OGUNQUIT SEWER DISTRICT, MAINE

Preliminary Design Report **NOVEMBER 2023**

Phase 4 WWTF Adaptation Upgrades

WRIGHT-PIERCE
Engineering a Better Environment

Phase 4 WWTF Adaptation Upgrades
Ogunquit Sewer District, Maine

November 2023

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Section 1 Introduction

1.1 Purpose

The Ogunquit Sewer District has retained Wright-Pierce to assist them with the Phase 4 WWTF Adaptation Upgrades. The project will include adaptation upgrades to existing process structures and the existing control building to provide flood protection.

1.2 Project Background

The District's current adaptation plans call for relocation of the WWTF in 20-30 years (or approximately between 2040 to 2055). The District has purchased land in the west part of Ogunquit and has been collecting funds for the future relocation which are set aside in a dedicated reserve account. The current projects are intended to provide some flood protection upgrades to protect the WWTF during the intervening years. The District was successful in securing project funding from the Maine Department of Transportation under the Maine Infrastructure Adaptation Fund (MIAF) program to complete these adaptation improvements.

1.3 Previous Reports, Studies, and Plans

The following reports, studies and plans related to adaptation improvements at the WWTF are summarized below.

- 2023 WWTF Adaptation Site Protection Alternatives Evaluation
- 2018 WWTF Process Upgrades and Office Space Additions
- 2016 WWTF and Pump Station No.1 Upgrade
- 2014 WWTF and Pump Station No.1 Adaptation Upgrade Facilities Plan

1.4 Previous WWTF Adaptation Projects

In 2016, Pump Station No.1 was upgraded to provide flood protection and included the following improvements.

- Converted the existing wetpit/drypit pump station to a submersible pump station
- Raised the electrical and control gear to elevation 16.79 (NAVD 1988)
- Refed utility and standby power directly from the WWTF

In 2018, the WWTF Process Upgrades and Office Space Additions project included the following improvements to provide some flood protection.

- Installation of portable stop logs at the Control Building doors (2) to elevation 16.0.
- Added a stair tower between the Control Building and the Garage and constructed a second floor to the Garage to provide office space and to protect the SCADA system.
- Sealed electrical conduits associated with new work.

Section 2 Design Considerations

2.1 Adaption Design Objectives

The design objectives for the adaptation measures are as follows:

- To prevent hazardous or destructive wave energy from the east from damaging WWTF buildings and tanks.
- To prevent flooding of the buildings and tanks from any direction - ideally, for an indefinite period of time; or, worst case, for a minimum of 24 hours.
- To minimize operational requirements/actions required to protect the buildings and structures (e.g., installing flood barriers, filling tanks with water to prevent floatation, etc.).
- To minimize/eliminate any further encroachment on the site footprint as there is currently no excess space.

2.2 Flood Protection

Based on the WWTF Adaptation Site Protection Alternatives Evaluation Technical Memorandum dated April 28, 2023, a flood protection elevation of 16.0 ft (NAVD88) was established for the WWTF. The detailed memorandum is provided in Appendix A.

2.3 Proposed Improvements

A description of the proposed improvements included in the scope of this upgrade are summarized in the following sections. Select preliminary design drawings are included in Appendix B.

2.4 Civil/Site

- Site restoration will be limited to repairing pavement or loaming and seeding at excavated/disturbed areas.
- Modify aeration piping at the Aeration Tanks as necessary for wall extensions.
- Modify effluent piping at the Aeration Tanks as necessary for effluent launder adjustments.
- Modify piping at Digester No.1 as necessary for wall extensions.
- Modify piping at Chlorine Contact Tank as necessary for wall extensions.
- Raise SMH1 top slab to the flood protection elevation.
- Valve Pit A: Seal all penetrations and carrier pipes.
- Valve Pit B: Seal all penetrations and carrier pipes.
- Valve Pit C: Seal all penetrations and carrier pipes.
- Scum Pits #1/#2: Install backflow preventers and relocate alarm panels.
- New Transformer Pad/extend secondary service to the WWTF.
- New or relocated Utility Transformer, primary feed and extending cables (by Central Maine Power). CMP will evaluate transformer for replacement.

2.5 Architectural

A portion of the current Ogunquit WWTF complex is the original Aeration Tank Structure constructed in 1963. This structure consisted of an approximately 100-foot by 75-foot concrete structure with the top of the structure approximately 1-foot above grade. This structure housed a holding tank in the northeast corner, a pump room in the northwest corner and aeration basins to the south of these. At the same time, an approximately 23-foot long by 23-foot wide building was built over a portion of the pump room at the northwest corner of the structure. In 1982, the Control Building was extended out 14-feet to the west of the Control Building and the Aeration Tank Structure. This portion of the control building is on a slab-on-grade and frost wall foundation.

The subject project includes upgrades to flood proof this Aeration Tank and Control Building Structure. In an earlier project a flood log system was added to the two doors of the control building to flood proof the openings. In this project complete flood proofing of the Control Building walls will be undertaken to provide water tightness of the walls and also structural reinforcement to resist flood water pressure. The flood protection elevation is at 16.00' and the existing floor is at 11.63' therefore the walls must resist flood loads to around 4'-4" above the floor elevation.

The existing top of the Aeration Tank Structure walls will be extended up to above flood plain (around 4'-4" higher) and will connect to northeast corner of the Control Building and at the southwest corner of the original 1963 portion of the control building. To complete flood proofing of the Control Building and Aeration Tank Structure, the north, west, and south walls of the Control Building that run between where the extended aeration tank walls connect in, will receive upgrades to improve water tightness and flood water pressure resistance.

The existing walls of the Ogunquit Sewer District Control Building are unreinforced 6" concrete masonry block walls with nominal 4" thick brick veneer on the exterior. The unreinforced concrete block is not strong enough to resist flood water pressure. To meet this loading requirement, we propose removing the existing brick veneer and installing a structural light gauge metal stud wall with plywood sheathing. To meet water tightness requirements, we propose installing a waterproofing barrier on the outside of the plywood sheathing. To provide a finished exterior surface, we propose using a metal siding system matching the system used on the office and stair tower addition.

The east wall of the Control Building and the portion of the south wall that is adjacent to the aeration basins do not need to be upgraded because they are inside of the extended Aeration Tank extended walls. These walls could be upgraded for other reasons if desired such as matching the other walls, improved insulation, and improved weather tightness.

Wall Mounted Items to Consider

The north wall has some electrical/communications pull boxes that will need to be worked around as well as some cameras and conduits that will need to be removed and reinstalled. See Photo 1.

The east wall does not have to be upgraded but if it is upgraded, there are pull boxes and associated conduit for aeration tank instrumentation that will need to be removed and reinstalled as well as a hose reel. See Photo 2.

Photo 1 – Control Building North Wall

The south wall has a downturned PVC drainpipe likely from HVAC equipment that should be easy to relocate above the flood plain. The south wall also has sections of cable tray running from equipment in the Control Building to the new electrical room in the Process Building. The existing brick veneer will need to be carefully removed from behind this cable tray and the new metal stud and plywood wall will need to be carefully installed up and in behind it. This can be accomplished by building the top section on the ground and slipping it in behind the conduit and fastening it to the existing roof plank and then splicing the bottom portion of the wall onto the installed top half. The cable tray is just under the roof at the portion of wall that needs to be upgraded however dips down at the portion that doesn't need to be upgraded. This would make it more difficult to upgrade the portion of the south wall that doesn't need to be upgraded. See Photo 3.


Photo 2 – Control Building East Wall


Photo 3 – Control Building South Wall

The west wall is in the new stair tower and only has some minor general power, lighting, and communications conduit and fixtures that would need to be removed and reinstalled. The stairs rise along this wall and will need to be worked around. There is also a wall mounted handrail that can be removed and reinstalled.

The following sections outline the removal and modification steps proposed.


Photo 4 – West Wall


Photo 5 – West Wall

Removals

- Remove doors, windows, and louvers. Possibly save newer items such as the windows for reinstallation.
- Remove the flood barrier exterior pressure plates and save for reinstallation.
- Remove minor electrical conduit and fixtures.
- Remove the brick veneer and any cavity wall insulation and materials to expose the exterior surface of the existing concrete block walls.

Modifications

- Install structural light gauge metal stud framing in the area where the veneer is today.
- Sheath the studs with ¾" plywood sheathing.
- Provide a watertight air/water barrier membrane on the plywood sheathing.
- Continue air/water barrier membrane on to concrete foundation walls (concrete slab at stair tower).
- Continue air/water barrier membrane into openings.
- Reinstall the exterior flood barrier pressure plates on the exterior side of the concrete block.
- Install metal siding system.

- Install doors, windows, and louvers.

2.6 Structural

Structural improvements involve extending selected tank walls to the flood protection elevation 16.0 (NAVD88). A description of the proposed improvements is provided below.

Governing Codes

- ASCE/SEI 7-10 Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- International Building Code (IBC) 2015

Design Criteria

Live Loads: In accordance with the IBC and ASCE 7

Risk Category III

Seismic Loads

- 0.2s Spectral Response Acceleration (Ss) = 0.260
- 1.0s Spectral Response Acceleration (S1) = 0.079
- Seismic Soil Site Class D (default)
- Seismic Design Category B
- Seismic Importance Factor (Ie) = 1.25

Wind Loads

- Basic Wind Speed, V_{ult} = 132 MPH, V_{asd} = 102 MPH
- Wind directionality factor, K_d = 0.85
- Exposure Category D
- Topographic Factor, K_{zt} = 1.0
- Gust Effect Factor, G = 0.85
- Enclosure Classification = Enclosed
- Internal Pressure Coefficient, GC_{pi} = +/- 0.18
- Wind Importance Factor (Iw) = 1.0

Snow Loads

- Ground Snow Load (Pg) = 50 psf
- Importance Factor (Is) = 1.1
- Exposure Factor (Ce) = 0.9
- Thermal Factor (Ct) = 1.0
- Slope Factor (Cs) = 1.0

Ice Loads

- Equivalent Radial Ice Thickness (t) = 1.0 inch
- 3 second wind gust speed (Vc) = 50 MPH
- Topographic Factor (Kze) = 1.0
- Ice Importance Factor (Ii) = 1.25

Removals

The following removals are required for each tank:

Flow Splitter Box

- Remove grating
- Remove gate operators

Clarifiers #1 and #2

- Remove cover from Clarifier 1
- Remove aluminum railings from Clarifier 2

Aeration Tanks & Digester #1

- Remove aluminum railings from perimeter of Aeration Tanks.
- Remove tank wall on East and West sides of Aeration Tanks down to launder invert at elevation 6.90'.
- Remove launder weir and weir plate on East and West sides of Aeration Tanks.

Chlorine Contact Tanks

- Remove aluminum railings.

Modifications

The following is a summary of the proposed modifications to each tank:

Flow Splitter Box

- Drill and epoxy new reinforcing steel dowels into the top of the existing tank walls and cast new concrete walls matching the thickness of the existing walls with reinforcing steel designed to withstand the flood loads.
- New concrete walls will extend to elevation 16.00', approximately 4'-9" above the current top of wall elevation.
- Install new aluminum grating with a center-supporting aluminum beam.
- Raise gate operators to new grating elevation.
- Install new aluminum ladder on the exterior of the splitter box to access the top.

Clarifiers #1 and #2

- Drill and epoxy new reinforcing steel dowels into the top of the existing tank walls and cast new concrete walls matching the thickness of the existing walls with reinforcing steel designed to withstand the flood loads.
- New concrete walls will extend to elevation 16.00', approximately 4'-9" above the current top of wall elevation.
- Provide opening in the new wall extension at the existing stairs/bridge with floodproof stop logs.

Aeration Tanks & Digester #1

- Drill and epoxy new reinforcing steel dowels into the top of the existing tank walls and cast new concrete walls matching the thickness of the existing walls with reinforcing steel designed to withstand the flood loads.
- New concrete walls will extend to elevation 16.00', approximately 4'-4" above the current top of wall elevation.
- Construct wall extensions around West, South, and East sides of the Aeration Tanks, and around the North side of Digester #1. Tie the new wall extensions into the masonry walls of the Control Building on the East and South sides.
- Provide openings in wall extension with floodproof stop logs near the East side of the Control Building and the south end of the three walkways.

Chlorine Contact Tanks

- Excavate down approximately 3 ft below grade around the perimeter of the tanks.

- Construct a concrete beam outside of the tanks near the top of the existing tank walls to strengthen the existing walls.
- Drill and epoxy new reinforcing steel dowels into the top of the existing tank walls and cast new concrete walls matching the thickness of the existing walls with reinforcing steel designed to withstand the flood loads.
- New wall extensions will include a concrete beam at the top to brace the wall extensions against flood loads.
- New concrete walls will extend to elevation 16.00', approximately 2'-3" above the current top of wall elevation. Provide openings in the new wall extensions with floodproof stop logs at the North and South sides of the tanks.

2.7 Electrical and Instrumentation

The following sections describe the proposed upgrades to electrical systems.

- Relocate or replace conduit, wiring, junction boxes, control boxes, outlets, etc. around tank wall modifications.
- Remove and replace conduit and wiring around Control Building wall modifications.
- Seal conduits at points of potential infiltration.
- Re-feed secondary service to raised utility transformer.

The locations of key electrical and instrumentation conduit, wiring, and junction boxes are shown in photographs in Appendix C.

Section 3 Project Implementation

3.1 Project Funding

The District was successful in securing project funding from Maine Department of Transportation under the Maine Infrastructure Adaptation Fund (MIAF) program to complete adaptation improvements. Funds are provided under the American Rescue Plan Act (ARPA) of 2021.

Funding agency requirements related to the American Rescue Plan Act (ARPA) that will need to be incorporated into the project contract documents are expected to include (but may not be limited to) the Federal Buy American Act (BAA) requirements.

3.2 Permitting and Regulatory Approvals

Based on our initial review of the project information and pertinent codes, it is our understanding that the project may require a NRPA Permit-by-Rule from the Maine Department of Environmental Protection (MDEP) for projects adjacent to protected natural resources and activities in coastal sand dunes or may qualify for a statutory exemption.

The proposed project is located in the Shoreland General Development 1 (SG1) Ogunquit Beach zone. Work in this zone typically requires Site Plan Approval from the Town of Ogunquit. However, during a site visit to the WWTF on November 6, 2023 the Town Code Officer indicated that this project may be able to avoid Planning Board review and only require a building permit. Design plans will be provided to the code officer for a final determination.

Permits and approvals will be obtained during final design and are required prior to construction.

3.3 Construction Sequencing Considerations

The tourist season will require the Contractor to sequence construction in such a way as to allow all existing tanks to remain online from May 1st through September 30th. The construction window at the WWTF will be from October 1st through April 30th. To accomplish the work in the construction window, the contractor must consider the following general constraints:

- Construction must take place from October 1st – April 30th. Selected activities may occur outside this window such as paving, loaming/seeding, and finish painting.
- Contractor must maintain WWTF operations at all times.
- During the construction window, the District can operate with the following process tanks online allowing the contractor to stagger construction at tanks:
  - 1 Clarifier (of 2 total)
  - 1 Chlorine Contact Tank (of 2 total)
  - 2 Aeration Tanks (of 4 total)
  - Digester No.1 is not needed in the construction window
- Contractor may need to temporarily relocate Control Building staff during removal/replacement of windows and doors during wall modifications.
- Coordinate removal, relocation and replacement of electrical pull boxes, conduits, etc. with District.
- Contractor to coordinate utility transformer relocation with CMP and the District.

- The contractor will be required to submit a construction schedule including sequencing of work for approval prior to construction.

3.4 Project Schedule

The Maine Infrastructure Adaptation Fund (MIAF) Grant Agreement between the Ogunquit Sewer District and the Maine Department of Transportation (MDOT) all infrastructure costs must be expended by December 31, 2026. Table 3-1 summarizes the anticipated project schedule.

Table 3-1 Project Schedule

Milestones	Expected Timelines	Status
Kickoff	October 2022	Completed
Project Scoping	October 2022 – August 2023	Completed
Preliminary Design Phase	August – November 2023	Ongoing
Final Design Phase & Permitting	December 2023 – May 2024	Future
Bidding Phase	June – July 2024	Future
Construction Phase*	October 24 – December 2025	Future
Post-Construction/Warranty Phase	December 2025 – December 2026	Future

* includes shop drawing reviews

Section 4 Preliminary Cost Estimate

Preliminary design phase AACE International Class 3 construction cost estimates have been developed for the work described in this report. AACE Class 3 estimates generally involve the use of generalized system-based line items cost (e.g., sitework, architectural, etc.). The accuracy range for Class 3 estimates is typically -20% to +30%. The estimated cost to construct or modify each of the affected process tanks/control building was developed using standard cost estimating procedures utilizing preliminary design and unit cost information. Where appropriate, recent construction cost data was incorporated. Allowances were provided for general contractor overhead and profit, undeveloped items, and contingency. This cost estimate is based on an Engineering News Record's 20-City Average Construction Cost Index 13498 (October 2023). The construction phase engineering costs are tentative, and services will be finalized once the construction schedule for the project is finalized. The preliminary project cost estimate is presented in Table 4-1 below.

Table 4-1 Preliminary Project Cost Summary

Ogunquit Sewer District – Phase 4 WWTF Adaptation Upgrades (ENR Index 13498, 10/2023)		
Description		Estimated Cost
Civil		$50,000
Architectural		$75,000
Structural		$940,000
Electrical/Instrumentation		
Transformer Pad/Refeed Secondary Service		$25,000
Relocate junction boxes, conduits, and wires, etc.		$150,000
Winter Construction		$100,000
General Contractor, Subtotal		**$1,340,000**
General Contractor OH&P	10.0%	$134,000
Subcontractors, Subtotal		$1,015,000
General Contractor Markup	5.0%	$51,000
Utility (CMP) Allowance		$5,000
General Contractor - General Conditions	10.0%	$153,000
Subtotal, Construction Costs		**$1,683,000**
Project Multiplier, Design Contingency	15.0%	$253,000
Project Multiplier, Inflation to Mid Pt Const.	5.0%	$85,000
Engineers estimate of construction cost		**$2,021,000**
Construction Contingency	10.0%	$202,000
Technical Services		
Design		$175,000
Bidding/CA/RPR/OPS/Materials Testing	10.0%	$202,000
Legal/ Administrative		$0
Subtotal		**$2,600,000**
Financing	1.0%	$26,000
Engineer's Estimate of Project Cost		**$2,626,000**

Appendix A
April 28, 2023 WWTF Site Protection Alternatives Evaluation (Flood Design)

Memorandum

Date: **4/28/2023**

Project No.: **21293A**

To: **Phil Pickering – Ogunquit Sewer District**

From: **Ed Leonard, Val Giguere**

Subject: **Ogunquit Sewer District WWTF and PS Adaptation Upgrades – WWTF Site Alternatives**

1 Background

The District's current adaptation plans call for relocation of the WWTF in 20-30 years (or approximately between 2040 to 2055). The District has purchased land in the west part of Ogunquit and has been collecting funds for the future relocation which are set aside in a dedicated reserve account. The current projects are intended to provide some flood protection upgrades to protect the WWTF during the intervening years as well as to provide for some mechanical equipment replacements/ upgrades to maintain treatment performance. The District was successful in securing project funding from Maine Department of Transportation under the Maine Infrastructure Adaptation Fund (MIAF) program.

After consultation with the Maine Department of Environmental Protection (10/21/2022 and 10/26/2022) and the Maine Geological Survey (10/26/2022), the District asked to consider several alternatives for protection of the WWTF site. The purpose of this memorandum is to summarize that alternatives analysis.

2 Design Objectives

The design objectives for these adaptation measures are as follows:

- To prevent hazardous or destructive wave energy from the east from damaging WWTF buildings and tanks.
- To prevent flooding of the buildings and tanks from any direction - ideally, for an indefinite period of time; or, worst case, for a minimum of 24 hours.
- To minimize operational requirements/actions required to protect the buildings and structures (e.g., installing flood barriers, filling tanks with water to prevent floatation, etc.).
- To minimize/eliminate any further encroachment on the site footprint as there is currently no excess space.

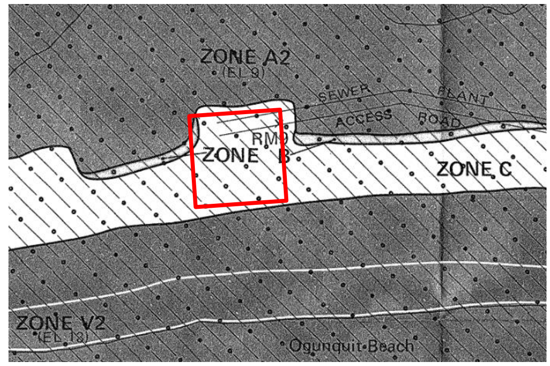
The specific tanks and structures on-site to be evaluated are:

- Clarifiers #1/#2,
- Digester #3,
- Aeration Tanks and SMH1,
- Digester #1/#2,
- Scum Pits #1/#2,
- Valve Pit A, B and C,
- Flow Splitter Box, and
- Chlorine Contact Tank/Effluent Sampler Building
- Utility Transformer

3 FEMA FIRM Mapping

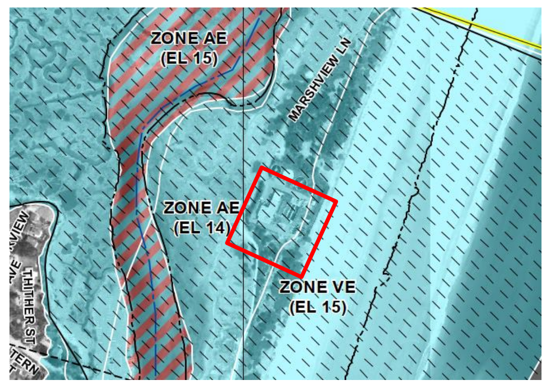
3.1 Effective FEMA Map

The effective flood mapping (Map No. 230632-0003C, revised 7/15/1992) identifies the 100-year flood elevation as A2 EL 9.0 (NGVD29) on-site and at V2 EL 13.0 (NGVD29) on the seaward side of the seawall (these are EL 8.26 and 12.26, respectively in NAVD88). The project area itself is classified as Zone C ("areas of minimal flooding"). This delineation is generally consistent with past and recent flooding events. The project area is not located within a coastal flood zone with a velocity hazard (wave action) because it is protected from that zone by the front dune.



3.2 Preliminary/Provisional FEMA Map

The preliminary/provisional flood mapping (Map No. 23031C0598G, revised preliminary 4/14/2017) identifies the 100-year flood at A2 EL 14.0 (NAVD88) on-site and at VE EL 15.0 (NAVD88) on the seaward side of the seawall. This map has been in preliminary status since 2014. This map is not yet effective but is a better tool to use when looking at future flood conditions in the area. The AE Zone corresponds with the 100-year flood and the VE zone corresponds with the velocity zone where there are wave hazards identified. The boundary of the VE zone corresponds with the boundary of the frontal dune.



Based on correspondence with the Maine Flood Plain Management Program (Susan Baker), the Town of Ogunquit did not appeal the provisional mapping; therefore, the provisional maps will likely become the effective mapping at some point in late 2023.

3.3 FEMA Flood Study Terminology

FEMA uses the following terminology in the Flood Study documents which form the basis for the floodplain boundary and floodplain elevations.

Stillwater Elevation (SWEL)	Total Stillwater Elevation	Floodplain Boundary	Coastal Base Flood Elevation	All Exclude
• Astronomical tide • Storm surge for 1% storm • Freshwater inputs (where relevant)	• Stillwater Elev • Wave setup	• Total Stillwater Elev for 1% storm	• Total Stillwater Elev for 1% storm • Storm-induced erosion • Overland wave propagation • Wave runup • Wave overtopping	• Sea level rise • Climate induced increases in storm surge and intensity • Site-specific modeling

The Preliminary 2022 FEMA Flood Insurance Study for York County, Maine (Study Number 23031CV002A) shows stillwater elevation in the vicinity of the Ogunquit WWTF (Coastal Transects 063 and 064) as:

- 1% recurrence (100-year) – EL 8.9 (NAVD88)
- 0.2% recurrence (500-year) – EL 9.5 (NAVD88)

The remainder of the difference between these elevations and the Coastal Base Flood EL 14.0/15.0 are based on storm-induced erosion, overland wave propagation, wave runup and wave overtopping. As noted above, the FEMA Flood Insurance Studies exclude sea level rise and climate induced increases in storm surge.

