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F: 860.633.5699
www.gza.com



May 31, 2019
GZA File No. 05.0043654.40

Mr. Joseph Martella
Rhode Island Department of Environmental Management
Office of Waste Management
235 Promenade Street, 3rd Floor
Providence, Rhode Island 02908

Re: Remedial Action Work Plan Addendum
Site Remediation File No. SR-26-0934A/Formerly RIDEM Case No. 95-022
Former Tidewater Facility
200 Taft Street
Pawtucket, Rhode Island

Dear Mr. Martella:

GZA GeoEnvironmental, Inc. (GZA), on behalf of The Narragansett Electric Company d/b/a National Grid (National Grid), has prepared this addendum to the June 2018 *Remedial Action Work Plan* (RAWP) for the Former Tidewater Facility located in Pawtucket, Rhode Island (herein referred to as the Site). This addendum serves as our response to your *RAWP Comment Letter* dated February 8, 2019.

This addendum also outlines certain proposed modifications to the remedy included in the June 2018 RAWP for approval by the Rhode Island Department of Environmental Management (RIDEM). Certain of these proposed modifications are necessary due to the presence of existing below grade infrastructure and identified wetland areas.

RESPONSES TO RIDEM'S FEBRUARY 8, 2019 COMMENT LETTER

The following section provides responses to each of the comments in your February 8, 2019 letter. For your convenience, your comments are repeated below followed by our response in italics.

RIDEM Comment 1: RAWP Section 11.10.4 (Soil Management Techniques) indicates:

- a. "Dry (non-saturated) excavated materials will be staged on-Site directly on the existing ground surface". It is the Department's position that staging of the excavated materials directly on the existing ground surface may only be done in areas of the Site that are scheduled to be capped at a later time, and only if the materials are compliant with the Department's GB Leachability Criteria (GBLC). Otherwise impacted excavated materials must be staged on polyethylene sheeting or in containers.

Response: Installation of the engineered caps will require significant re-grading of the existing ground surface of the Site. We estimate that approximately 37,000 cubic yards of soil will be removed (cut) from portions of the Site and subsequently re-used to fill low lying areas in other portions of the Site. Some of this soil will contain GB Leachability Criteria (GBLC) exceedances¹ based on previous analytical testing results and it is our intent to re-use this soil as fill to the extent practical for a couple of reasons.

¹ GBLC exceedances are primarily associated with the presence of petroleum hydrocarbons in both surface and subsurface soils.



First, the use of this non-saturated soil as fill is not likely to significantly impact the underlying groundwater quality as the impacted soil will only be placed below the impermeable cap (and above the groundwater table) and will not be re-used as fill in areas where the permeable cap will be installed or in the freshwater wetland area in the northern portion of the Site, proximate to the natural gas infrastructure adjacent to Tidewater Street, within the existing substation area, the slopes adjacent to the river, and proximate to the wooded slopes in the southwestern portion of the Site. Therefore, potential leaching of contaminants is unlikely as infiltrated precipitation or groundwater will not be moving through the placed material. In addition, placement of these soils with GBLC exceedances in the Former Gas Plant Area (FGPA) and the Former Power Plant Area (FPPA) where the majority of the former Manufactured Gas Plant (MGP) operations and bulk oil storage and management activities were historically performed and in portions of the North Fill Area (NFA) and the South Fill Area (SFA) will not significantly change the level of contaminants in these areas as soils with GBLC exceedances that will not be excavated will remain in these areas.

Second, the proposed remedy was designed to not only limit further degradation of groundwater quality by limiting infiltration of precipitation through these impacted soils but to also minimize the impact to the surrounding community. By re-using the most soils practicable on-Site as fill below the caps, we will not only be minimizing the amount of truck traffic through the adjacent residential neighborhood, but the remedy installation will be shortened thereby minimizing the duration the residential neighborhood will be subject to construction related activities. If GBLC exceedances of excavated material had to be determined prior to placement, the vast majority of excavated soils would need to be stockpiled while soil samples are collected and tested to confirm acceptability for placement/disposal, which would significantly slow the grading process. During the performance of this earthwork, we anticipate the contractor will perform most of this re-grading using a combination of bulldozers and graders to cut and place the material in the low-lying areas to minimize the amount of handling and equipment necessary to perform the work. This approach will also limit the amount of soil stockpiling (and time) necessary to complete the work.

