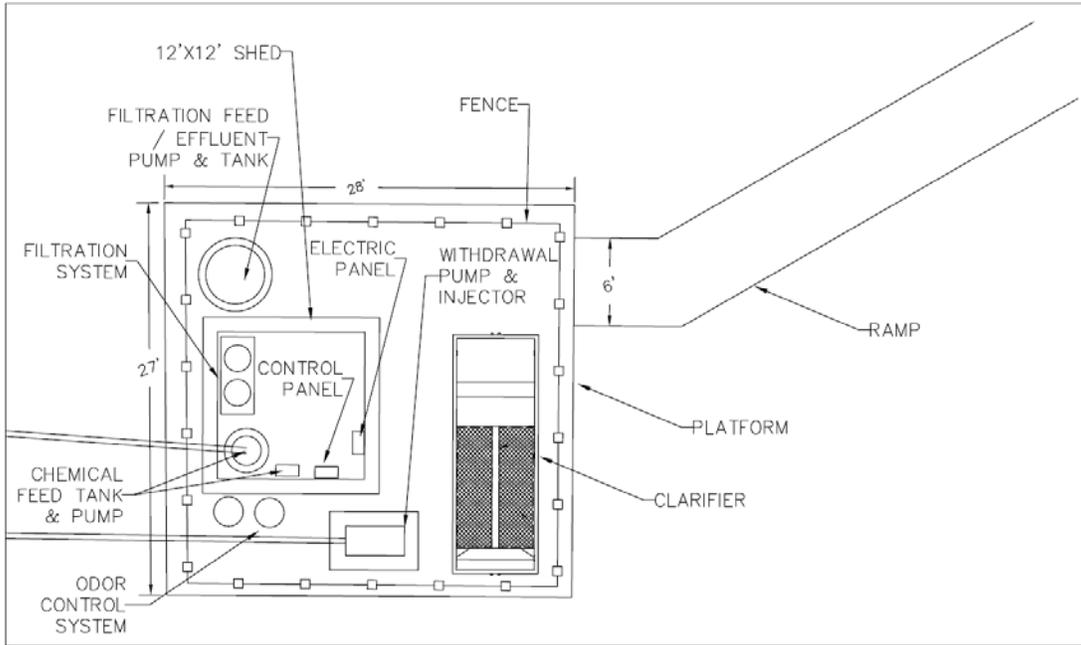


Figure ES-2 Hypolimnetic Withdraw, Treatment & Discharge System – Process Flow Diagram & Layout

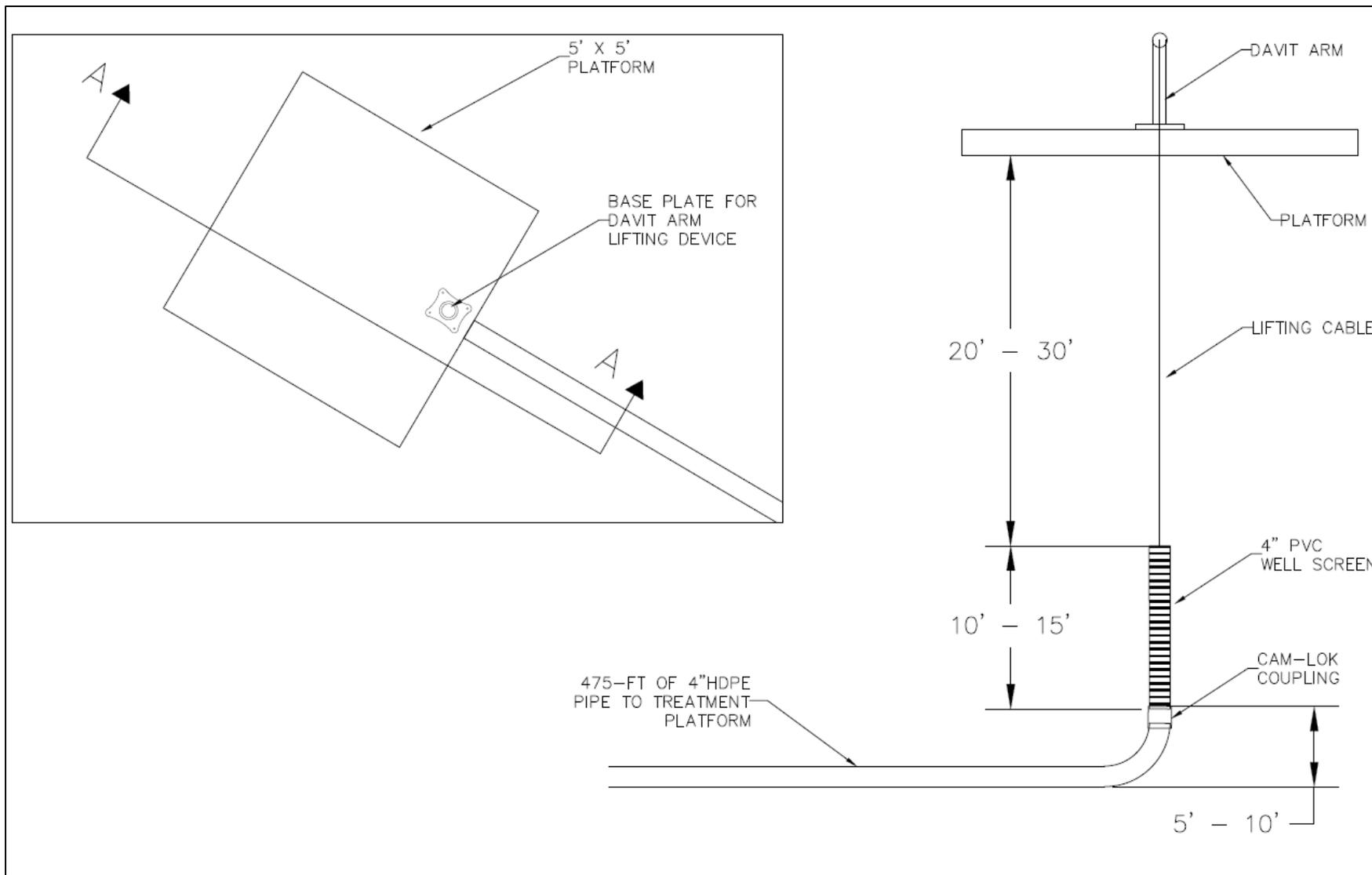


Figure ES-3 Hypolimnetic Withdraw System – Plan & Section Views