4 Flood Protection Elevations and Durations

4.1 TR-16 Guides for the Design of Wastewater Treatment Works

TR-16 is prepared by the New England Interstate Water Pollution Control Commission and was last revised in 2011 and 2016. The 2011 revisions were substantive and comprehensive, the 2016 revisions addressed flood protection guidance based on the increasing recognition of the impacts of climate change, sea level rise, and storm intensity. These guides are typically pushed by state regulatory agencies.

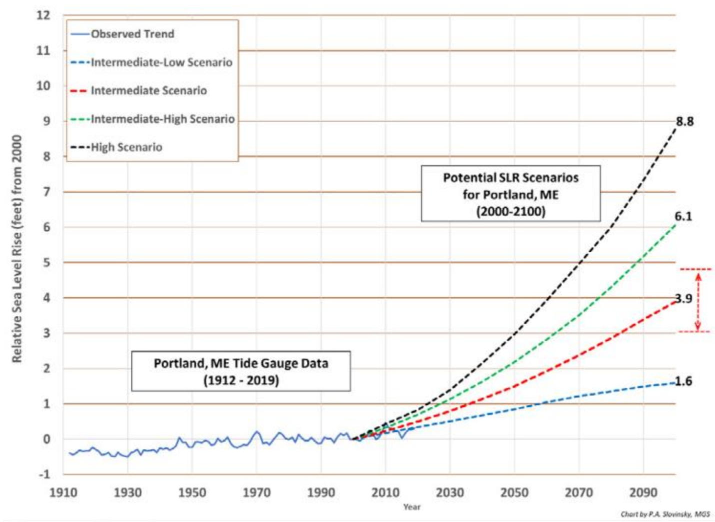
TR-16 recommends that critical wastewater infrastructure equipment be protected up to a water surface elevation that is 3 feet above the 100-year flood elevation and that non-critical equipment be protected up to a water surface elevation that is 2 feet above the 100-year flood elevation.

4.2 Other Implications of FEMA Elevations from Other Agencies

- Rural Development requires that projects be protected to the 500-year flood elevation. (Not applicable for current project)
- The 2015 Amendments to Executive Order 11988 state that facilities should be protected as follows:
  - "(i) the elevation and flood hazard area that result from using a climate-informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis;
  - "(ii) the elevation and flood hazard area that result from using the freeboard value, reached by adding an additional 2 feet to the base flood elevation for non-critical actions and by adding an additional 3 feet to the base flood elevation for critical actions;
  - "(iii) the area subject to flooding by the 0.2 percent annual chance flood; or
  - "(iv) the elevation and flood hazard area that result from using any other method identified in an update to the FFRMS [Federal Flood Risk Management Standard].
- The FEMA Letter of Map Revision (LOMR) process would be required to implement changes to the floodplain and flood elevation related to any site wide flood protection measures such as a sheeting wall or embankment.

4.3 Maine Climate Council (Sea Level Rise)

The Maine Climate Council has recommended that the State 'commit to manage' 1.5 feet of sea level rise by year 2050 and 3.9 feet of sea level rise by year 2100 (based on year 2000 sea levels). The Maine Climate Council also recommends that the state 'prepare to manage' (i.e., consider what would be required) 3 feet of sea level rise by year 2050 and 8.8 feet of sea level rise by year 2100. These recommendations correspond to the intermediate scenario and the high scenario projections which are shown in the inset figure.



Since the District's adaptation plan calls for relocation of the WWTF in 20-30 years, only the 2050 'commit to manage' will be considered.

4.4 Storm Surge

FEMA considers storm surge in the 'stillwater elevations' which are part of the Base Flood Elevation.

4.5 Existing Frontal Dune and Sea Wall

The WWTF was originally constructed at the current location in the early 1960s. In the 1970s, the existing dunes were breached several times by storms. In the late 1970s/early 1980s, the current frontal dune was constructed by the Army Corps of Engineers (vegetated earthen embankment with gravel core), including a sheet piling wall at the crest of the frontal dune on the seaward side of the WWTF. The top of the existing seawall is at EL 20.71-20.97 (NAVD88).

4.6 Conclusions

Given the following, it seems appropriate to utilize the provisional mapping and the 'non-critical equipment' designation to establish the flood protection elevation for the site at EL 16.0 (NAVD88):

- TR-16 are guidelines
- The effective mapping matches floods of record
- The provisional mapping (2022) accounts for a substantially more detailed analysis and substantially higher flood elevations than the effective mapping (1992), and
- The WWTF will be relocated in the next 20-30 years.

The following items should also be noted:

- Access to the site along Bourne Avenue, Atlantic Avenue and Marshview Lane will be limited beginning at approximately EL 9 to 10 (NAVD88).
- The State-designated Frontal Dune area is formed by the dune constructed by the ACOE.
- The WWTF site is located within the Coastal Barrier Resource System.

A sketch showing the various elevations described in Section 4 of this memorandum is included as Attachment A.

5 Site-Level Adaptation Alternatives

Based on discussions with the District and DEP, four site-level adaptation alternatives were identified for analysis:

1. Protect buildings and tanks by installing flood gates and raising tank walls
2. Protect site via perimeter sheeting wall
3. Protect site via perimeter earthen embankment
4. Do nothing

This desktop analysis utilized State mapping as well as existing site survey information. The analysis also considered the structural implications for Alternative 1, the geotechnical implications for Alternatives 2 and 3 and the permitting/land acquisition implications for each alternative. Haley & Aldrich (H&A) was retained to provide the geotechnical advice. Refer to Attachment B for narrative information provided by H&A. A summary of each alternative is provided below.

1-Protect Buildings and Tanks by Installing Flood Gates and Raising Tank Walls

One approach to protecting the site structures would be to extend the existing tank walls vertically up to the flood protection elevations. Extending tank walls vertically appears to be allowed under the Coastal Sand Dune rules (06-096-6.B.4). All other site work is within the existing disturbed area of the site and appears to be allowed under NRPA Permit-by-Rule. Refer to Figure 1. Refer to Table 1 (at the end of this memorandum) for key information, elevations and considerations for each structure.

The existing circular clarifiers #1 and #2 and Digester #3 were all constructed with pressure relief valves (PRVs) in the base slab to allow groundwater into the tanks to prevent uplift under high groundwater/flood conditions. Raising the tank walls and the existing PRVs is expected to protect these tanks.

For other tanks including the Aeration Tanks, Digester #1 and #2 and the Chlorine Contact Tank, the tanks would have to be filled with wastewater or plant water to the elevations identified in Table 1 in advance of anticipated flood events. The structural integrity of these tanks may be compromised without filling them with water.

The specific tanks and structures on-site to be protected are:

- Clarifiers #1/#2: clarifier drives/gear reducers, part of forward-flow treatment. Raise walls, maintain existing clarifier mechanisms.
- Digester #3: diffusers/ supernatant-decant piping. Dry flood protection not needed, defer upgrades.
- Aeration Tanks and SMH1: diffusers/submersible mixers/instruments in Aeration Tanks, nothing in SMH1, both part of forward-flow treatment. Raise walls.
- Digester #1: diffusers. Needed for solids handling. Raise walls.
- Digester #2: diffusers. Dry flood protection not needed, defer upgrades.
- Scum Pits #1/#2: no equipment. Dry flood protection not needed, will backflow if not protected. Backflow prevention required.
- Valve Pit A: no equipment, no back flow to tanks. Seal all penetrations and carrier pipes.
- Valve Pit B: flow meter, submersible sump pump, no back flow to tanks. Seal all penetrations and carrier pipes.
- Valve Pit C: no equipment, no back flow to tanks. Seal all penetrations and carrier pipes.
- Flow Splitter Box: no equipment, part of forward-flow treatment. Raise walls.

- Chlorine Contact Tank/Effluent Sampler Building: submersible pumps, top mounted mixers, electrical gear feeding effluent pumps, effluent sampler, part of forward-flow treatment. Raise walls and raise flood protection elevation in Effluent Sampler Building. If funds are not available, potentially defer raising the CCT walls but implement flood protection of Effluent Sampler Building.
- Utility Transformer: This transformer is owned by Central Maine Power. The District will discuss flood protection of this transformer with CMP.

Operations steps required for flood protection:

1. Fill all process tanks to design water surface elevation (WSE) to prevent tank floatation. Use sewage, return sludge and/or plant water. The amount of time this takes is dependent on the number of tanks off-line. At average sewage flow rates, this operation could take numerous hours.
2. Install flood gates at Control Building doors.
3. Install flood gates at walkways to Aeration Tanks, Secondary Clarifiers, and CCT/Effluent Sampler Building.
4. Close gate valves at Scum Pits #1/#2
5. Evacuate site prior to Bourne Avenue getting submerged (Ogunquit River EL 9-10).

This approach appears to require relatively straight-forward permitting (e.g., Natural Resources Protection Act Permit-by-Rule for projects adjacent to protected natural resources and activities in coastal sand dunes or may qualify for a statutory exemption, and potentially a Town of Ogunquit Shoreland Zone Permit). This approach would not require any rights-of-way or easements.

2-Protect Site via Perimeter Sheeting Wall

Another approach would be to construct a new perimeter sheeting wall around the site at the location of the existing chain link fence. This sheeting wall would not tie into the existing seawall and would be within the existing disturbed area of the site. DEP stated that the Coastal Sand Dune rules do not allow for new seawalls in the Frontal Dune but do allow for new seawalls in the Back Dune. DEP indicated that placing new seawall could potentially be allowed in the disturbed portion of the Frontal Dune through a legislative or executive branch approval given the unique circumstances that the District is facing. DEP indicated that this would not go through NRPA in this scenario. DEP indicated that the future WWTF relocation will require the removal of all unused and/or unneeded treatment facilities. Refer to Figure 2.

This alternative includes leaving the site at existing grade, installing steel sheeting wall around the perimeter of the site to EL 16.0 (NAVD88), installing a single flood protection gate at the site entrance, and installing stormwater pumping station(s) to remove stormwater from site inside the sheeting wall during rain events. Modifications to the existing drainage system may be required to collect stormwater.

The feasibility of sheeting walls for flood protection was evaluated by Haley & Aldrich, with the following preliminary recommendations, based on the high permeability of the existing site soils:

- Install a continuous vertical hot-rolled sheetpile cutoff wall around the perimeter of the WWTF from EL 16 down to approximately EL -32 (i.e., advanced 3 to 5 feet into the marine clay deposit).
- Design the sheeting wall to include a corrosion allowance or to prevent corrosion (e.g., active cathodic protection system, epoxy coating or vinyl sheets).

- Design the above grade portion of the sheeting wall to resist the unbalanced lateral hydrostatic loading of the design flood event.
- Design the sheeting wall to include a cap beam at the top of the sheets.

Numerous pipes cross the proposed location of the sheeting wall, as summarized below (listed clockwise, starting from the northwest corner of the site):

- UGE to Pump Station No. 1 and Pump Station No. 12
- 10” INF FM from Pump Station No. 2
- 2” INF FM from Pump Station No. 12
- 10” INF FM from Pump Station No. 1
- 18” SD/Outfall pipe to the Ogunquit River
- 6” W service
- UGE from CMP
- 14” EFF FM to the Atlantic Ocean

Given the high permeability of the site soils, these utility crossing will need to be treated carefully to maintain the flood protection objectives and operational requirements. If the utility can be shut down for a period of time, the best method would be to sever the existing utility, install the sheeting wall, burn a hole through the sheeting wall, reconnect the utility and backfill with low permeability fill or grout. If the utility cannot be shutdown, other more complicated approaches will be required.

This approach would require the same permits as Alternative 1 plus additional, more extensive efforts related to the FEMA Letter of Map Revision process and site flood protection certifications. This approach would not require any rights-of-way or easements unless existing utilities need to be moved outside of existing easements.

3-Protect Site via Perimeter Earthen Embankment

Coastal Sand Dune rules allow for “dune restoration” in the Frontal Dune area. This alternative includes constructing an earthen embankment around the perimeter of the site to EL 16 (NAVD88) which ties into the existing Frontal Dune. Stormwater pump station(s) would also be required for this alternative to remove stormwater from inside the embankment. The embankment would integrate the existing entrance (versus a flood gate across the roadway) and requires reconstruction of Marshview Lane in both directions to provide access between the existing Footbridge Bathhouse and Marshview Lane. A maximum grade of 5% would be allowed to ensure that large vehicles required for WWTF operations (sludge hauling, chemical delivery, small cranes, utility trucks, passenger vehicles) can access the site. During construction a temporary access road to the WWTF would have to be constructed so that daily operations can be maintained. Refer to Figure 3.

The feasibility of an earthen embankment for flood protection was evaluated by Haley & Aldrich, with the following preliminary recommendations, based on the high permeability of the existing site soils:

- Earthen embankment at 2 horizontal to 1 vertical (2H:1V) side slopes armored with a minimum 3-ft thick layer of heavy riprap with a low-permeability clay core to reduce water seepage through the embankment.
- A 3 to 4 foot wide flat area at the top of the embankment is anticipated.

- The earthen embankment will not meet the flood conditions objectives due to the seepage in the soils under the embankment. The embankment would provide some protection against wave action but would not meet the flood protection goals.
- A sheetpile cutoff wall within the footprint of the earthen embankment would be needed to meet the flood protection objective.

Earthen embankments are limited by a specific height to width ratio to maintain structural integrity. Due to the difference between existing grade and the flood protection elevation, the footprint of the embankments would be quite large and would result in significant permanent fill (i.e., approximately 5,100 CY) on the adjacent property (sensitive habitat) and potential adjacent coastal wetlands.

This approach would require the same permits as Alternative 2 plus more extensive environmental reviews based on the expanded site footprint. There is the potential that this alternative will also require a permit from the Army Corps of Engineers which triggers other reviews. A permit is required for any of the following conditions:

- Any work below the mean high-water mark
- Any placement of fill material below the high tide line (or HAT line in Maine)
- Any placement of fill in freshwater or salt marsh wetland

In addition, before any permit can be issued to place fill in freshwater or salt marsh wetland it will need to be demonstrated that there is no other practicable alternative. For salt marsh wetland, if impacts cannot be avoided compensatory mitigation is likely to be required at approximately $12/SF.

This approach would require additional property or easements to accommodate the earthen embankments.

4-Do Nothing

The do-nothing alternative does not meet the flood protection objectives identified herein. Sea level rise and increasing storm intensity are expected to increase the risk of flooding.

6 Comparison of Alternatives

A summary of the advantages and disadvantages for each alternative is presented in Table 2. Planning-level comparative costs were developed for the flood protection alternatives and are also presented in Table 2. These planning level costs were developed using standard cost estimating procedures consistent with industry standards utilizing conceptual layouts, unit cost information, and planning level cost curves as necessary. The 20-year costs are based on the construction cost. The costs presented is in 2022 dollars (December 2022, Engineering News Record Cost Index CCI 13175).

7 Closing Remarks

Selection among the site protection alternatives involves judging construction cost, replacement cost, current risks and future estimated risks. The intention of this memorandum is to provide a framework for decision-making, as there are sub-alternatives within each of the approaches described herein which could reduce cost or combine elements of the various approaches. Given the costs involved in site protection and the future WWTF relocation, it is important to consider the advantages, disadvantages and operational requirements associated with each alternative.

Prior to moving forward, each of these alternatives will require more detailed data collection efforts in the design phase; however, Alternatives 2 and 3 would require the most data collection (i.e., additional geotechnical investigations, wetland delineation, highest annual tide elevation (site-specific), habitat assessment and potentially supplemental site survey).

As the District considers the alternatives, it is important to understand that Alternative 1 was the basis for the MIAF grant and award. If Alternative 2 or 3 were selected, additional funds beyond the MIAF award would be required.

We appreciate the opportunity to complete this site alternatives analysis for the District. After you have reviewed this memorandum, please contact us to discuss any questions you or the Trustees may have.

ATTACHMENTS

A	Flood Elevations Sketch
B	Geotechnical Narrative

FIGURES

1	Alternative No.1	Raise Tank Walls/Flood Gates
2	Alternative No.2	Sheet Wall
3	Alternative No.3	Earthen Embankment

Table 1 – Key Elevations of Structures for Alternative No. 1

Structure	Approximate Construction Date	Approximate Dimensions	Grade EL (NAVD88)	Existing Top of Slab EL (NAVD88)	Existing Top of Wall EL (NAVD88)	Pressure Relief Valve EL (NAVD88)	Recommendation Based on Raising Top of Wall to EL 16.0 (NAVD88)	Critical Infrastructure Requiring Dry Flood Proofing?
Clarifiers #1/#2	~1991	45' diameter	10	-4.84	11.25'	3.73'	Fill with 13 ft water (~EL 8.2)	N
Aeration Tanks	~1963	91'L x 69' W	11	-6.8	11.58'	N/A	Fill with 16 ft water (~EL 9.2)	N
Digester #1	~1963	17'L x 21' W	10	-6.8	11.58		Fill with 9.5 ft water (~EL 2.7)	Y
Digester #2	~1963	17'L x 21' W	10	-6.8	11.58		Fill with 9.5 ft water (~EL 2.7)	N
Digester #3	~1982	55' diameter	10	-0.8	11.14'	2.0'	Fill with 12.5 ft water (~EL 11.7)	N
Chlorine Contact Tank and Effluent Sampler Building	~1991	52'L x 41'W	11-12	-1.46	13.58'	N/A	Fill with 9 ft water (~EL 7.6)	Y (Effluent Building), N (CCT)
Scum Pit #1	~1991	5' diameter	11-12	TBC	11.93	N/A	TBC in design phase, need to prevent backflow	N
Scum Pit #2	~1991	5' diameter	10	TBC	10.30	N/A	TBC in design phase, need to prevent backflow	N
Valve Pit "A"	~1991					N/A	TBC in design phase	N
Valve Pit "B"	~1991					N/A	TBC in design phase	N
Valve Pit "C"	~1982	6'x8'	10.2	10.2	10.26	N/A	TBC in design phase	N
Flow Splitter Box	~1991	10L x 8' W	10	4.13	10.46	N/A	TBC in design phase, need to prevent backflow	N
Sewer Manhole #1	~1991			12.33			Double check survey	N
Transformer Pad	~1991			13.01			Double check survey	Y
Control Building	~1963/1982			11.62 (16.00)			No change	Y
Process Building				15.58			Consider addition of stop logs at door openings to elevation 16.0 ft	Y

TBC= to be confirmed

Table 2 – Advantages, Disadvantages, Operator Actions Required and Comparative Cost Costs for Various Alternatives

Alternative	Advantages	Disadvantages	Operator Actions Required	Comparative Cost Estimate
#1-Protect Buildings and Tanks by Installing Flood Gates and Raising Tank Walls	• Permitted via existing rules • No work outside existing disturbed area • Meets flood protection objectives • Gives the District additional protection prior to future WWTF relocation	• Requires relocation of select existing handrails, walkways, instrumentation and electrical conduit/wire • Requires mechanical, control systems and electrical contractors	• Fill rectangular tanks prior to a flood event to protect against the potential for floatation or tank overstress conditions • Install flood gates at Control Building	• $3,400,000
#2-Protect Site via Perimeter Sheeting Wall	• Requires mostly earthworks contractor with limited multi-disciplinary work for a stormwater pump station • Little work outside existing disturbed areas • Meets flood protection objectives • Gives the District additional protection prior to future WWTF relocation	• Permitted by legislative or executive action but not regular permitting actions. •	• Close flood gates at the site perimeter. • Maintain/operation stormwater pump station	• $6,200,000
#3-Protect Site via Perimeter Earthen Embankment	• Requires mostly earthworks contractor with limited multi-disciplinary work for a stormwater pump station • Requires no operator intervention to protect the site • Gives the District additional protection prior to future WWTF relocation	• Significant disturbance beyond the existing site/fence line. • Requires property acquisition or permanent easements from the Town • Requires sheeting wall within the earthen embankment to meet flood protection objectives	• Maintain/operation stormwater pump station	• $11,100,000
#4-Do Nothing	• No construction costs	• No risk mitigation	• None	• $0

Note: Comparative construction cost estimates are presented in December 2022 dollars (ENR CCI 13175) and do not include all project costs.

ATTACHMENT A

OGUNGUIT SEWER DISTRICT
FLOOD ELEVATIONS SKETCH

BY EJL DATE 12/7/2022

CHCKD. BY ________ DATE ________

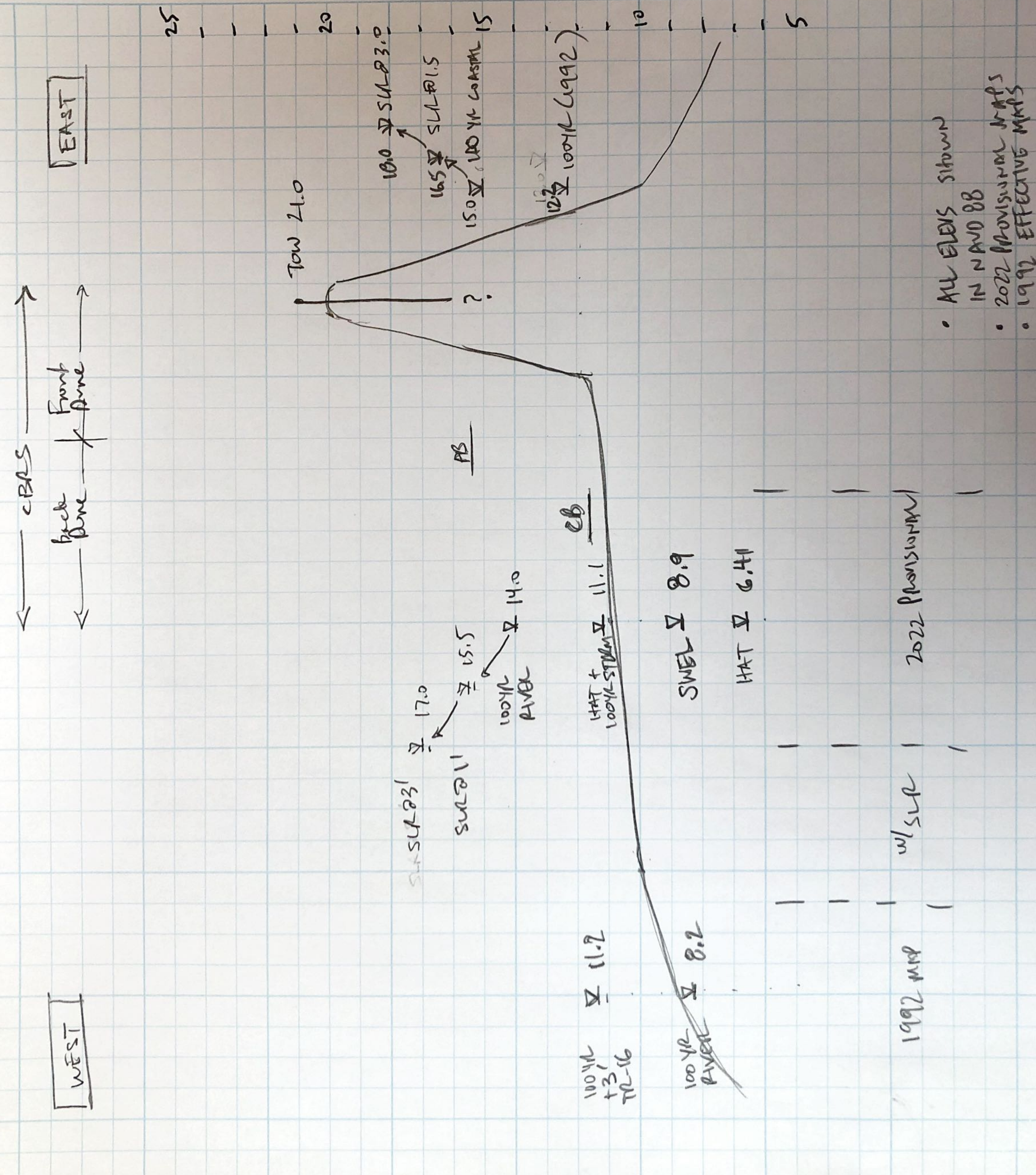
WRIGHT-PIERCE Engineering a Better Environment

SHEET NO. ________ OF ________

PROJECT NO. ________

PROJECT Ogunquit Sewer District WWTF

BOOK NO. ________



ATTACHMENT B

GEOTECHNICAL NARRATIVE

Geotechnical Narrative

SUBSURFACE EXPLORATIONS

Haley & Aldrich completed one test boring (HA15-2) at the site on 29 October 2015 in support of the proposed WWTF office building. The test boring was drilled to a depth of 80 ft below ground surface. The "as-drilled" boring location is shown on Figure 1 and the boring log is included in Appendix A.

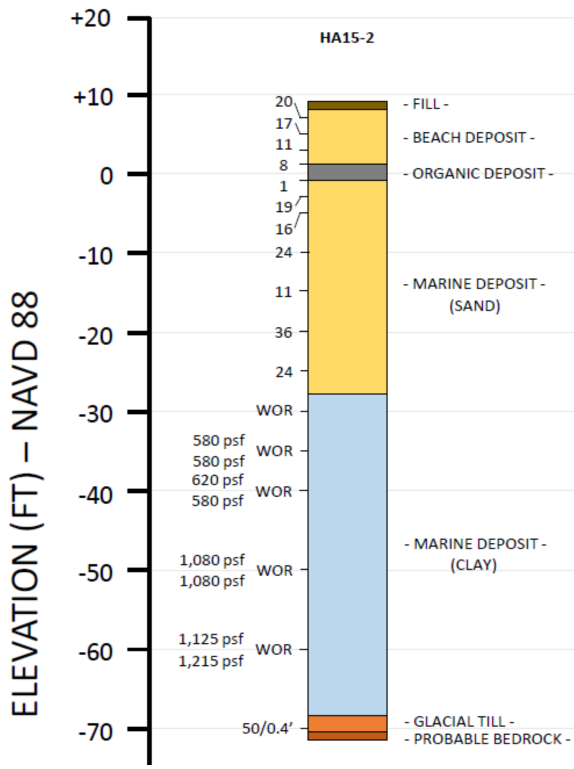
In addition, previous subsurface explorations were conducted at the site in support of the 1990 WWTF upgrade. Seven borings were drilled to depths ranging from approximately 22 to 37 ft below ground surface. The boring location plan and logs for this program are included in Appendix B.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the site consist of the following geologic units presented in order of increasing depth below ground surface:

- Bituminous concrete (sporadic)
- In-situ, man-placed fill (sporadic)
- Beach deposit
- Organic deposit (sporadic)
- Marine sand deposit
- Marine clay deposit
- Glacial till deposit
- Bedrock

The conditions encountered in boring HA15-2 are shown on the graphic. Detailed soil descriptions are provided on the boring log included in Appendix A.



EVALUATIONS

Model and Assumptions

Initial flood control seepage modeling was conducted using the computer program SEEP/W by GeoStudio. The following assumptions were made to set up these initial models:

- 100-year flood level - El. 15
- Astronomical high tide - El. 6.4
- Existing ground surface inside the facility - El. 10
- Existing ground surface outside the facility - El. 10 to El. 4
- Hydraulic conductivity of the beach deposits and marine sand deposits - $2x10^{-2}$ cm/sec
- Hydraulic conductivity of the marine clay deposits - $1x10^{-5}$ cm/sec
- Continuous, vertical hot-rolled sheetpile cutoff installed around the entire perimeter of the WWTF advanced to various depths

Initial Seepage Results

The results of the flood control seepage modeling indicate that flooding may occur within the facility starting as early as when the maximum flood elevation (El. 15) is first reached. With the sheetpile cutoff in place at El. 0, El. -10, and El. -20, the flooding within the facility is not prevented due to the relatively high permeability of the near surface, marine sand deposit. With increasing depth of the sheetpile cutoff, the water elevation inside the facility is decreased, but not enough that it will not rise above the ground surface (El. 10) relatively quickly (less than 24 hours). When the sheetpile cutoff is toed into the marine clay to El. -32 (4 ft toe), flooding within the facility is successfully prevented from rising above the ground surface (El. 10) for an extended period of time (more than 96 hours). The table below summarizes the results of the initial flood control seepage modeling.

Bottom of Sheeting Elevation (ft, NAVD 88)	Elapsed Time (hours)	Water Elevation Inside WWTF (ft, NAVD 88)	Flooding Occurs?
0	24	12.9	Yes
-10	24	12.1	Yes
-20	24	11.3	Yes
-32	24	7.6	No
	96	8.9	No

Notes:
1. Elapsed time is measured relative to the time when the flood level is reached (El. 15).
2. Seepage model assumed that a 24 hour duration is needed to reach the design the flood level.

CONTINUOUS SHEETPILE CUTOFF ALTERNATIVE

To prevent flooding within the facility, we recommend that a continuous sheetpile cutoff be installed around the perimeter of the WWTF. The cutoff should consist of hot-rolled sheets and be advanced 3 to 5 ft into the marine clay deposit. We anticipate sheets will extend from El. 16 (top) to approximately El. -32 (tip). The upper 5 to 6 ft of the sheetpile cutoff will be exposed above ground surface and will need to be designed to resist the unbalanced lateral hydrostatic loading of the design flood event. See photograph below for the exposed portion of a similar flood control cutoff system installed at LaGuardia airport in New York City. We recommend that a “cap beam” be installed at the top of the sheets.

Final design and sizing of sheetpile sections for the cutoff should account for corrosion loss/protection. The following options could be considered:

- include a corrosion allowance on each side of sheeting based on the desired design life of the system (1/16 in. is typical).
- install an active cathodic protection system
- use epoxy coated sheets (but there is risk of epoxy being damaged during installation)
- use vinyl sheets (would need to evaluate whether vinyl sheets could be driven to the depths required to penetrate into the clay)

For initial, concept-level planning purposes, we anticipate that the installed cost of a sheetpile cutoff system will range between $95 and $120/sf. For 50-ft long sheets and assuming a 250 ft by 300 ft perimeter area, the estimated total cost could be on the order of $5 to $6 million. Some additional costs will likely be incurred to address utility penetrations and the access road crossing (see section below).

EARTHEN EMBANKMENT DAM ALTERNATIVE

Due to the relatively high permeability of the near-surface marine sand deposit, an earthen embankment dam constructed around the perimeter of the WWTF would not be effective in preventing flooding (water would rise above ground surface in less than 24 hours) within the WWTF, but would provide resistance to wave energy. If this alternative was found to be technically feasible, the embankment cross section would generally consist of the following:

- 2 horizontal to 1 vertical (2H:1V) side slopes
- Outside slope armored with minimum 3-ft thick layer of heavy riprap
- A low-permeability clay core to reduce water seepage through the embankment

UTILITY AND ROADWAY CROSSINGS

We understand that there are currently five to ten below-grade utility crossings into the WWTF. Where possible, consideration should be given to rerouting the utilities to avoid the number of penetrations that are required through the sheetpile cutoff. For example, consider using overhead poles to bring power inside the facility.

The following alternatives should be considered at locations where below-grade utilities must remain and cross the cutoff alignment:

- Temporarily reroute the utility and demolish the portion of the line along/near the cutoff alignment. Install continuous sheetpile cutoff. Burn openings in the installed cutoff to allow penetration of the new utility line into the facility. Construct/install new line and connect into existing. Seal annual space between new utility and opening in sheetpile cutoff with a low permeability grout. Backfill the excavation.
- Excavate to expose the below-grade utility line near the cutoff alignment. Install sheetpile sections on either side of the utility, as close as possible without causing damage. Mobilize specialty geotechnical equipment and install a series of angled grouted holes between the edges of the sheets and the utility line. In order to fully enclose the space between the sheets, the

grouting must be successfully installed below the utility down to the top of (and slightly into) the marine clay. Backfill around the utility with low permeability grout that ties into the previously installed grouted mass. It will be difficult to prove out the success of the grouting operations.

To allow vehicular access into the WWTF, we recommend constructing an earthen ramp up and over the top of the cutoff. Alternatively, a sealed flood gate may be constructed across the driveway.

REQUIRED FUTURE WORK

Once a flood control approach is selected, we recommend that a supplemental field investigation and laboratory testing be performed to provide additional information for design and construction of the cutoff. Field explorations would likely consist of a series of four to eight test borings around the perimeter of the facility. The borings would extend into the marine clay deposit and in-situ permeability testing would be conducted in the granular soils. The investigation is required to determine the depth to marine clay and the hydraulic properties of the marine clay and overlying sand deposits.

Final design evaluations will be required to determine sheeting depths, sealant requirements at joint interlocks, sheeting sizing, corrosion protection, and utility penetration detailing.

APPENDIX A

RECENT TEST BORING LOG

TEST BORING REPORT

Boring No. HA15-2

Project	Ogunquit Waste Water Treatment Facility Upgrade, Ogunquit, Maine	File No.	41882-000
Client	Wright-Pierce	Sheet No.	1 of 4
Contractor	New England Boring Contractors	Start	29 October 2015
		Finish	29 October 2015
		Driller	B. Enos
		H&A Rep.	K. Russ

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	--	Rig Make & Model: Mobile B53 Truck
Inside Diameter (in.)	4.0	1.375	--	Bit Type: Roller Bit; Drill Mud: Bentonite
Hammer Weight (lb)	300	140	-	Casing: HW Drive to 9', mud to 80'
Hammer Fall (in.)	24	30	-	Hoist/Hammer: Winch Safety Hammer; PID Make & Model: None

Elevation 9.0
Datum NAVD 88
Location See Plan

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
0				8.7 / 0.3		-BITUMINOUS CONCRETE-										
						-FILL-	10	15	10	30	25	10				
	7 10 10 12	S1 12	1.0 3.0	7.7 / 1.3	SW-SM	Medium dense brown well graded SAND with silt and gravel (SW-SM), mps 1 in, no odor, wet					80	20				
					SP	Medium dense light brown poorly graded SAND (SP), mps 0.25 in, no odor, moist				10	86	4				
	6 8 9 8	S2 11	3.0 5.0		SP-SM	Medium dense light brown poorly graded SAND with silt (SP-SM), mps 0.42 mm, no odor, moist					80	20				
5	6 6 5 8	S3 18	5.0 7.0		SP-SM	Medium dense light brown poorly graded SAND with silt (SP-SM), mps 0.25 in, no odor, moist					70	30				
						-BEACH DEPOSIT-										
	6 5 3	S4 17	7.0 8.4		SP	Medium dense light brown to gray poorly graded SAND (SP), mps 0.25 in, no odor, moist					96	4				
	2 1	S4A 7	8.4 9.0	0.6 / 8.4	OL/OH	Soft brown ORGANIC SOIL (OL/OH), mps 0.42 mm, strong organic odor, roots, wet					15	85				
		S5 6	9.0 9.5													
10	WOH WOH 3	S5A 12	9.5 11.0	-0.5 / 9.5	SM	-ORGANIC DEPOSIT- Very soft gray silty SAND (SM), mps 0.42 mm, strong organic odor, wet, trace roots				2	71	27				
	5 7 12 9	S6 11	11.0 13.0	-2.0 / 11.0	SM	Medium dense gray silty SAND (SM), mps 1 in, no odor, wet	10				75	15				
	1 12 4 8	S7 8	13.0 15.0		SM	Medium dense gray silty SAND (SM), mps 0.42 mm, no odor, wet					85	15				
15																
						Note: Drill action indicates gravel layer from approximately 17.5 ft - 18.0 ft.										
	18 14 10 6	S8 11	18.0 20.0		SM	Medium dense gray silty SAND (SM), mps 1.25 in, no odor, wet	5				75	20				
						-MARINE DEPOSIT-										
20																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
- O - Open End Rod
- T - Thin Wall Tube
- U - Undisturbed Sample
- S - Split Spoon Sample

Well Diagram
- Riser Pipe
- Screen
- Filter Sand
- Cuttings
- Grout
- Concrete
- Bentonite Seal

Summary

Overburden (ft)	79.4
Rock Cored (ft)	
Samples	17S

Boring No. HA15-2

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None; **Toughness**: L - Low M - Medium H - High; **Plasticity**: N - Nonplastic L - Low M - Medium H - High; **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20																
	5 4 7 9	S9 14	23.0 25.0	-14.0 23.0	SM	Medium dense dark brown silty SAND (SM), mps 0.42 mm, slight organic odor, wet					85	15				
25				-17.0 26.0												
	11 17 19 18	S10 11	28.0 30.0		SM	Dense gray silty SAND with gravel (SM), mps 1.5 in, no odor, wet -MARINE DEPOSIT-	15	10	-	10	35	30				
30																
	17 11 13 12	S11 16	33.0 35.0		SM	Medium dense olive gray silty SAND (SM), mps 0.42 mm, no odor, wet					60	40				
35				-28.0 37.0												
	WOR WOR WOR WOR	S12 24	38.0 40.0		CL	Very soft olive gray lean CLAY (CL), few fine sand lenses, mps 0.42 mm, no odor, wet					5	95				
40																
	WOR WOR WOR WOR	S13 24	43.0 45.0		CL	Medium stiff olive gray lean CLAY (CL), occasional fine sand lenses, mps 0.42 mm, no odor, wet 55mm x 110 mm vane FV1: 43.3 ft- 43.8 ft: 150/24 in/lbs, Su= 580/95 psf FV2: 44.3 ft- 44.8 ft; 150/30 in./ lbs, Su= 580/115 psf					5	95				
45						-MARINE DEPOSIT-										
	WOR WOR WOR WOR	S14 24	48.0 50.0		CL	Medium stiff olive gray lean CLAY (CL), one fine sand seam, mps 0.42 mm, no odor, wet						100				

TEST BORING REPORT

HALEY ALDRICH

Boring No. HA15-2
File No. 41882-000
Sheet No. 3 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
50						55mm x 110 mm vane FV3: 48.3 ft-48.8 ft: 158/30 in/lbs, Su= 620/115 psf FV4: 58.3 ft-58.8 ft; 150/30 in./ lbs, Su= 580/115 psf										
55																
	WOR WOR WOR WOH	S15 24	58.0 60.0		CL	Stiff olive gray lean CLAY (CL), mps 0.075 mm, no odor, wet 65mm x 130 mm vane FV5: 58.3 ft-58.8 ft: 455/100 in/lbs, Su= 1,080/235 psf FV6: 59.3 ft-59.8 ft; 452/112 in./ lbs, Su= 1,080/275 psf -MARINE DEPOSIT-						100				
60																
65																
	WOR WOR WOR WOR	S16 24	68.0 70.0		CL	Stiff olive gray lean CLAY (CL), occasional fine sand seams, mps 0.075 mm, no odor, wet 65mm x 130 mm vane FV7: 68.3 ft-68.8 ft: 475/110 in/lbs, Su= 1,125/260 psf FV8: 69.3 ft-69.8 ft; 512/122 in./ lbs, Su= 1,215/290 psf					5	95				
70																
75																
				-68.5 77.5		Note: Drill action indicates strata change at approximately 77.5 ft.										
	17 17 50/5"	S17 6	78.0 79.4		GM	Very dense gray silty GRAVEL with sand (GM), mps 2.0 in, moderately bonded, no odor, wet	30	15	5	15	15	20				

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA15-2

HALEY ALDRICH

TEST BORING REPORT

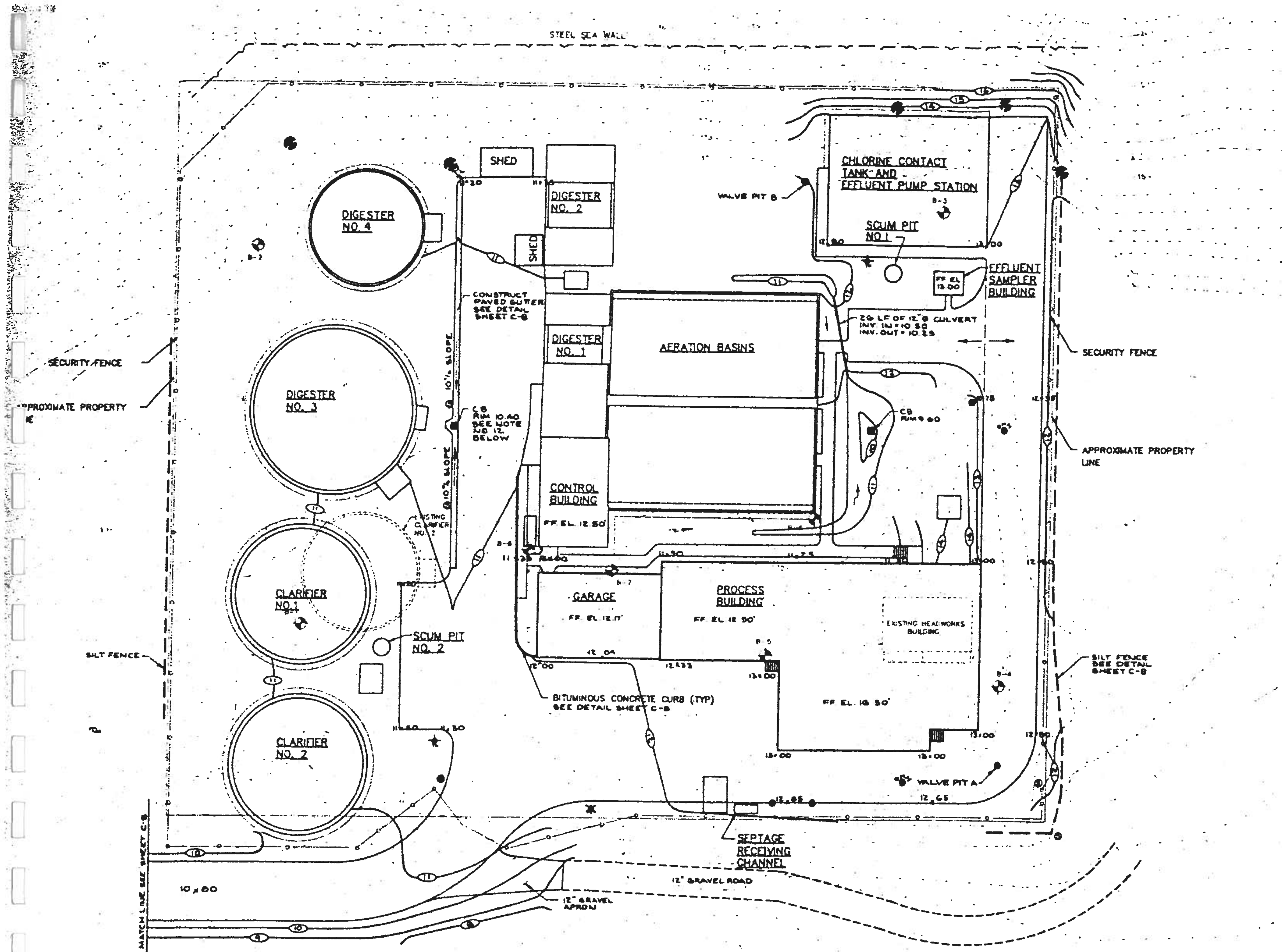
Boring No. HA15-2
File No. 41882-000
Sheet No. 4 of 4

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
				-70.4 79.4		-GLACIAL TILL-										
				-71.0 80.0		Note: Split spoon refusal at 79.4 ft. on probable bedrock. Advanced roller bit to 80.0 ft.										
						Bottom of Exploration at 80.0 ft.										

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

APPENDIX B

HISTORIC TEST BORING LOGS



LEGEND

EXISTING		PROPOSED
⊕	SEWER MANHOLE	●
	ELECTRICAL PULL BOX	⊚
⊖	CATCH BASIN	■
	DRAINAGE MANHOLE	
	SPOT ELEVATION	12x75
	FIRE HYDRANT	
	YARD HYDRANT	
B-1	BORINGS	
	SILTATION FENCE	— — —
— — 15 — —	CONTOUR	—(15)—

1. STRIPPING OF TOPSOIL SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02115 REFER TO SHEET C4 FOR LIMIT OF WORK

2. ALL ROAD AND PARKING AREA SURFACES SHALL PITCH 1/4 INCH PER FOOT MINIMUM UNLESS OTHERWISE NOTED. REFER TO C8 FOR PAVEMENT DETAILS

3. ALL AREAS THAT ARE EXCAVATED, FILLED, OR OTHERWISE DISTURBED BY THE CONTRACTOR SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED, UNLESS OTHERWISE NOTED. THE TOP 4 INCHES OF SOIL SHALL BE LOAM, REFER TO SPECIFICATION SECTION 02485.

4. THE CONTRACTOR SHALL PROVIDE PROPER EROSION CONTROL AND DRAINAGE MEASURES IN ALL EXCAVATED AND GRADED AREAS, AND CONFINE SOIL SEDIMENT TO WITHIN THE LIMITS OF GRADING. PRIOR TO BEGINNING EXCAVATION WORK, EROSION CONTROL FENCE SHALL BE INSTALLED AT THE DOWN GRADIENT PERIMETER OF THE ACTUAL LIMITS OF GRUBBING AND/OR GRADING, AS DIRECTED BY THE ENGINEER, AND AS SHOWN ON THE DRAWINGS. EROSION CONTROL FENCE SHALL ALSO BE INSTALLED AT THE DOWNGRADIENT PERIMETER OF THE TOPSOIL STOCKPILES. ALL DISTURBED EARTH SURFACES ARE TO BE STABILIZED IN THE SHORTEST PRACTICAL TIME AND TEMPORARY EROSION CONTROL DEVICES SHALL BE EMPLOYED UNTIL SUCH TIME AS ADEQUATE SOIL STABILIZATION HAS BEEN ACHIEVED. TEMPORARY STORAGE OF EXCAVATED MATERIAL IS TO BE IN A MANNER THAT WILL MINIMIZE EROSION. REFER TO SPECIFICATION SECTION 02270

5. ALL STORM DRAINAGE INLETS SHALL BE PROTECTED BY HAY BALE FILTERS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS DURING CONSTRUCTION.

6. BORING LOGS FOR THE WASTEWATER TREATMENT SITE ARE INCLUDED IN APPENDIX A OF THE SPECIFICATIONS.

[redacted] ALL ELEVATIONS REFER TO THE NATIONAL GEODETIC VERTICAL DATUM. ORIENTATION IS GRID NORTH MAINE STATE PLANE COORDINATE SYSTEM. [redacted]

8. CONTRACTOR SHALL CONTROL DUST TO A TOLERABLE LIMIT ON THE CONSTRUCTION SITE AS OUTLINED IN SPECIFICATION SECTION 01562.

9. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH AND DEBRIS ON PUBLIC STREETS.

10. ALL CATCH BASINS, MANHOLES AND VALVES SHALL BE ADJUSTED TO MATCH FINAL GRADES.

11. REMOVE AND DISPOSE OF ALL DEBRIS AND EXCESS EXCAVATED MATERIAL, FROM WITHIN THE CONSTRUCTION LIMITS, AT A SUITABLE SITE PROVIDED BY THE CONTRACTOR, IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS.

12. REMOVE EXISTING SANITARY SEWER MANHOLE FRAME AND COVER, AND REPLACE WITH A NEW CATCH BASIN FRAME AND COVER, WHERE NOTED ON THIS DRAWING.

NO.	REVISIONS
1	FOR BIDDING - SEPTEMBER 1990
2	REVISED DISINFECTION SYSTEM - APRIL 1991

WRIGHT-PIERCE
ENGINEERS
99 Main Street Topsham, Maine 04086
(207) 725-8721
170 Commerce Way Portsmouth, N.H. 03801
(603) 436-0174

OGUNQUIT SEWER DISTRICT
WASTEWATER TREATMENT FACILITY
UPGRADE
CONTRACT NO. 1

SITE GRADING PLAN

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT	WRIGHT & PIERCE	SHEET 1 OF 1	HOLE NO. B-1
DRILLER	DARREL MCKEEN	PROJECT NAME	OGUNQUIT TREATMENT PLANT
M.B. JOB NUMBER	89-228	LOCATION	OGUNQUIT, MAINE
LINE & STATION		OFFSET	

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START	DATE FINISH
12/20/89	12/20/89

SURFACE ELEVATION 12 ±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING
AUGER									
"									
"									
"	1D	2"	18"		4.0	3	5	5	
"									
2	2D	2"	18"		6.5	2	2	1	
2									
3									
2									
5									
3	3D	2"	18"		11.5	2	2	3	
3									
4									
28									
31									
23	4D	2"	18"		16.5	9	18	19	
42									
57									
65									
34									
29	D	2"	18"		21.5	10	12	14	
34									
21	5D	2"	18"		23.5	3	4	8	
28									
52									
41	D	2"	18"		26.5	13	23	25	
56									
72									
77									
90									
	6D	2"	18"		31.5	15	39	53	

DEPTH	STRATUM DESCRIPTION
1.0	BROWN SANDY SILT (TOPSOIL)
10.0	BROWN FINE-MED SAND ~ LOOSE ~
13.0	GRAY FINE-MED SAND, TR/WOOD ~ LOOSE ~
31.5	~ DENSE ~ GRAY FINE-MED SAND, TR/GRAVEL, TR/WOOD W= 54.9 % W/BLACK ORGANICS ~ DENSE ~
	BOTTOM OF BORING @ 31.5' CAVED @ 8.0' WATER @ 7.5'

SAMPLES
D = SPLIT SPOON
C = 2" SHELBY TUBE
S = 3" SHELBY TUBE
P = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[X] SOIL TECHNICIAN-VISUALLY
[X] LABORATORY TESTS

REMARKS:

(2)

HOLE NO. B-1

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT WRIGHT & PIERCE	SHEET 1 OF 1 HOLE NO. B-2
DRILLER DARREL MCKEEN	PROJECT NAME OGUNQUIT TREATMENT PLANT	LINE & STATION
JOB NUMBER 89-228	LOCATION OGUNQUIT, MAINE	OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BARREL	DATE START	DATE FINISH
	TYPE	NW	SS		12/21/89	12/21/89
AT 0.00 FT. AFTER 0.00 HOURS	SIZE I.D.	3"	1 3/8"		SURFACE ELEVATION	
	HAMMER WT.	300	140			
AT 0.00 FT. AFTER 0.00 HOURS	HAMMER FALL	16"	30"		12±	

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING
AUGER									
8	1D	2"	18"		4.0	1	1	4	
	2D	2"	18"		6.5	6	8	9	
5	3D	2"	18"		11.5	1	1	1	
	4D	2"	18"		16.5	7	19	29	
32	5D	2"	18"		21.5	10	15	17	
	6D	2"	18"		26.5	5	8	11	
30	7D	2"	18"		31.5	25	38	40	
20	D	2"	18"		34.0	6	23	30	
	8D	2"	18"		36.5	16	30	40	

DEPTH	STRATUM DESCRIPTION
1.0	BROWN SANDY SILT (TOPSOIL)
3.0	BROWN FINE-MED SAND
3.5	DARK BROWN SILTY PEAT
10.0	BROWN FINE-MED SAND ~ MEDIUM DENSE ~
12.5	BROWN SILTY FINE SAND W/ORGANICS ~LOOSE~
18.0	GRAY FINE-MED SAND ~DENSE~
23.0	GRAY FINE-CR SAND, TR/GRAVEL ~ DENSE ~
26.0	DARK BROWN ORGANICS, SILT & FINE SAND
36.5	GRAY FINE-MED SAND, TR/GRAVEL ~ DENSE ~
	BOTTOM OF BORING @ 36.5' CAVED @ 8.2' WATER @ 7.9'

SAMPLES
- D = SPLIT SPOON
- U = SHELBY TUBE
- = 3" SHELBY TUBE
- = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [X] SOIL TECHNICIAN-VISUALLY
- [X] LABORATORY TESTS

REMARKS:

(3)

HOLE NO. B-2

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: WRIGHT & PIERCE

SHEET 1 OF 1

HOLE NO. B-3

DRILLER: DARREL MCKEEN

PROJECT NAME: OGUNQUIT TREATMENT PLANT

LINE & STATION:

.B. JOB NUMBER: 89-228

LOCATION: OGUNQUIT, MAINE

OFFSET:

OUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START	DATE FINIS
12/21/89	12/21/89

SURFACE ELEVATION: 13.5±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING
AUGER									
"									
"									
"	1D	2"	18"		4.0	5	11	14	
"									
14	2D	2"	18"		6.5	6	11	8	
18									
21									
18									
[illegible]									
4	3D	2"	18"		11.5	1	1	2	
7									
[illegible]									
36									
47									
6	4D	2"	18"		16.5	6	14	16	
23									
24									
2									
8									
26	5D	2"	18"		21.5	14	15	19	
[illegible]									
[illegible]									
30									
29									
[illegible]	6D	2"	18"		26.5	12	20	22	
[illegible]									
74									
[illegible]									
	7D	2"	18"		31.5	11	21	28	

DEPTH	STRATUM DESCRIPTION
1.0	BROWN SANDY SILT (TOPSOIL)
8.0	BROWN FINE-MED SAND ~ MEDIUM DENSE ~
12.0	DARK BROWN SILTY FINE SAND W/ORGANICS ~ LOOSE ~
18.0	GRAY FINE-MED SAND ~DENSE~
23.0	GRAY FINE-MED SAND, TR/CR SAND & GRAVEL ~ DENSE ~
27.0	DARK BROWN FINE-MED SAND ~ DENSE ~
31.5	GRAY FINE-MED SAND, TR/GRAVEL ~ DENSE ~

BOTTOM OF BORING @ 31.5'
CAVED @ 8.8'
WATER @ 7.2'

SAMPLES
- SPLIT SPOON
- SHELBY TUBE
- 3" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [X] SOIL TECHNICIAN-VISUALLY
- [ ] LABORATORY TESTS

REMARKS:

4

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: WRIGHT PIERCE

SHEET 1 OF 1

HOLE NO. B-4

DRILLER: DARREL MCKEEN

PROJECT NAME: OGUNQUIT TREATMENT PLANT

LINE & STATION:

[illegible].B. JOB NUMBER: 89-228

LOCATION: OGUNQUIT, MAINE

OFFSET:

[illegible]ROUND WATER OBSERVATIONS

[illegible]T 3.00 FT. AFTER 0.00 HOURS

[illegible] 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START	DATE FINI[SH]
12/21/89	12/27/89

SURFACE ELEVATION: 12 ±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										1.0	BROWN SANDY SILT (TOPSOIL)
"											
"											
"	1D	2"	18"		4.0	2	2	3			~ LOOSE ~
"											
25	2D	2"	18"		6.5	6	12	22			BROWN FINE-MED SAND
50											
55											~ MEDIUM DENSE ~
42											
38											
8	3D	2"	18"		11.5	2	5	4		11.3	~ LOOSE ~
9											
8										13.0	GRAY FINE-MED SAND TRACE OF ORGANICS
17											
38											
25	4D	2"	18"		16.5	13	21	30			
53											
60											~ DENSE ~
55											
66											
28	5D	2"	18"		21.5	12	17	21			
40											GRAY FINE-MED SAND
55											
59											
49											
32	6D	2"	18"		26.5	5	10	12			~ MEDIUM DENSE ~
45											
63											
[illegible]3											
[illegible]6											
	7D	2"	18"		31.5	8	15	15		31.5	

BOTTOM OF BORING @ 31.5'
HOLE CAVED @ 10.0'
WATER @ 9.0'

SAMPLES
- [illegible]PLIT SPOON
- [illegible]" SHELBY TUBE
- 3" SHELBY TUBE

SOIL CLASSIFIED BY:
- XX DRILLER-VISUALLY
- X SOIL TECHNICIAN-VISUALLY
- ☐ LABORATORY TESTS

REMARKS:

5

MAINE TEST BORINGS, INC. BREWER, MAINE 04412	CLIENT WRIGHT-PIERCE	SHEET 1 OF 1 HOLE NO. B-5
DRILLER ERVIN GIGUERE	PROJECT NAME OGUNQUIT TREATMENT PLANT	LINE & STATION
M.T.B. JOB NUMBER [illegible]-228	LOCATION OGUNQUIT, MAINE	OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START	DATE FINISH
01/23/90	01/23/90

SURFACE ELEVATION 12.5 ±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING
AUGER									
[illegible]									
[illegible]	1D	2"	18"		3.5	9	6	7	
[illegible]									
[illegible]									
[illegible]2	2D	2"	18"		6.5	12	16	18	
28									
21									
[illegible]									
[illegible]									
4	3D	2"	18"		11.5	7	7	3	
[illegible]									
[illegible]									
23									
27									
[illegible]	4D	2"	18"		16.5	15	16	20	
[illegible]									
27									
	5D	2"	18"		21.5	31	53	57	

DEPTH	STRATUM DESCRIPTION
0.5	TOPSOIL
11.0	~ MEDIUM DENSE ~ BROWN FINE SAND ~ DENSE ~ ~ MEDIUM DENSE ~
13.0	GRAY MED-FINE SAND W/ ORGANIC FIBERS
18.0	GRAY MED-FINE SAND ~ DENSE ~
21.5	GRAY MED-FINE SAND W/ TRACE OF FINE GRAVEL ~ DENSE ~

BOTTOM OF BORING @ 21.5'

SAMPLES

D = SPLIT SPOON

U = [illegible]" SHELBY TUBE

T = 3" SHELBY TUBE

[illegible] 3½" SHELBY TUBE

SOIL CLASSIFIED BY:

[XX] DRILLER-VISUALLY

[X] SOIL TECHNICIAN-VISUALLY

[ ] LABORATORY TESTS

REMARKS:

6

HOLE NO. B-5

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: WRIGHT-PIERCE

SHEET 1 OF 1

HOLE NO. B-6

DRILLER: ERVIN GIGUERE

PROJECT NAME: OGUNQUIT TREATMENT PLANT

LINE & STATION

JOB NUMBER: 9-228

LOCATION: OGUNQUIT, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	NW	SS	
SIZE I.D.	3"	1 3/8"	
HAMMER WT.	300	140	
HAMMER FALL	16"	30"	

DATE START 01/22/90

DATE FINISH 01/23/90

SURFACE ELEVATION 12±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS 0-6	BLOWS 6-12	BLOWS 12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
AUGER										0.5	TOPSOIL
	1D	2"	18"		3.5	6	5	4			
2	2D	2"	18"		6.5	1	2	2			~ LOOSE ~
3											
2											
2											
3											BROWN FINE SAND
2	3D	2"	18"		11.5	2	3	2			GRAY MEDIUM TO FINE SAND
3											
5											
4											
3											~ LOOSE ~
[illegible]	4D	2"	18"		16.5	2	1	4			
5											
										19.0	GRAY MED-FINE SAND
	5D	2"	18"		21.5	5	6	8		21.5	~ MEDIUM DENSE ~
											BOTTOM OF BORING @ 21.5'

SAMPLES
D = SPLIT SPOON
U = 2" SHELBY TUBE
T = 3" SHELBY TUBE
= 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
[XX] DRILLER-VISUALLY
[X] SOIL TECHNICIAN-VISUALLY
[ ] LABORATORY TESTS

REMARKS:

7

HOLE NO. B-6

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: WRIGHT-PIERCE

SHEET 1 OF 1

HOLE NO. B-7

DRILLER: ERVIN GIGUERE

PROJECT NAME: OGUNQUIT TREATMENT PLANT

LINE & STATION:

JOB NUMBER: -228

LOCATION: OGUNQUIT, MAINE

OFFSET:

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HS	SS	
SIZE I.D.	2 1/2"	1 3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DATE START: 01/23/90

DATE FINISH: 01/23/90

SURFACE ELEVATION: 12±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING
	1D	2"	24"		4.0	7	6	7	16
	2D	2"	24"		6.0	8	12	15	17
	3D	2"	24"		8.0	8	14	20	23
	4D	2"	24"		10.0	9	10	17	14
	5D	2"	24"		12.0	5	7	7	10
	1C	2"	24"		14.0	HYD	PUSH		
	6D	2"	24"		16.0	7	14	21	27
	7D	2"	24"		18.0	11	14	21	27
	8D	2"	24"		20.0	11	16	34	41
	9D	2"	24"		22.0	12	13	21	37

DEPTH	STRATUM DESCRIPTION
0.5	TOPSOIL
5.8	BROWN FINE SAND W/ TRACE OF FINE GRAVEL ~ MEDIUM DENSE ~
11.7	BROWN MED-FINE SAND ~ DENSE ~
13.5	BROWN FINE SANDY SILT W/ ORGANIC SILTS W=30.5%
22.0	GRAY MED-FINE SAND ~ DENSE ~
	BOTTOM OF BORING @ 22.0'

SAMPLES
- D = SPLIT SPOON
- " SHELBY TUBE
- " SHELBY TUBE
- = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [X] SOIL TECHNICIAN-VISUALLY
- [X] LABORATORY TESTS

REMARKS:

8

HOLE NO. B-7

MAINE TEST BORINGS, INC.
BREWER, MAINE 04412

CLIENT: WRIGHT-PIERCE

SHEET 1 OF 1

HOLE NO. 8-8

DRILLER: ERVIN GIGUERE

PROJECT NAME: OGUNQUIT TREATMENT PLANT

LINE & STATION

JOB NUMBER: 9-228

LOCATION: OGUNQUIT, MAINE

OFFSET

GROUND WATER OBSERVATIONS

AT 0.00 FT. AFTER 0.00 HOURS

AT 0.00 FT. AFTER 0.00 HOURS

	CASING	SAMPLER	CORE BARREL
TYPE	HS	SS	
SIZE I.D.	2 1/2"	1 3/8"	
HAMMER WT.		140	
HAMMER FALL		30"	

DATE START 01/23/90

DATE FINISH 01/23/90

SURFACE ELEVATION 12 ±

CASING BLOWS PER FOOT	SAMPLE NO.	O.D.	PEN.	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	VANE READING	DEPTH	STRATUM DESCRIPTION
										0.2	CRUSHED STONE
	1D	2"	18"		3.5	3	2	5			~LOOSE~ BROWN FINE SAND
	2D	2"	18"		6.5	1	1	4			
	3D	2"	18"		11.5	3	2	3		15.0	GRAY COARSE TO MEDIUM SAND ~LOOSE~
	4D	2"	18"		16.5	8	12	28			GRAY MED-FINE SAND ~DENSE~
	5D	2"	18"		21.5	14	17	27		21.5	
											BOTTOM OF BORING @ 21.5'

SAMPLES
- D = SPLIT SPOON
- " SHELBY TUBE
- = 3" SHELBY TUBE
- = 3½" SHELBY TUBE

SOIL CLASSIFIED BY:
- [XX] DRILLER-VISUALLY
- [X] SOIL TECHNICIAN-VISUALLY
- [ ] LABORATORY TESTS

REMARKS:

9

HOLE NO. 8-8

KEY TO THE NOTES & SYMBOLS

Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

The boring logs were submitted by the drilling contractor. Modifications have been made by S. W. Cole Engineering, Inc. based on visual examination and laboratory testing of samples.

w - water content, percent (dry weight basis)

q_u - unconfined compressive strength, kips/sq. ft. - based on unconfined compressive test

S_v - field vane shear strength, kips/sq. ft.

L_v - lab vane shear strength, kips/sq. ft.

q_p - unconfined compressive strength, kips/sq. ft., pocket penetrometer

O - organic content, percent (dry weight basis)

W_L - liquid limit - Atterberg test

W_P - plastic limit - Atterberg test

WOH - advance of sampler by weight of hammer

WOR - advance of sampler by weight of rods

HYD - advance of sampler by force of hydraulic piston on drill

RQD - Rock quality designator - An index of the quality of a rock mass. RQD is computed from recovered core samples.

REFUSAL: Test Boring Explorations - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: Test Pit Explorations - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

FIGURES

NOTES:

1. ALL ELEVATIONS ARE NAVD 1988.
2. WETLAND AND DUNE LINES FROM OGUNQUIT GIS (NOT DELINEATED)
3. HA15-2 APPROXIMATE LOCATION OF BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS, INC. OF HERMAN, MAINE ON OCTOBER 28-29, 2015. LOCATIONS OF TEST BORING WAS DETERMINED IN THE FIELD BY TAPING DISTANCES FROM EXISTING SITE FEATURES. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.
4. RAISE TANK WALLS:
   CLARIFIERS NO.1 & NO.2
   AERATION BASINS
   FLOW SPLITTER BOX
   CHLORINE CONTACT TANK AND EFFLUENT SAMPLER BUILDING
   DIGESTER NO.1

NO	REVISIONS	APP'D	DATE
1			
2			
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PROJECT NO: 21293
DESIGNED: V.GIGUERE
CAD COORD: A.COUTURE
CAD: A.COUTURE
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION: CONCEPTUAL DESIGN

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OGUNQUIT SEWER DISTRICT
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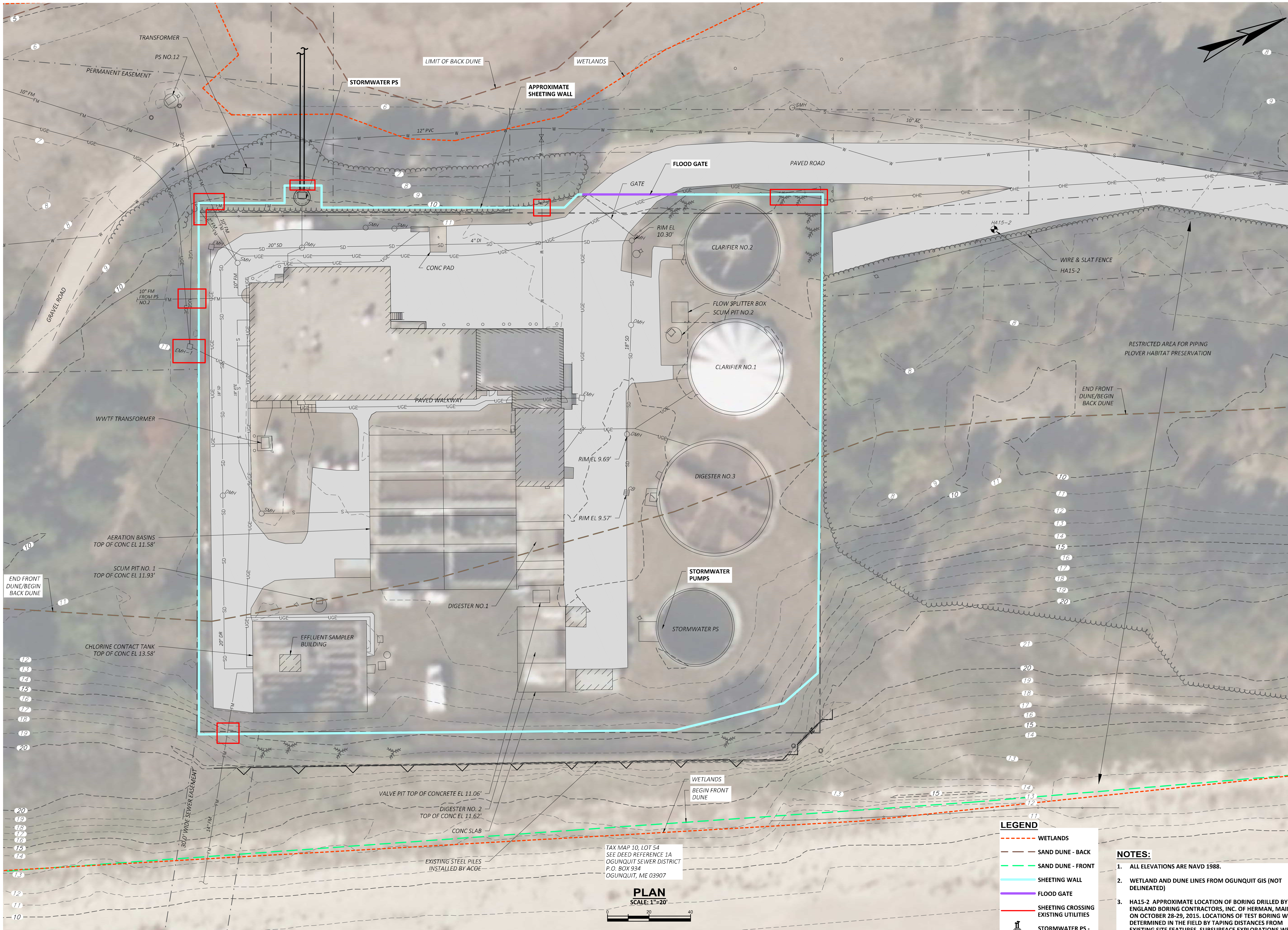
WASTEWATER TREATMENT FACILITY ADAPTATION UPGRADES

ALTERNATIVE NO.1
PROTECT BUILDINGS AND TANKS
(FLOOD GATES/RAISE TANK WALLS)

DRAWING
FIGURE 1

LAST SAVED BY: ADAM.COUTURE 1/16/2023 8:30 AM

J:\ENG\ME\OGUNQUITSD\21293-WWTF-PS-ADAPTATION-UPGRADES_DRAWINGS\CIV\21293-CS-SITEPLAN-PROPOSED.DWG | Site Plan - Alt 2 - 20 Scale | 1:2.5849 | ---- | 1/16/2023 8:31:28 AM | ADAM.COUTURE



LEGEND

- WETLANDS
- SAND DUNE - BACK
- SAND DUNE - FRONT
- SHEETING WALL
- FLOOD GATE
- SHEETING CROSSING EXISTING UTILITIES
- STORMWATER PS - W/ DUAL FM'S

NOTES:

1. ALL ELEVATIONS ARE NAVD 1988.
2. WETLAND AND DUNE LINES FROM OGUNQUIT GIS (NOT DELINEATED)
3. HA15-2 APPROXIMATE LOCATION OF BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS, INC. OF HERMAN, MAINE ON OCTOBER 28-29, 2015. LOCATIONS OF TEST BORING WAS DETERMINED IN THE FIELD BY TAPING DISTANCES FROM EXISTING SITE FEATURES. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.

NO	REVISIONS	APP'D	DATE
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PROJECT NO: 21293
DESIGNED: V.GIGUERE
CAD COORD: A.COUTURE
CAD: A.COUTURE
CHECKED:
DATE:
APPROVED:
DATE:
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ALTERNATE NO.2
PROTECT SITE - PERIMETER SHEETING WALL

DRAWING
FIGURE 2

LEGEND

- WETLANDS
- SAND DUNE - BACK
- SAND DUNE - FRONT
- NEW PAVEMENT

NOTES:

1. ALL ELEVATIONS ARE NAVD 1988.
2. WETLAND AND DUNE LINES FROM OGUNQUIT GIS (NOT DELINEATED)
3. HA15-2 APPROXIMATE LOCATION OF BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS, INC. OF HERMAN, MAINE ON OCTOBER 28-29, 2015. LOCATIONS OF TEST BORING WAS DETERMINED IN THE FIELD BY TAPING DISTANCES FROM EXISTING SITE FEATURES. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.

NO	REVISIONS	APP'D	DATE
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4			
5			

PROJECT NO: 21293
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CAD COORD: A.COUTURE
CAD: M.LAPIERRE
CHECKED:
DATE:
APPROVED:
DATE:
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ALTERNATIVE NO.3
EARTHEN EMBANKMENT

DRAWING
FIGURE 3

Appendix B
Preliminary Design Drawings

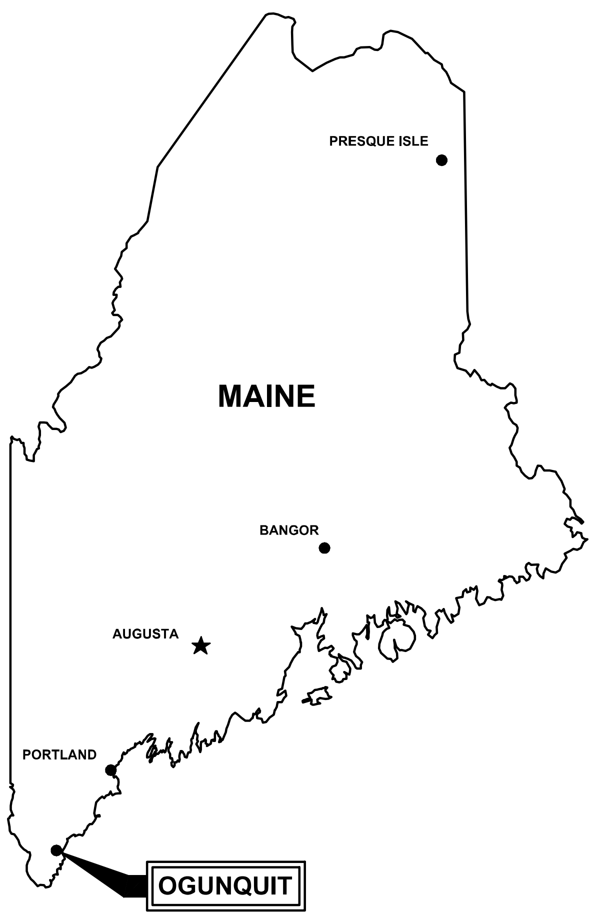
OGUNQUIT SEWER DISTRICT
OGUNQUIT, MAINE

PRELIMINARY DESIGN DRAWINGS FOR

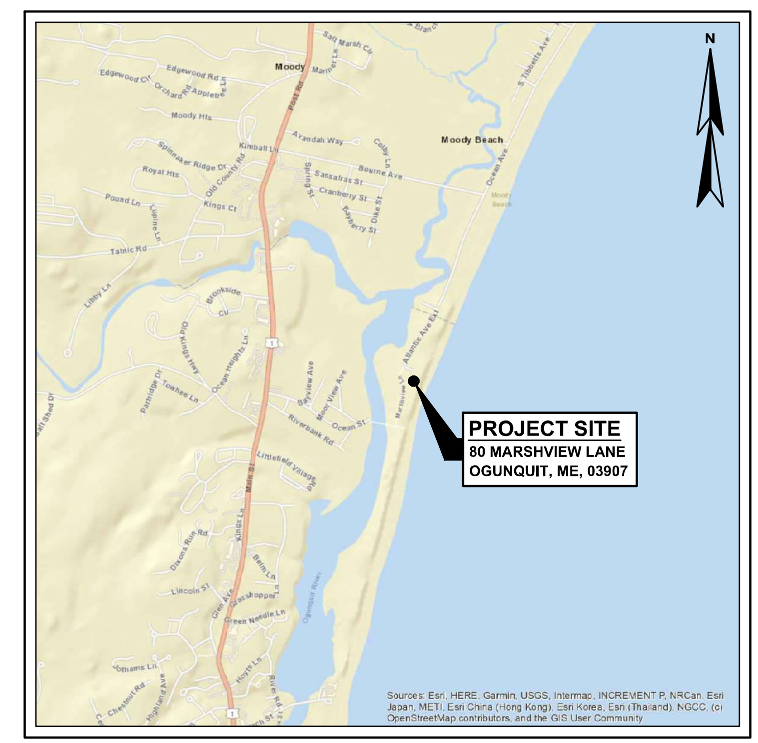
PHASE 4 WWTF
ADAPTATION UPGRADES

NOVEMBER 2023

PRELIMINARY DESIGN REVIEW



DRAWING INDEX



LOCATION PLAN
SCALE: 1"=2,000'

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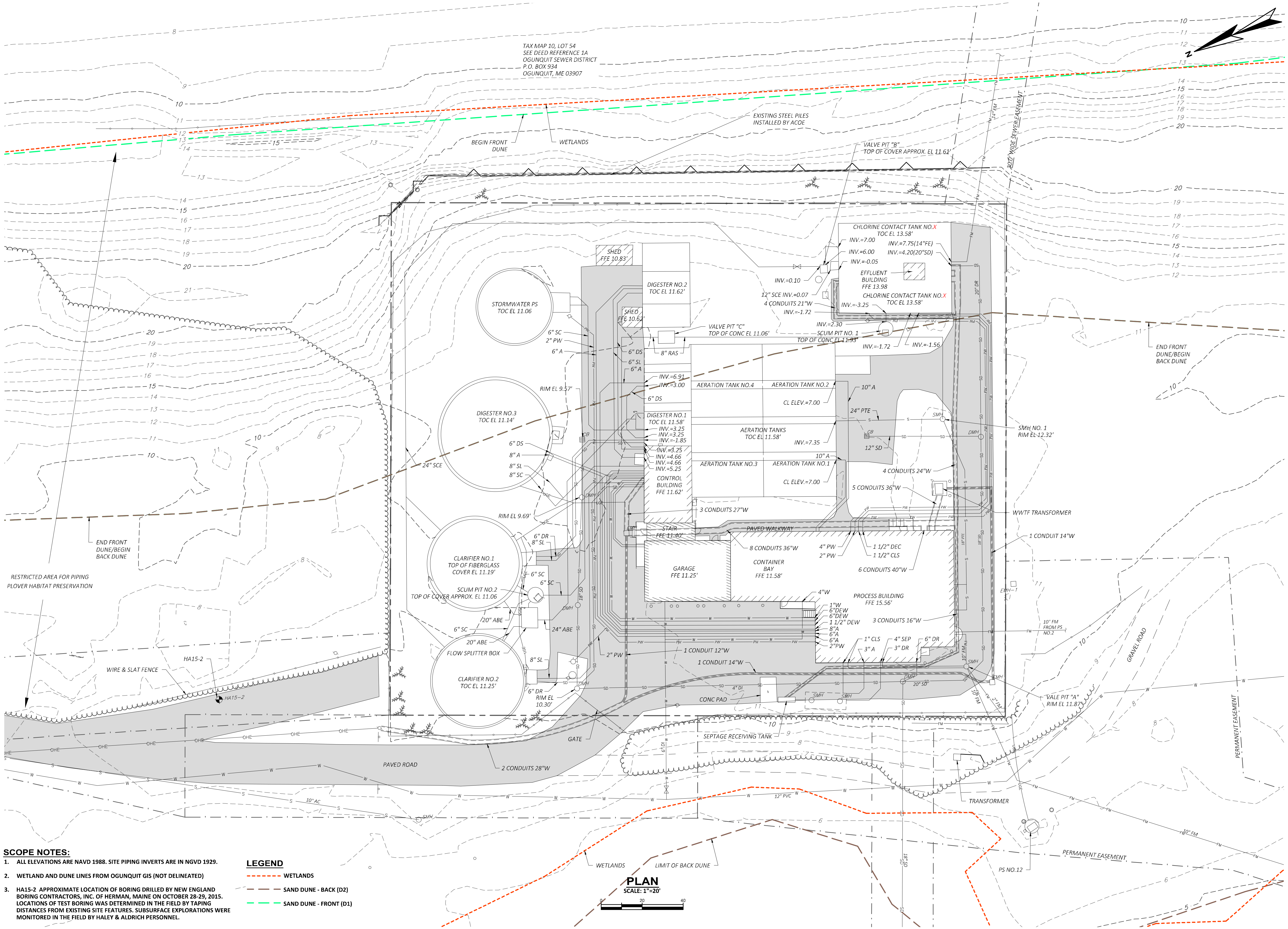
WP PROJECT No. 21293



PLAN
SCALE: 1"=20'

SCOPE NOTES:

1. ALL ELEVATIONS ARE NAVD 1988. SITE PIPING INVERTS ARE IN NGVD 1929.
2. WETLAND AND DUNE LINES FROM OGUNQUIT GIS (NOT DELINEATED)
3. HA15-2 APPROXIMATE LOCATION OF BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS, INC. OF HERMAN, MAINE ON OCTOBER 28-29, 2015. LOCATIONS OF TEST BORING WAS DETERMINED IN THE FIELD BY TAPING DISTANCES FROM EXISTING SITE FEATURES. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.

LEGEND

- WETLANDS
- SAND DUNE - BACK (D2)
- SAND DUNE - FRONT (D1)

REVISIONS

NO		APP'D	DATE

PROJECT NO: 21293
DESIGNED: V.GIGUERE
CAD COORD: A.COUTURE
CAD: A.COUTURE
CHECKED:
DATE:
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DATE:
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OGUNQUIT SEWER DISTRICT
OGUNQUIT, MAINE
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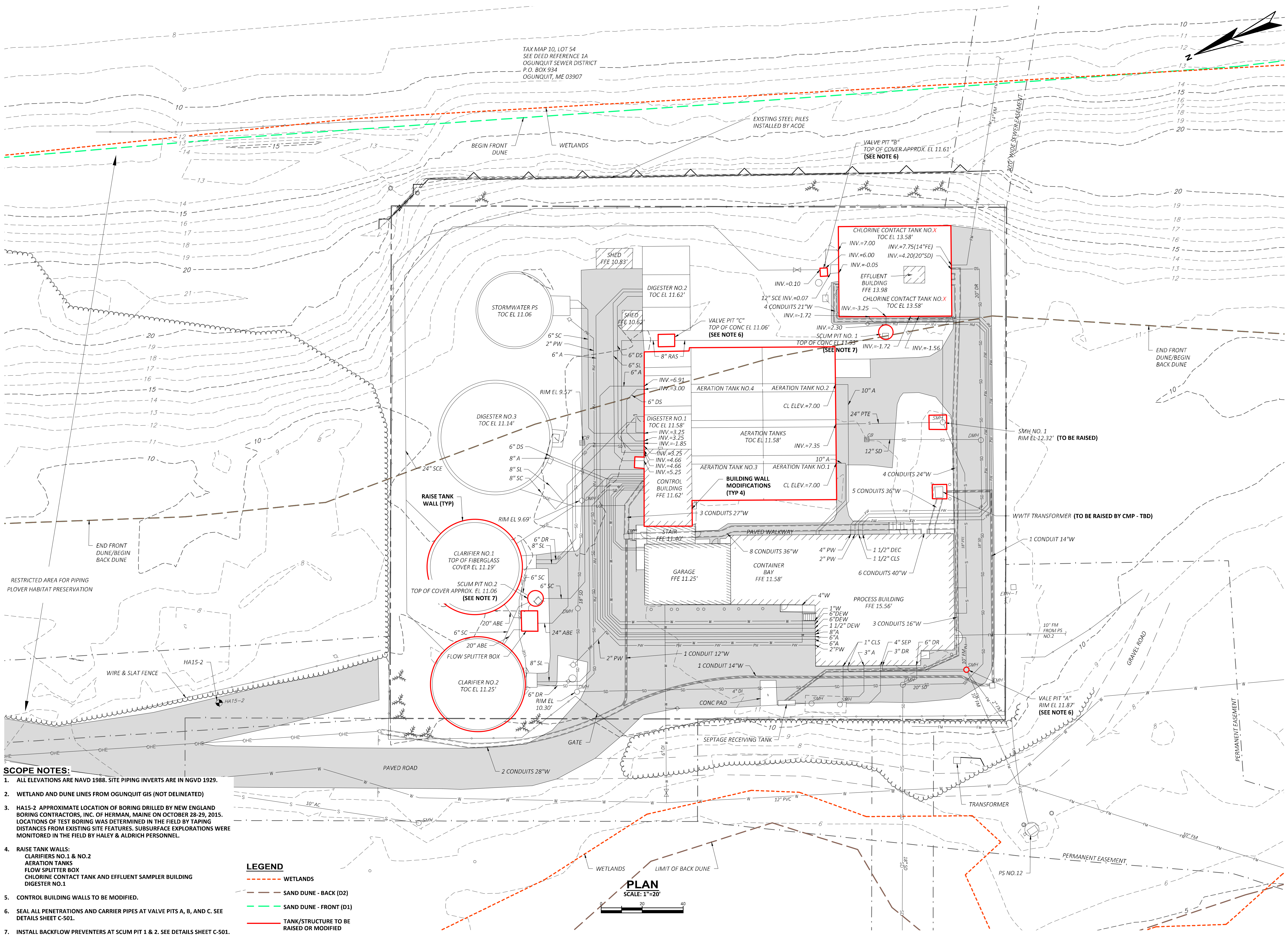
ADAPTATION UPGRADES

EXISTING SITE CONDITIONS AND DEMOLITION PLAN

DRAWING
C-101



SCOPE NOTES:

1. ALL ELEVATIONS ARE NAVD 1988. SITE PIPING INVERTS ARE IN NGVD 1929.
2. WETLAND AND DUNE LINES FROM OGUNQUIT GIS (NOT DELINEATED)
3. HA15-2 APPROXIMATE LOCATION OF BORING DRILLED BY NEW ENGLAND BORING CONTRACTORS, INC. OF HERMAN, MAINE ON OCTOBER 28-29, 2015. LOCATIONS OF TEST BORING WAS DETERMINED IN THE FIELD BY TAPING DISTANCES FROM EXISTING SITE FEATURES. SUBSURFACE EXPLORATIONS WERE MONITORED IN THE FIELD BY HALEY & ALDRICH PERSONNEL.
4. RAISE TANK WALLS:
   - CLARIFIERS NO.1 & NO.2
   - AERATION TANKS
   - FLOW SPLITTER BOX
   - CHLORINE CONTACT TANK AND EFFLUENT SAMPLER BUILDING
   - DIGESTER NO.1
5. CONTROL BUILDING WALLS TO BE MODIFIED.
6. SEAL ALL PENETRATIONS AND CARRIER PIPES AT VALVE PITS A, B, AND C. SEE DETAILS SHEET C-501.
7. INSTALL BACKFLOW PREVENTERS AT SCUM PIT 1 & 2. SEE DETAILS SHEET C-501.

LEGEND

- WETLANDS
- SAND DUNE - BACK (D2)
- SAND DUNE - FRONT (D1)
- TANK/STRUCTURE TO BE RAISED OR MODIFIED

LAST SAVED BY: ADAM.COUTURE 11/9/2023 3:26 PM

J:\ENG\ME\OGUNQUIT\SD\21293-WWTF-PS-ADAPTATION-UPGRADES_DRAWINGS\CIVIL\21293-CS-SITEPLAN-PROPOSED.DWG | ProposedSitePlan | 1:2.5849 | — | 11/9/2023 3:26:30 PM | ADAM.COUTURE

NO	REVISIONS	DATE	APP'D

PROJECT NO: 21293
DESIGNED: V.GIGUERE
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OGUNQUIT SEWER DISTRICT
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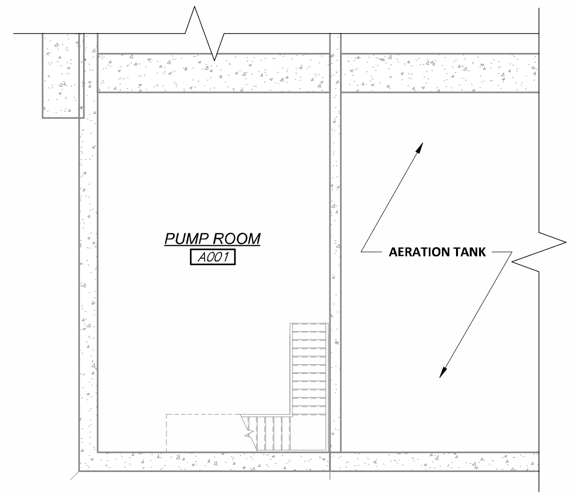
ADAPTATION UPGRADES

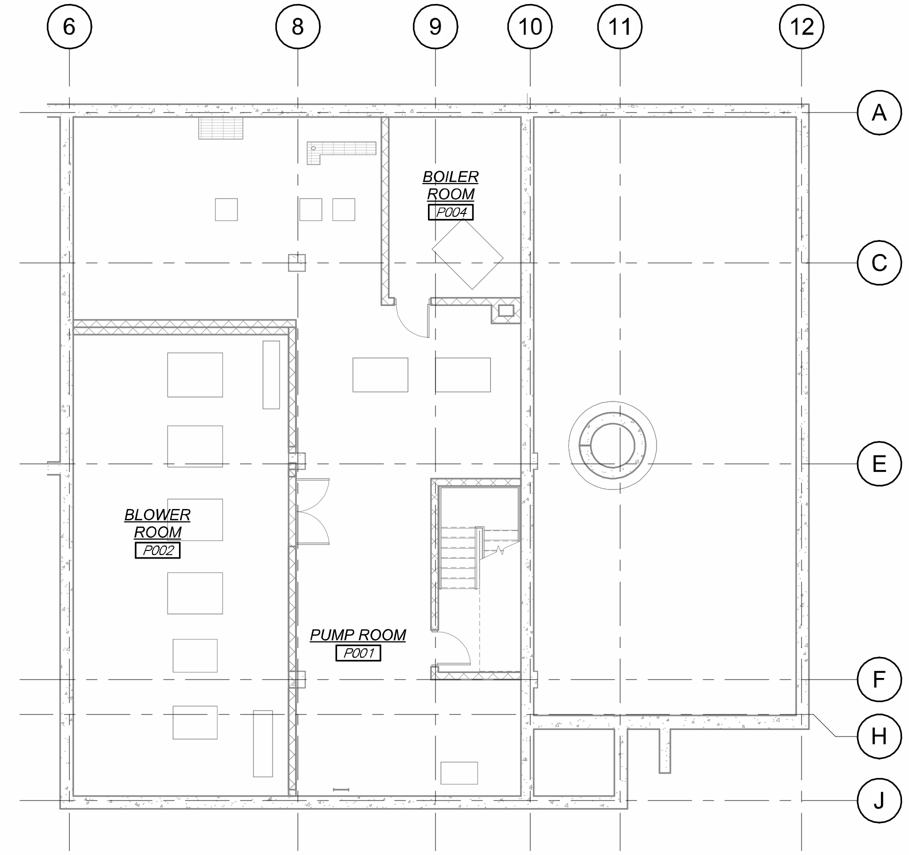
SITE MODIFICATIONS PLAN

DRAWING
C-102



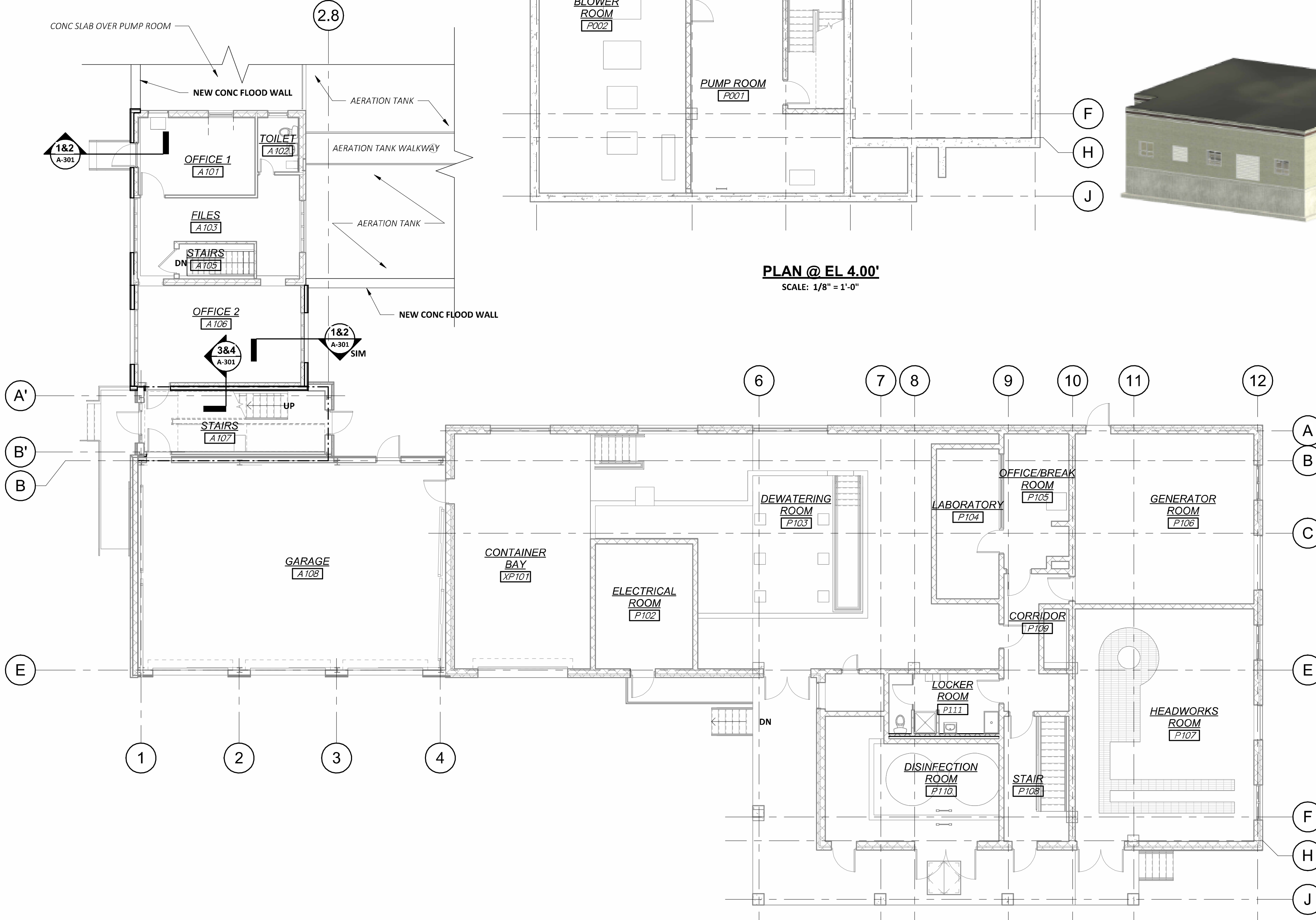
PLAN @ EL -6.00'

SCALE: 1/8" = 1'-0"



PLAN @ EL 4.00'

SCALE: 1/8" = 1'-0"



PLAN @ EL 11.58'

SCALE: 1/8" = 1'-0"

NO		APP'D	DATE
1		EJL	03/18
2		EJL	07/18
3			
4			
5			

REVISIONS

PROJECT NO: 21293
DESIGNED: R.WILLIAMS
CAD COORD: A.COUTURE
CAD: S.RICKLEY
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DATE:
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ADAPTATION UPGRADES

FLOOR PLANS AND 3D VIEWS

DRAWING
A-101

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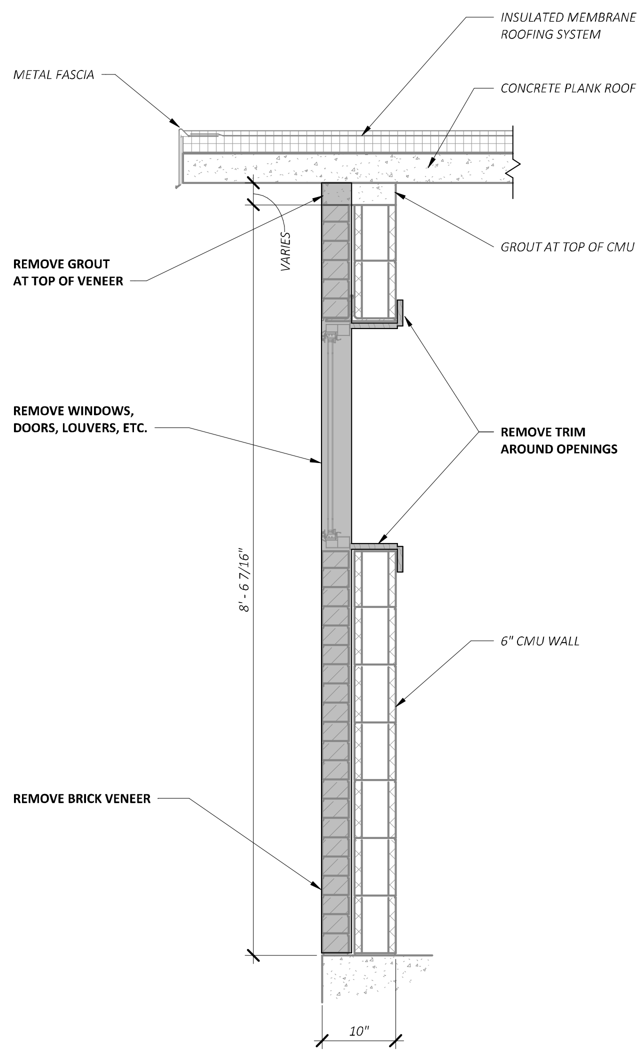
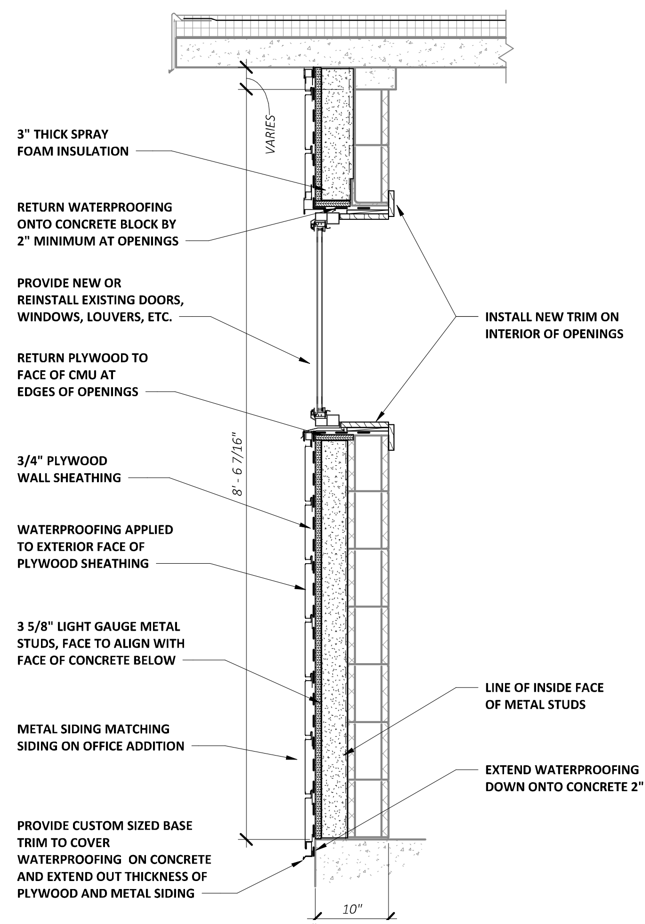


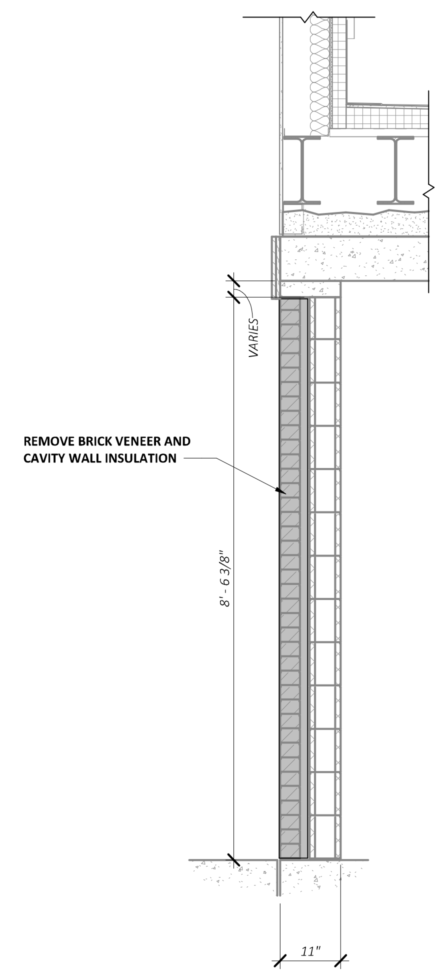
1 REMOVALS
SCALE: 1" = 1'-0"

NOTE: THIS SECTION TYPICAL OF EXTERIOR WALLS.



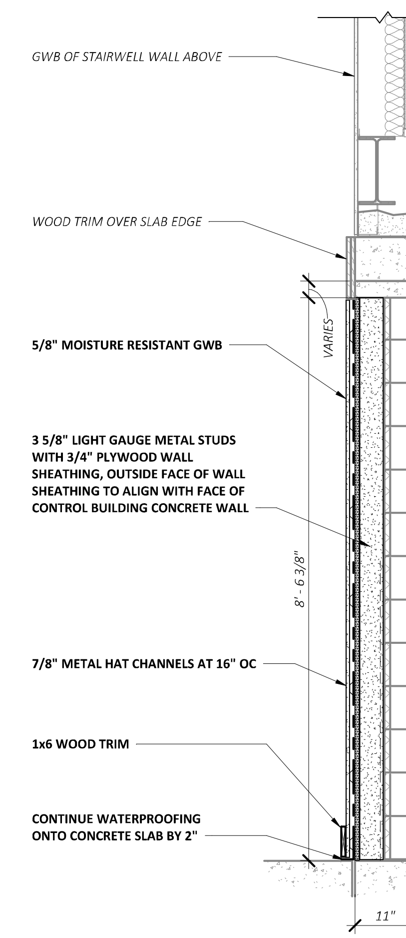
2 MODIFICATION
SCALE: 1" = 1'-0"

NOTE: THIS SECTION TYPICAL OF EXTERIOR WALLS.



3 REMOVALS
SCALE: 3/4" = 1'-0"

NOTE: THIS SECTION TYPICAL OF WALL BETWEEN CONTROL BUILDING AND STAIRWELL.



4 MODIFICATION
SCALE: 3/4" = 1'-0"

NOTE: THIS SECTION TYPICAL OF WALL BETWEEN CONTROL BUILDING AND STAIRWELL.

NO	REVISIONS	APP'D	DATE
1			
2			
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PROJECT NO: 21293
DESIGNED: R.WILLIAMS
CAD COORD: A.COUTURE
CAD: S.RICKLEY
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DATE:
APPROVED:
DATE:
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WALL SECTIONS

DRAWING
A-301

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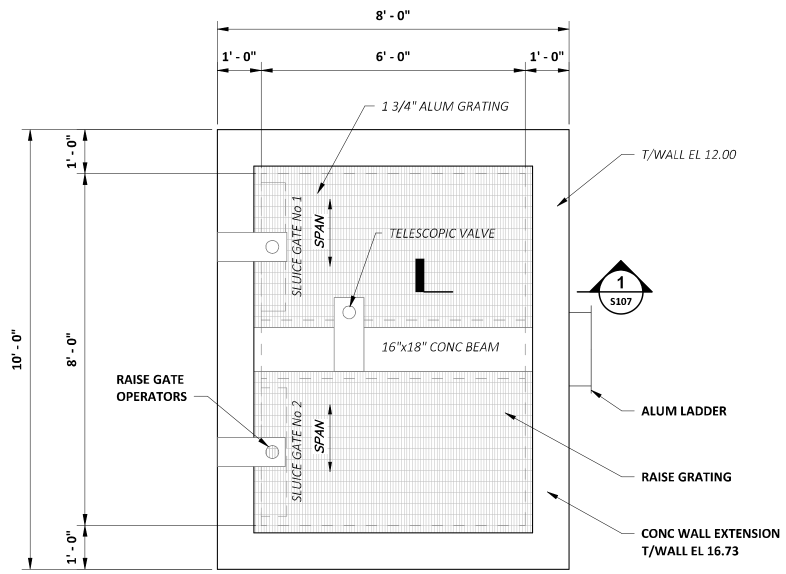
DATUM NGVD 1929



TOP PLAN MODIFICATIONS

SCALE: 1/2" = 1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-1. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
CHECKED:
DATE:
APPROVED:
DATE:
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OGUNQUIT SEWER DISTRICT
OGUNQUIT, MAINE
PHASE 4 WWTF
ADAPTATION UPGRADES

FLOW SPLITTER BOX - PLANS

DRAWING
S-102

11/2/2023 3:36:06 PM

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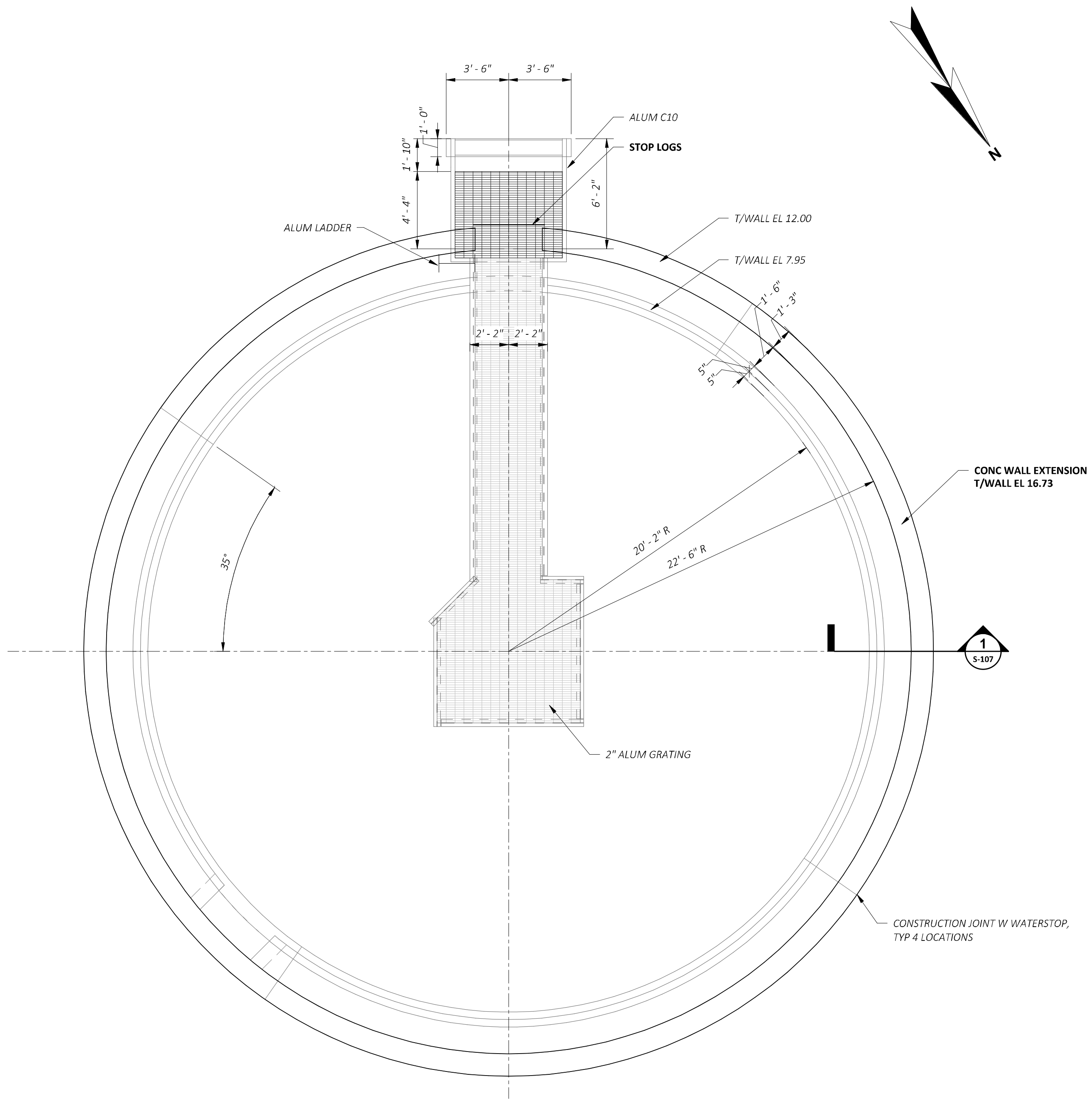
DATUM NGVD 1929



TOP PLAN MODIFICATIONS

SCALE: 1/4" = 1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-001. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	APP'D	DATE
1			
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PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
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CLARIFIER NO. 1 - PLANS AND SECTION

DRAWING
S-103

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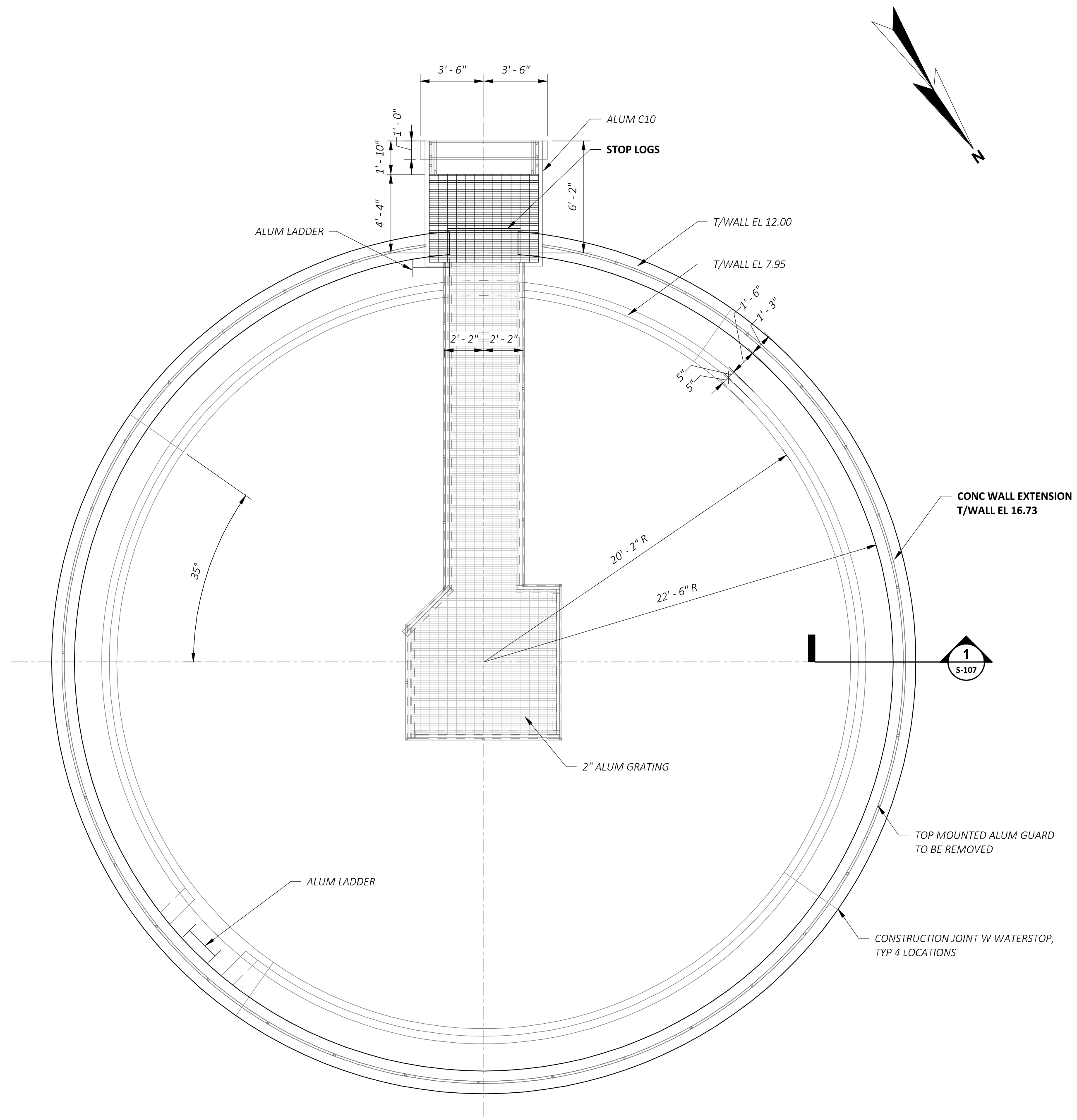

TOP PLAN MODIFICATIONS

SCALE: 1/4" = 1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-001. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	APP'D	DATE
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5			

PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
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APPROVED:
DATE:
SUBMISSION: 30% DESIGN REVIEW

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PHASE 4 WWTF
ADAPTATION UPGRADES

CLARIFIER NO. 2 - PLANS AND SECTION

DRAWING
S-104

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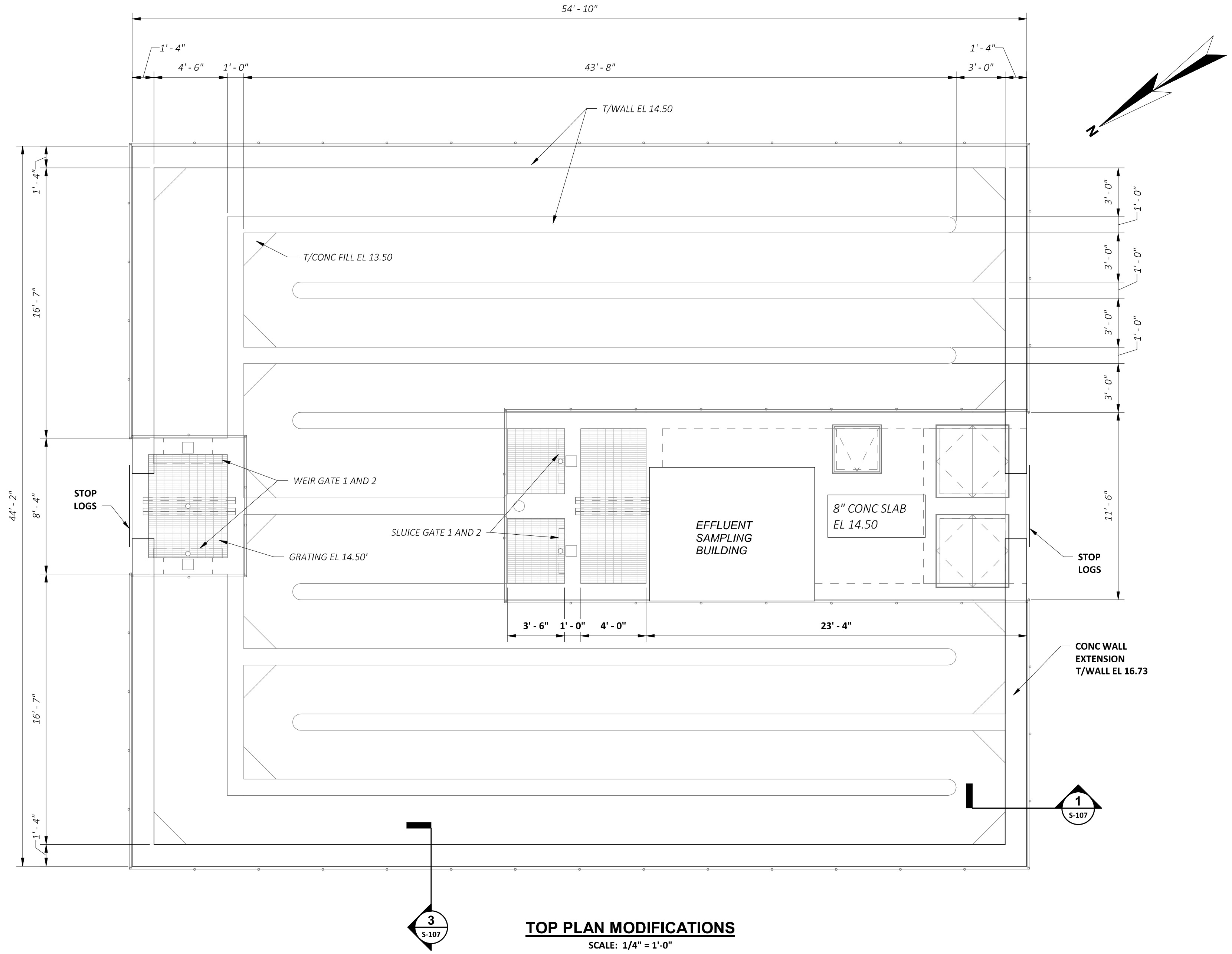
DATUM NGVD 1929



TOP PLAN MODIFICATIONS

SCALE: 1/4" = 1'-0"

NOTES:
1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-001. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
CHECKED:
DATE:
APPROVED:
DATE:
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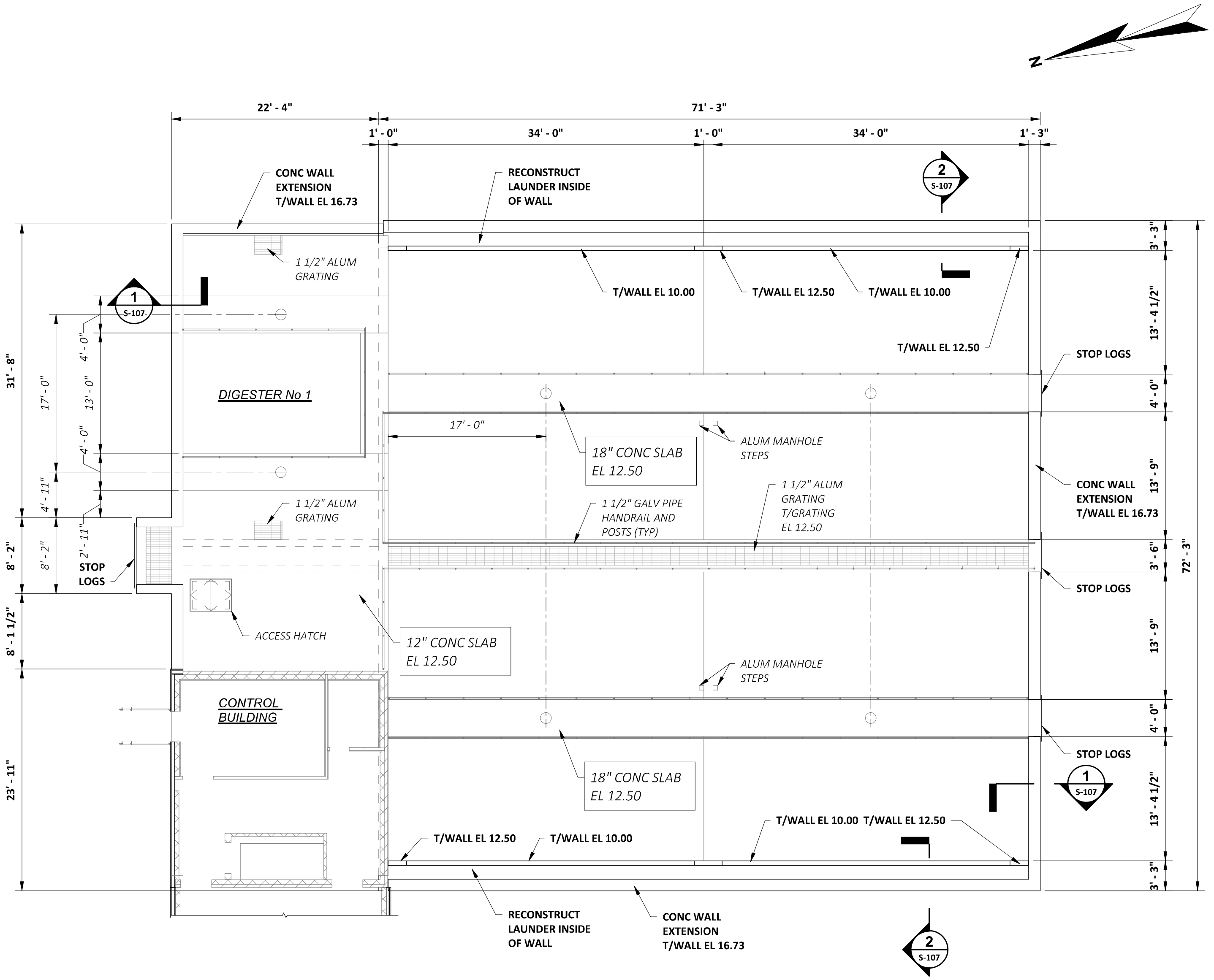
CHLORINE CONTACT TANK - PLANS

DRAWING
S-105

11/10/2023 11:06:21 AM

DATUM NGVD 1929



TOP PLAN MODIFICATIONS

SCALE: 1/8" = 1'-0"

NOTES:

1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-001. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	DATE	APP'D
1			
2			
3			
4			
5			

PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
CHECKED:
DATE:
APPROVED:
DATE:
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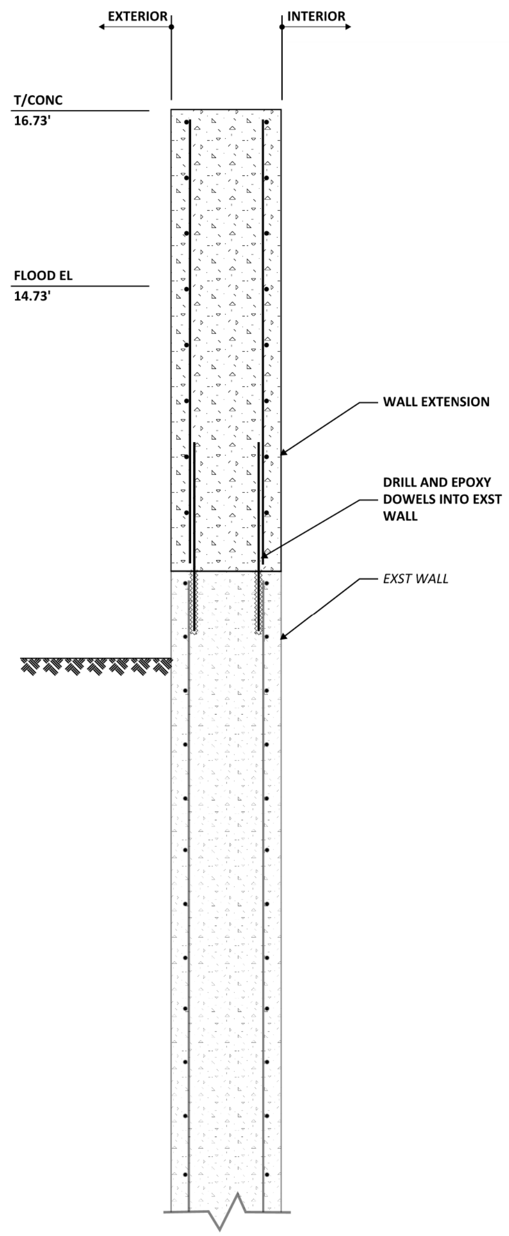
PHASE 4 WWTF
ADAPTATION UPGRADES

AERATION BASIN/ DIGESTER #1 - PLANS

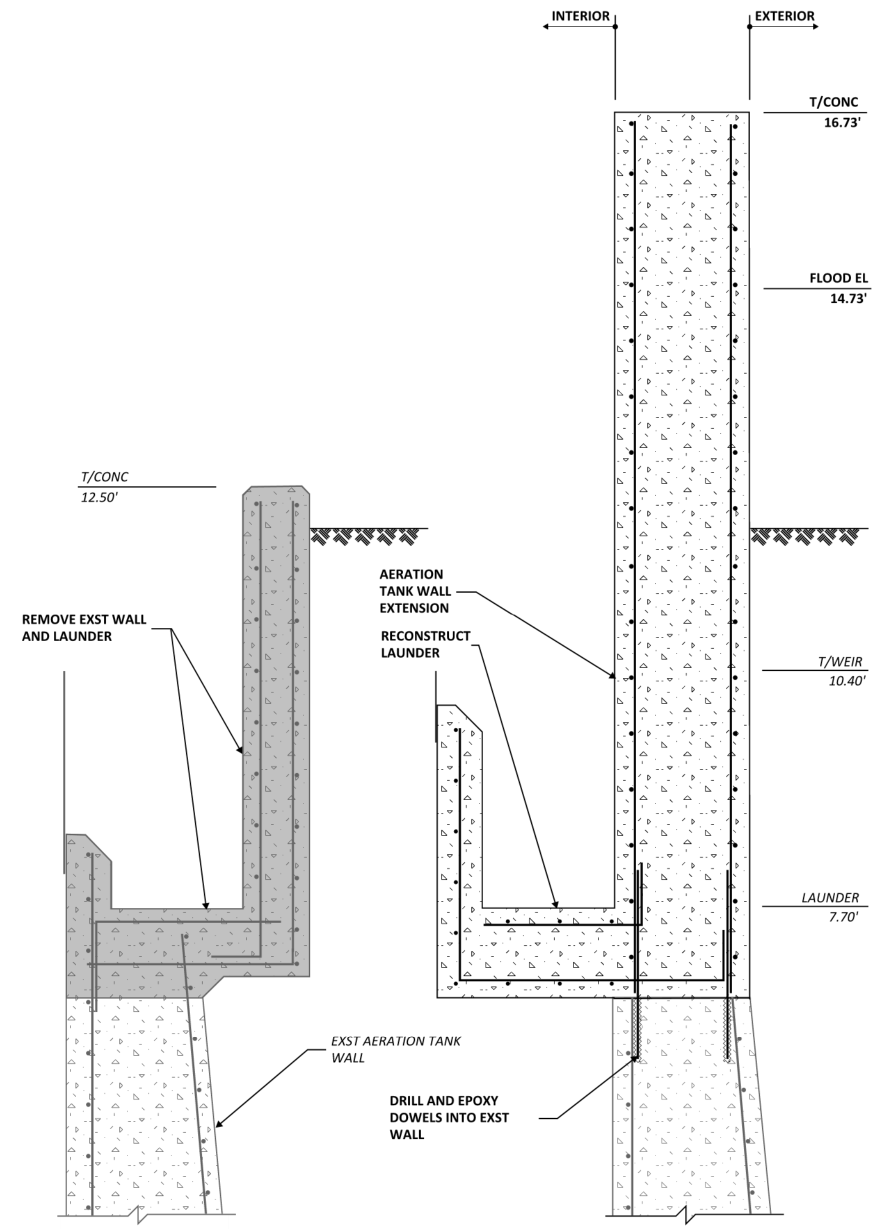
DRAWING
S-106

J:\ENG\ME\OgunquitSD\21293-WWTF-P5-Adaptation-Upgrades_Drawings\STR\Revit\21293-SM-AerationTank.rvt

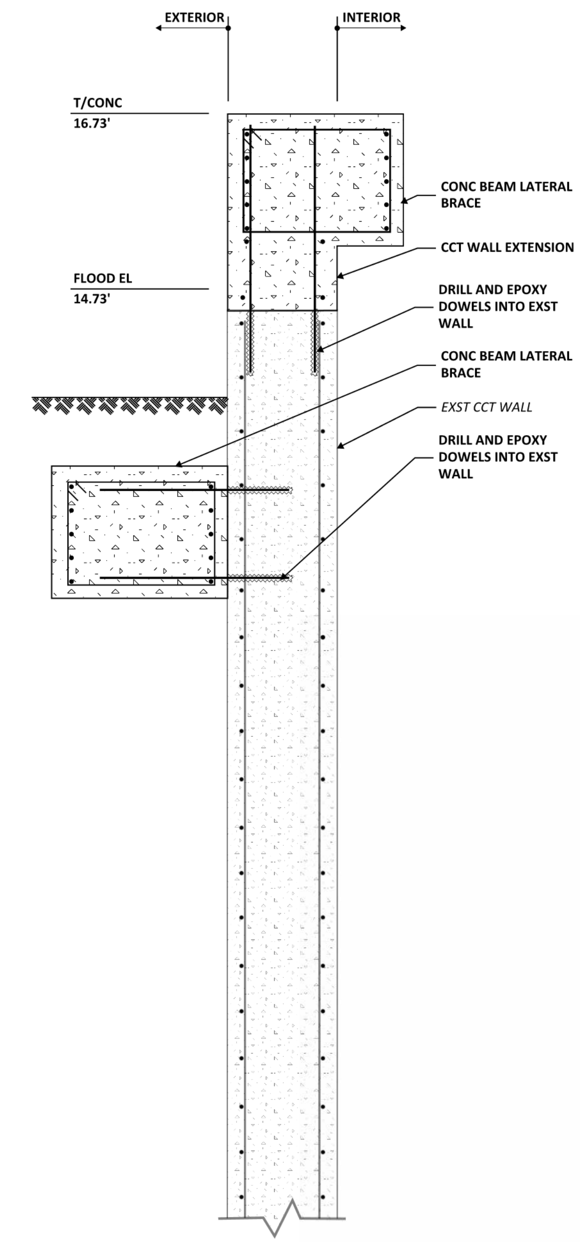
DATUM NGVD 1929



1 TYPICAL TANK WALL EXTENSION
SCALE: 1" = 1'-0"



2/106 AERATION TANK E/W WALL EXTENSION
SCALE: 1" = 1'-0"



3/105 CHLORINE CONTACT TANK E/W WALL EXTENSION
SCALE: 1" = 1'-0"

NOTES:
1. FOR GENERAL STRUCTURAL NOTES, SEE DRAWING S-001. FOR TYPICAL STRUCTURAL DETAILS, SEE DRAWINGS S-XX THROUGH S-XX.

NO	REVISIONS	DATE	APP'D
1			
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3			
4			
5			

PROJECT NO: 21293
DESIGNED: J.KELLOGG
CAD COORD: A.COUTURE
CAD: M.DOLAN
CHECKED:
DATE:
APPROVED:
DATE:
SUBMISSION: 30% DESIGN REVIEW

WRIGHT-PIERCE
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75 WASHINGTON AVENUE, SUITE 202, PORTLAND, ME 04101

OGUNQUIT SEWER DISTRICT
OGUNQUIT, MAINE
PHASE 4 WWTF
ADAPTATION UPGRADES

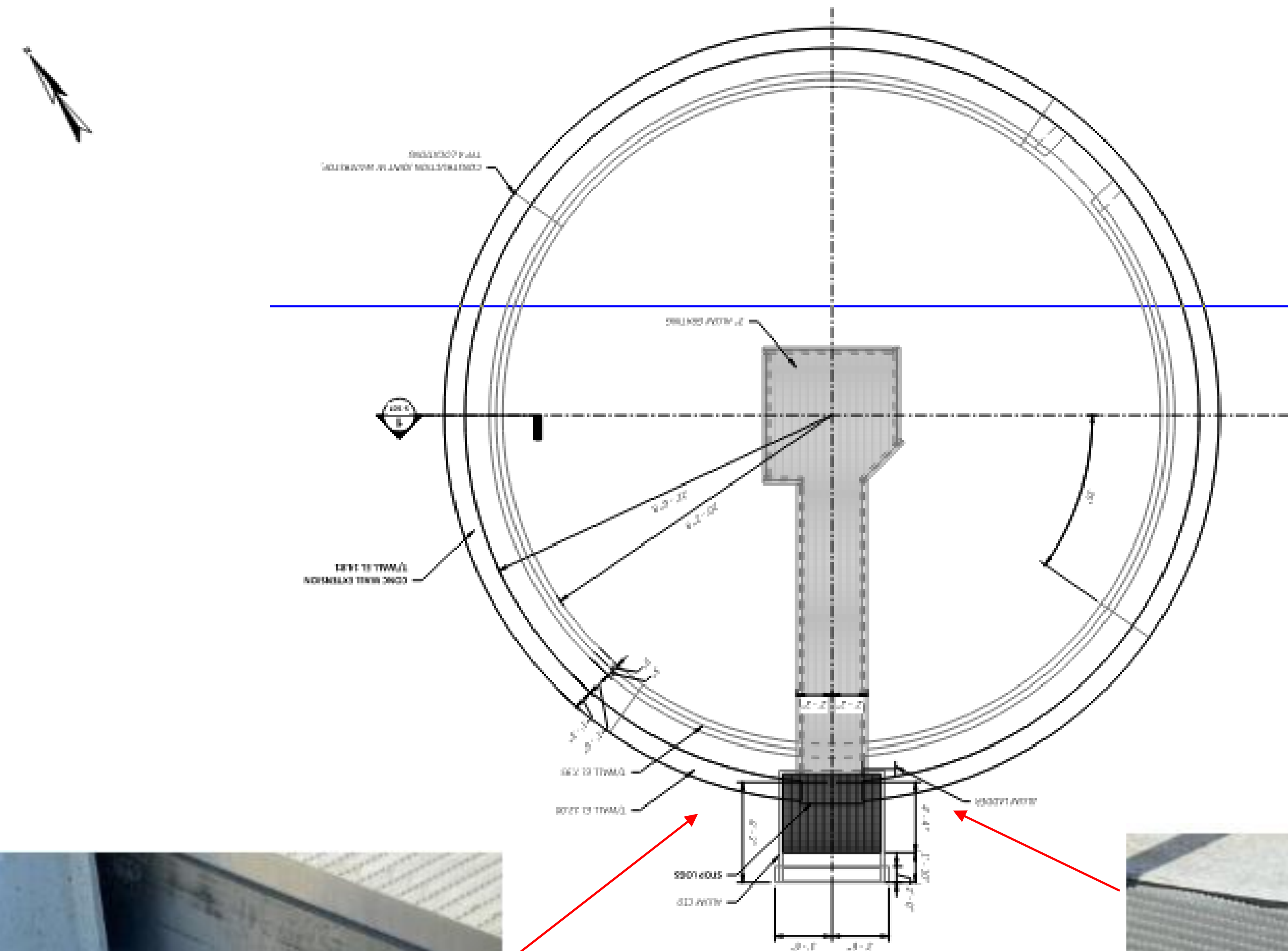
SECTIONS AND DETAILS

DRAWING
S-107

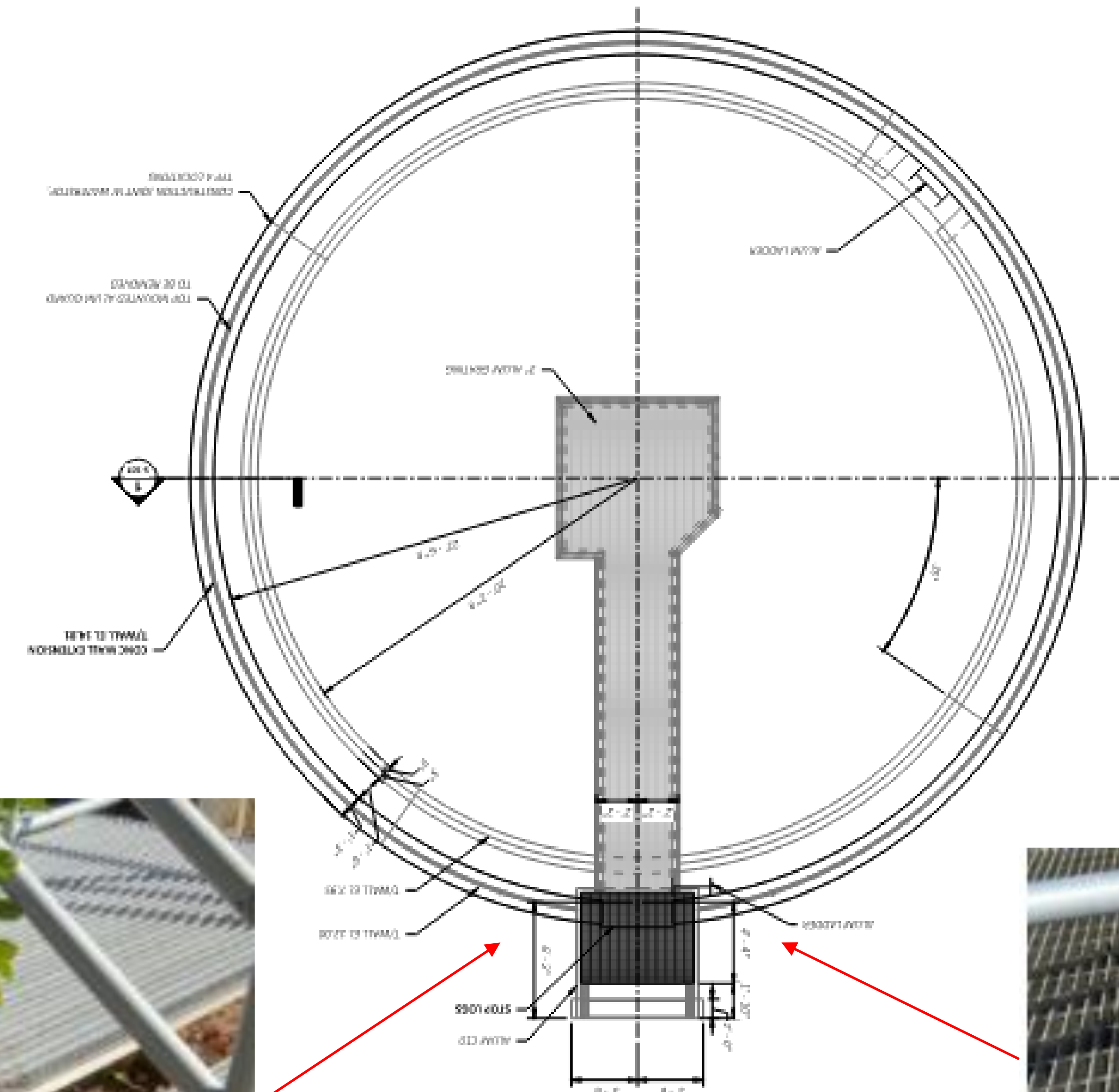
10/30/2023 9:59:51 AM
J:\ENG\ME\OgunquitSD\21293-WWTF-PS-Adaptation-Upgrades_Drawings\STR\Revit\21293-SM-AerationTank.rvt

Appendix C
Site Photos

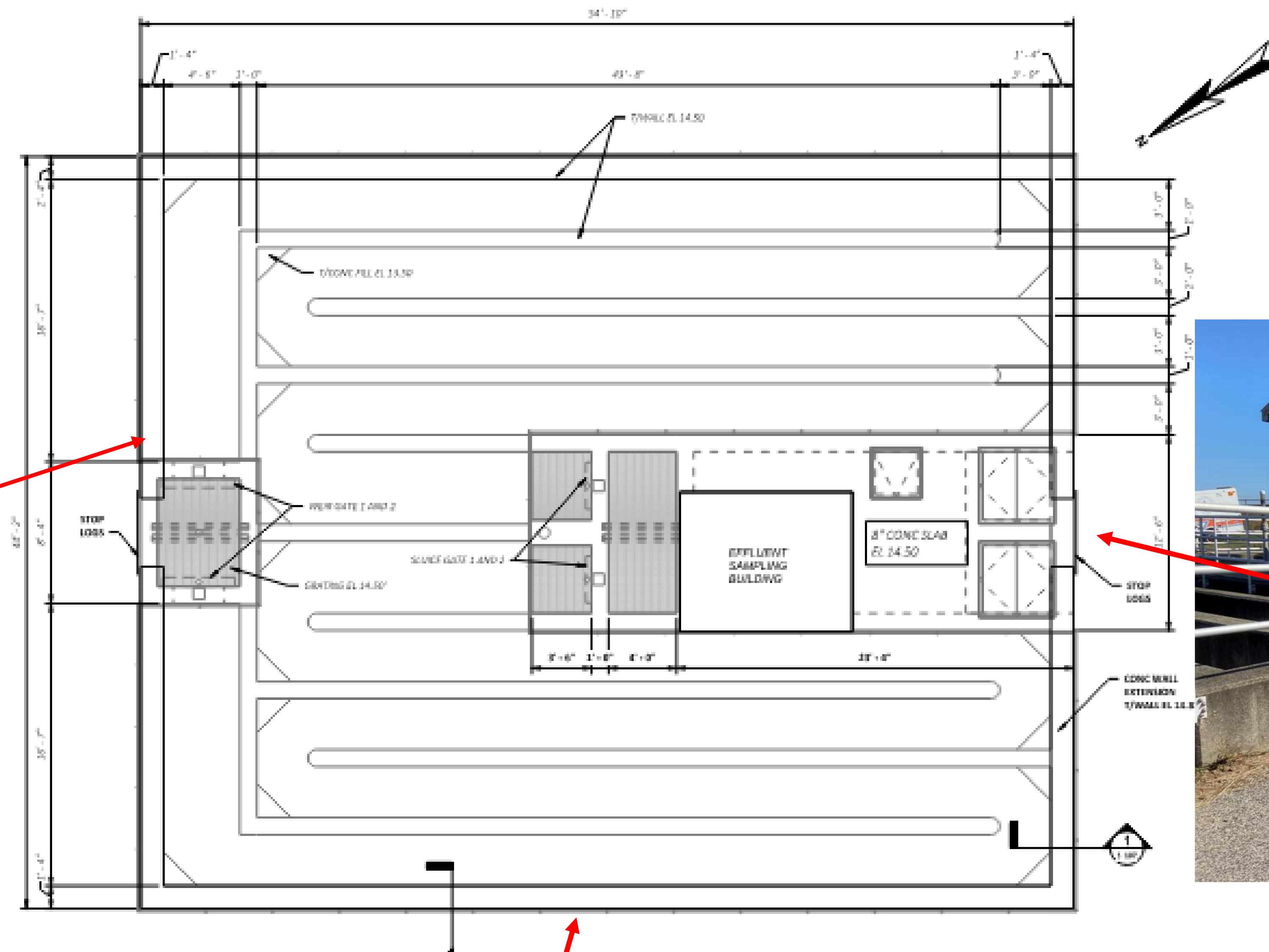
Clarifier No.1



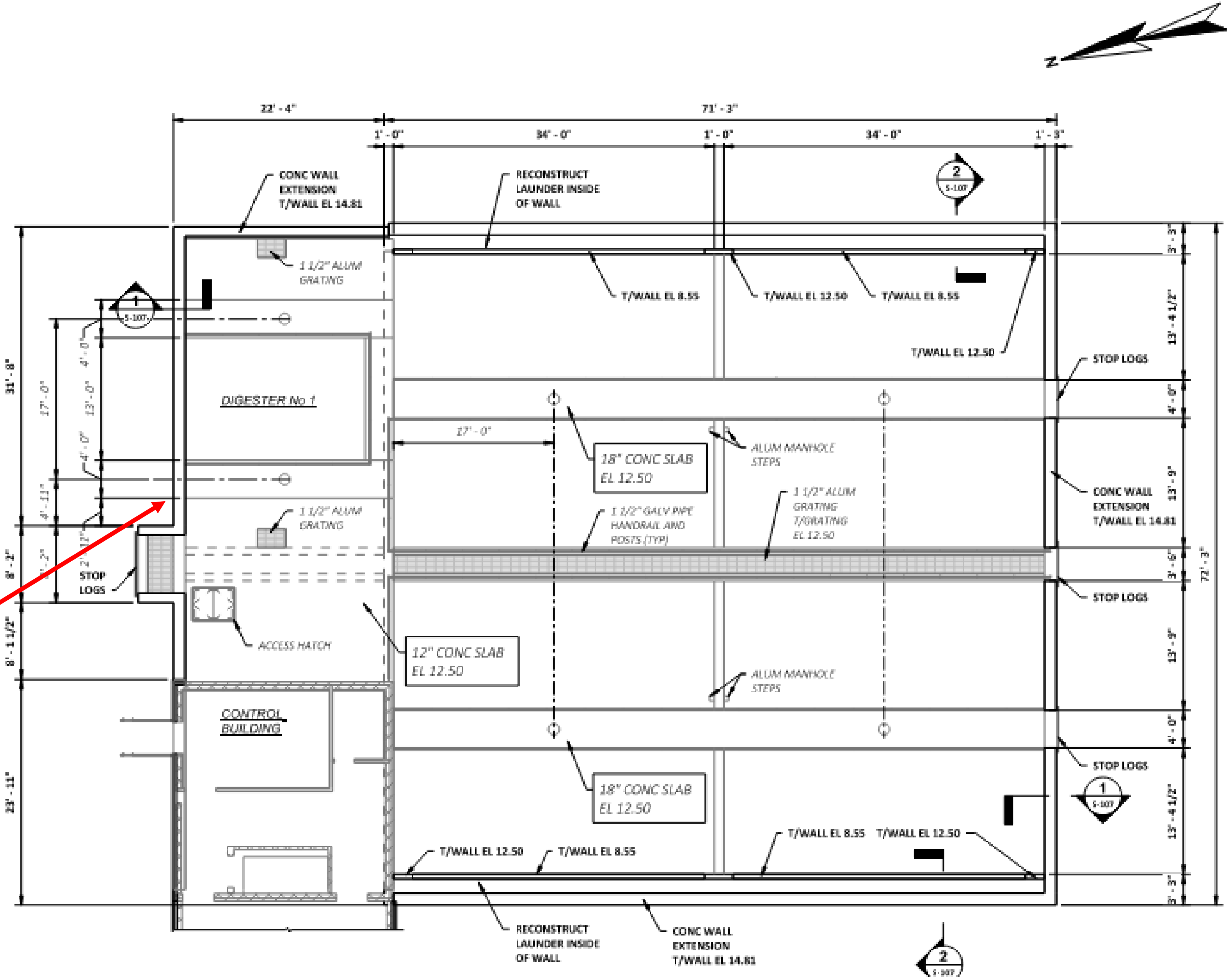
Clarifier
No.2



Chlorine Contact Tank

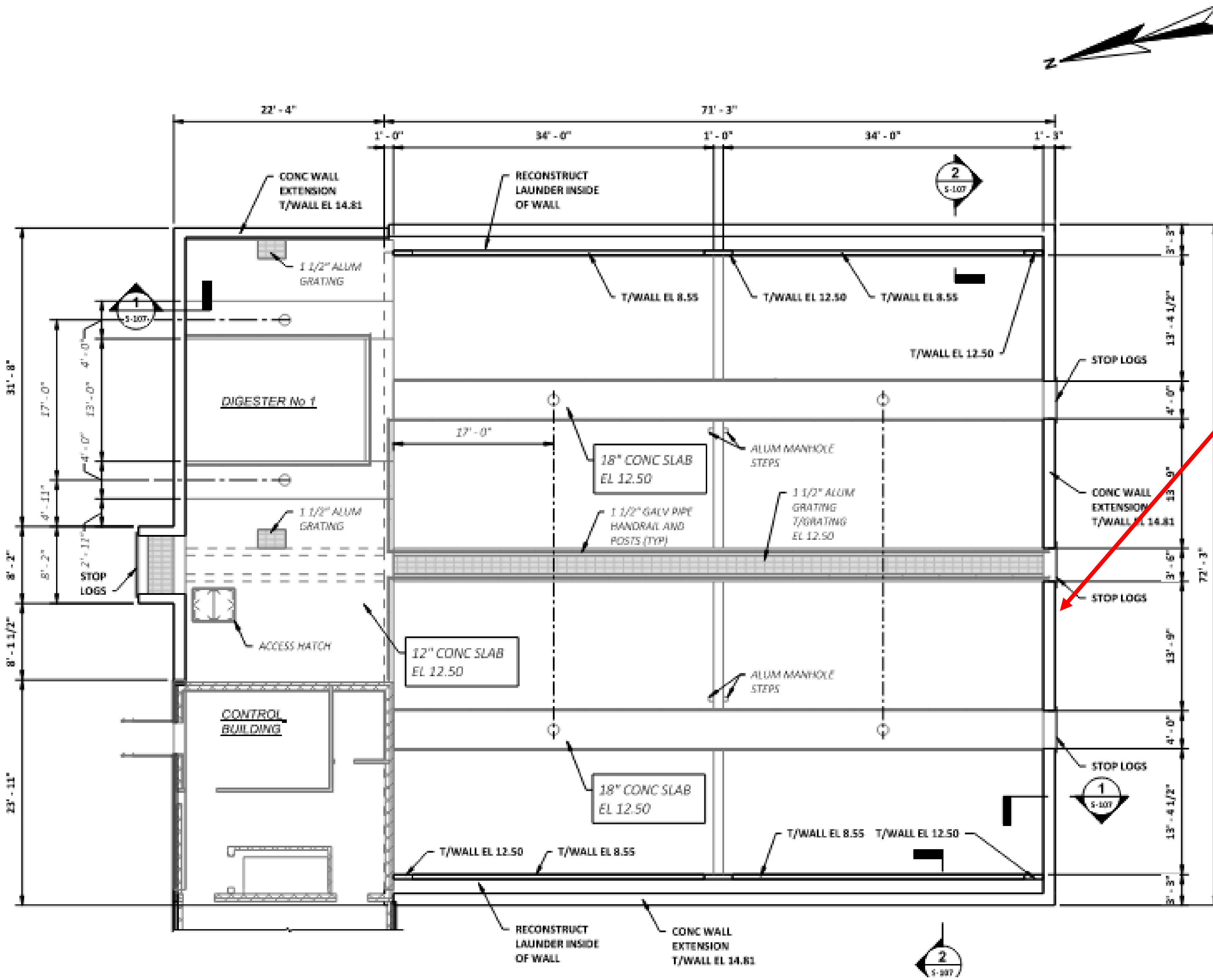


Aeration Tanks

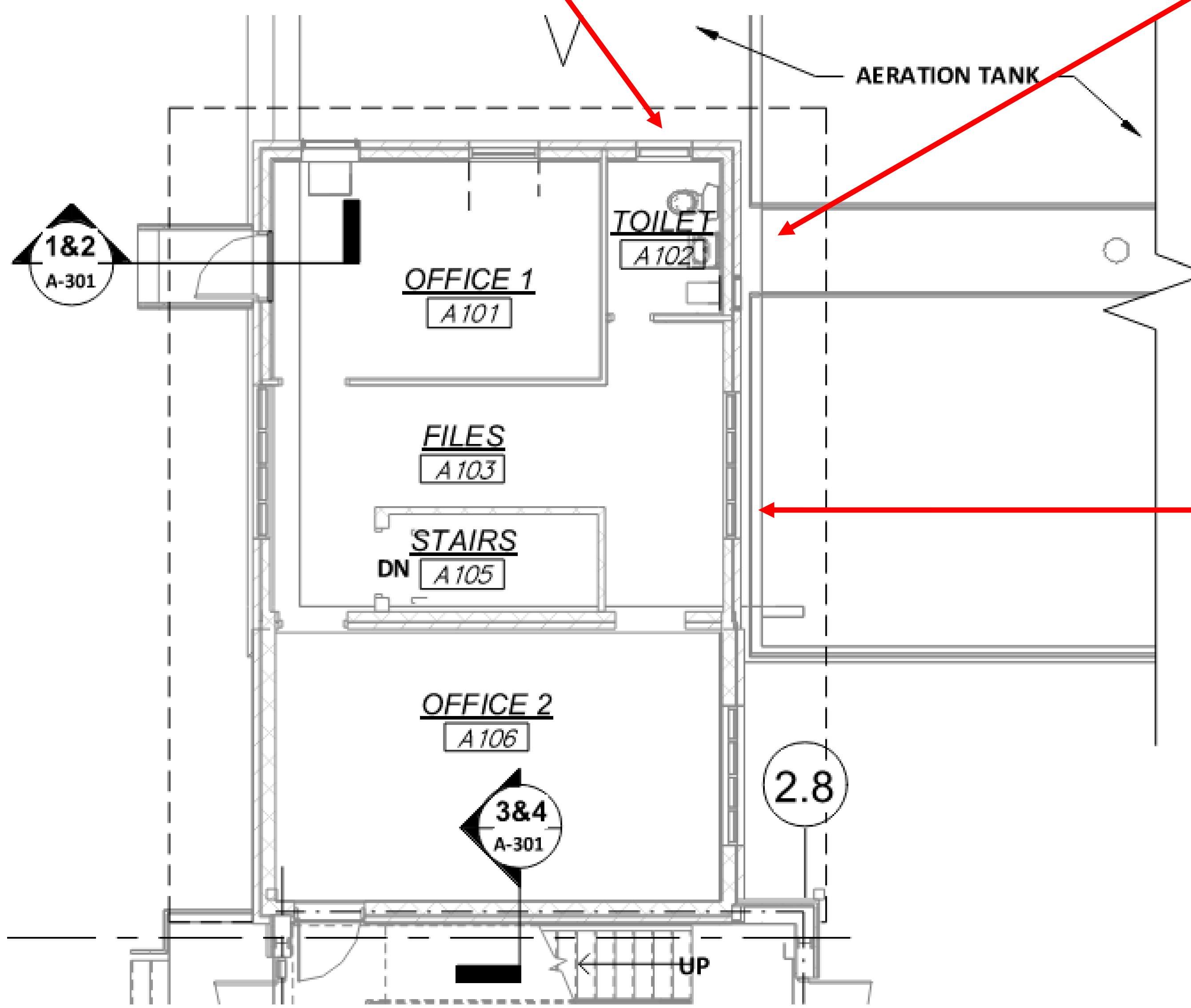


Pull Boxes at Digester No.2 (not shown on dwg)

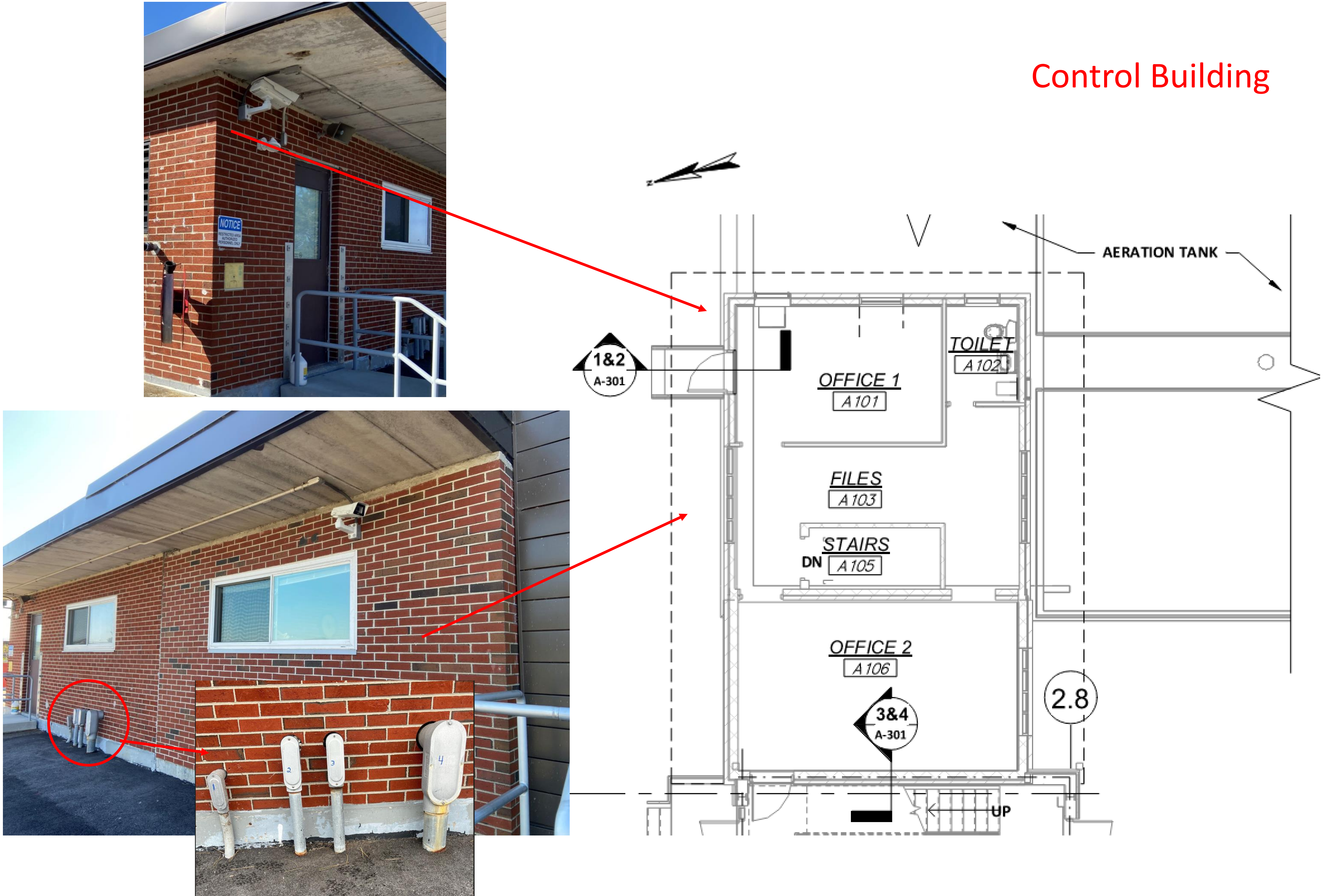
Aeration Tanks

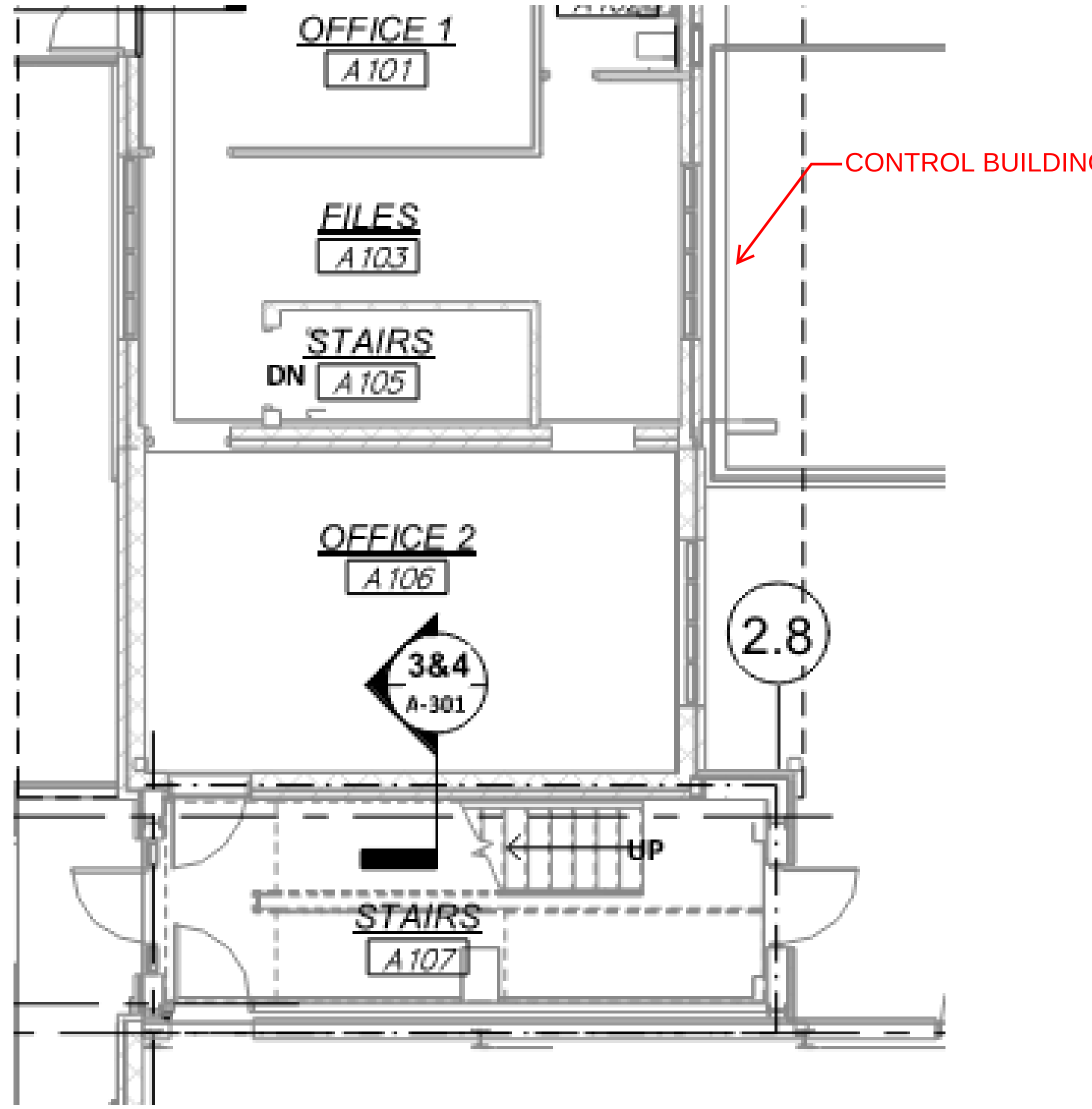


Control Building

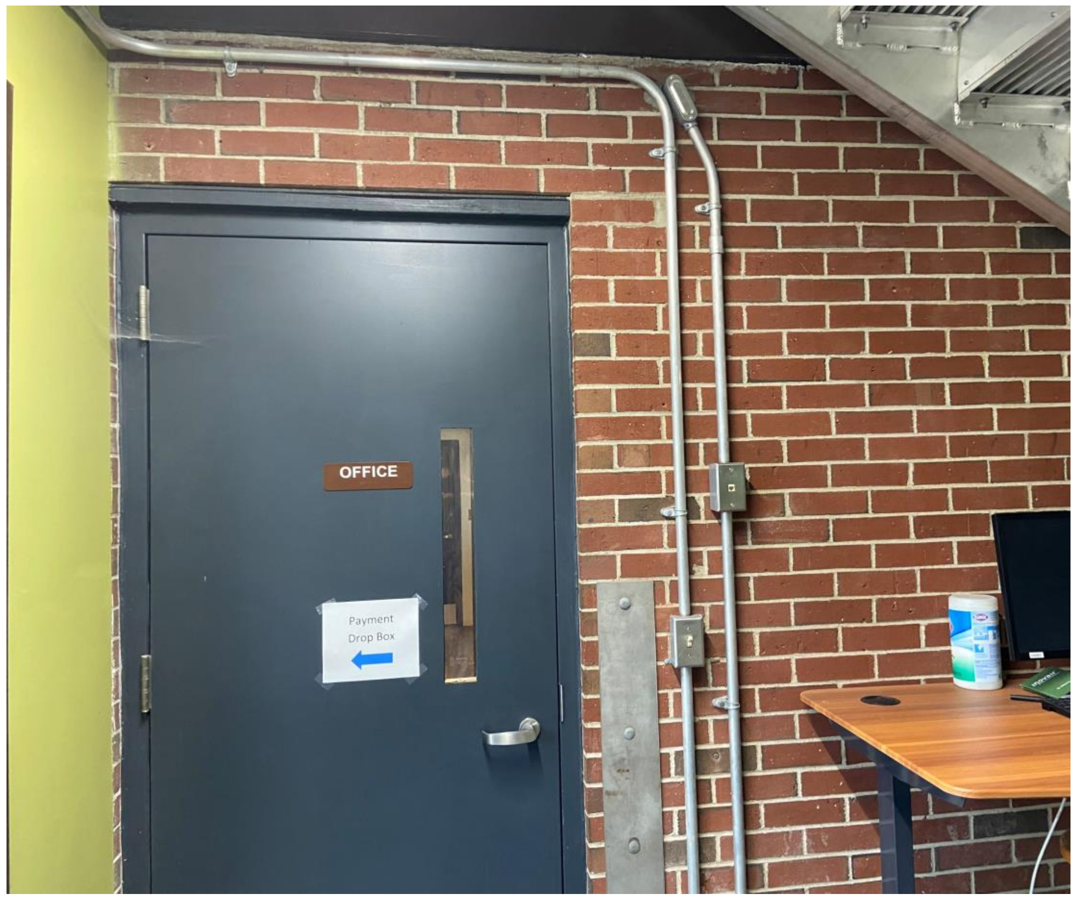


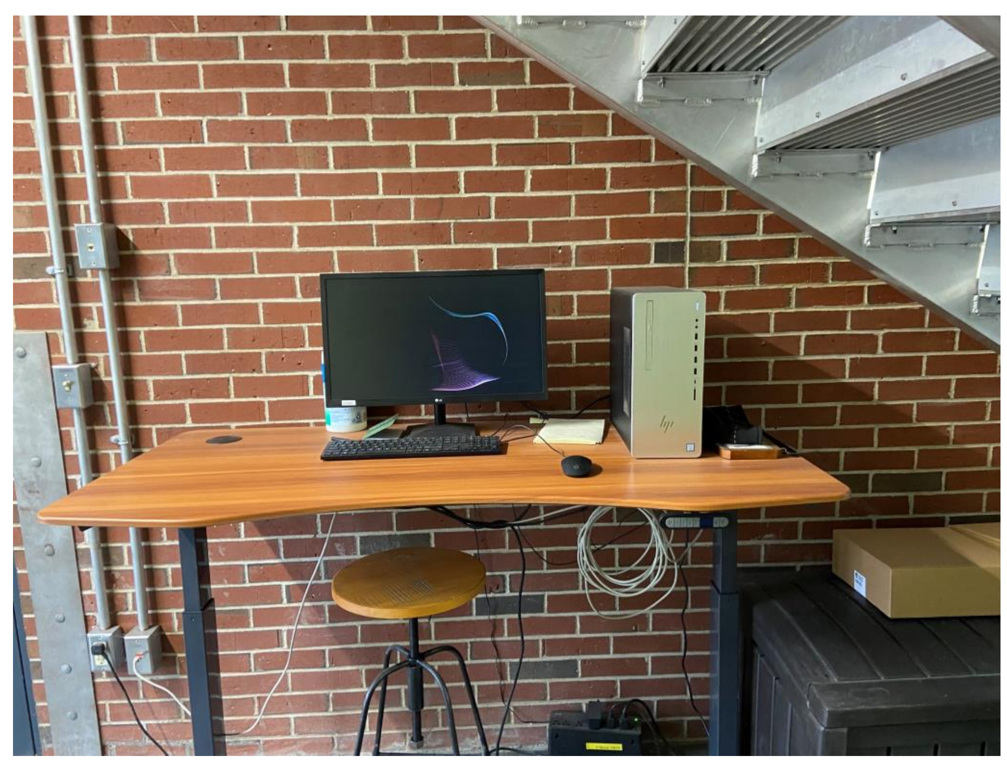
Control Building




OFFICE 1
A 101
FILES
A 103
STAIRS
DN
A 105
OFFICE 2
A 106
3&4
A-301
2.8
UP
STAIRS
A 107
CONTROL BUILDING

STAIRWELL


OFFICE
Payment
Drop Box




EXIT

Control Building

NORTH WALL

Electrical Manhole

- Conduits 1,2 and 3 do go into a cabinet after coming thru the wall.
- Conduit #1 goes out directly to Digester 3 with one cable for the level monitor power and a 4-20 ma signal. Plus a ground wire.
- Conduit #2 goes out to the electrical manhole with one phone landline. This is for the VT SCADA alarm in the process building.
- Conduit #3 goes out to the electrical manhole with a 10 pair cable. This goes to the bisulfite building for communication and control.
- Conduit #4 is the phone landline cable coming to the plant and comes from the CMP pole outside the fence as Phil said.

Control Building

SOUTH WALL

- Upper raceway is high voltage feed to lighting panels and pump feeds from the VFD’s in the new electrical room.

- Lower race way is controls and instrumentation feeds from existing equipment to the PLC also in the new electrical room.

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