As indicated in the RAWP, performance of this re-grading will require that certain materials be temporarily staged on the ground surface near the point of excavation and near the point of filling as the work progresses. However, as described below and as depicted on the attached updated Figure 18 from the RAWP, we propose to extend the impermeable cap conservatively to the northern Site boundary. Given this extension, most of the Site will now be covered with an impermeable engineered cap and all temporary staging of soils will be conducted in areas that will be subsequently capped.

Dry excavated materials that are not placed as fill on the same day the material is cut will be temporarily stockpiled on top of polyethylene sheeting in designated soil stockpile areas. It is not feasible to depict the location of these temporary stockpiles since the locations will likely be adjusted as the work progresses; however, these temporary stockpiles will be staged outside the 200-foot CRMC jurisdictional zone. As indicated in the RAWP, stockpiles will be no larger than 1,000 CY and will also be covered with a layer of polyethylene sheeting during the work-day (to the extent practical and when material is not actively being stockpiled) and during all non-working hours to control the generation of wind-blown dusts and potential migration of soils with stormwater runoff. Temporary erosion and sedimentation controls will also be installed surrounding the perimeter of the stockpiles.

- b. "Residual soils within the saturated materials management area will either be disposed off-Site or reused as fill to achieve the subgrade for the engineered cap if sufficiently dry and stable." It is the Department's position that excavated saturated soils must be properly characterized. Any soil that is not compliant with the GBLC should not be reused onsite and should be properly disposed of at a licensed disposal facility.



Response: Excavations below the groundwater table that will generate saturated soils are anticipated to be limited to portions of the source area excavations, within the freshwater wetlands identified in the northern portion of the Site, and during pre-clearing activities for installation of the containment wall. In addition, saturated soils/sediments will also be excavated from below the Mean Low Water (MLW) line during installation of the revetments on the riverbank in the northern portion of the Site. The saturated materials from these excavations will be staged within lined saturated material management areas located outside the 200-foot Coastal Resource Management Council (CRMC) jurisdictional zone. The saturated materials management and equipment staging areas will be located outside the 200-foot CRMC limit in the approximate areas indicated on the attached Figure C-2. Note, the work will be performed in phases and the size and location of these staging areas may be modified as the work progresses

Within the saturated material management area, saturated (wet) soil that is grossly impacted with non-aqueous phase liquids (NAPLs) will be segregated from the less visibly impacted material. The grossly impacted soil will then be dried for shipment and subsequently disposed off-Site to a permitted facility approved by National Grid.

With respect to the less visibly impacted material, it is our intent to amend this soil with a drying agent such as Portland Cement or other suitable material and re-use the less visibly impacted material as fill below the impermeable engineered cap to the maximum extent practicable without analytical testing to demonstrate compliance with the GBLC as discussed previously. As indicated above, impacted soil will not be re-used as fill in areas where the permeable cap will be installed or in the freshwater wetland area in the northern portion of the Site, proximate to natural gas infrastructure adjacent to Tidewater Street, within the existing substation area, the slopes adjacent to the river, and proximate to the wooded slopes in the southwestern portion of the Site.

- c. Please provide a site figure identifying all proposed temporary stockpiling locations, temporary materials handling areas, and temporary equipment staging areas.

Response: The saturated materials management and equipment staging areas will be located outside the 200-foot CRMC limit in the approximate areas indicated on the attached Figure C-2. Note, the work will be performed in phases and the size and location of these staging areas may be modified as the work progresses

As indicated above, excavated soils that are not placed as fill on the same day will be temporarily stockpiled. It is not feasible to depict the location of these temporary stockpiles since the locations will likely be adjusted as the work progresses; however, these temporary stockpiles will be staged outside the 200-foot CRMC jurisdictional zone. As indicated above, stockpiles will be no larger than 1,000 CY and will be staged on top of and covered with a layer of polyethylene sheeting during the work days (to the extent practical) and during all non-working hours to control the generation of wind-blown dusts and potential migration of soils with stormwater runoff. Temporary erosion and sedimentation controls will also be installed surrounding the perimeter of the stockpiles.

RIDEM Comment 2: RAWP Section 11.11.1 (Tier I — 'Real Time Monitoring') indicates the proposed installation of 11 stationary perimeter air monitoring stations. Please clarify if all 11 air monitoring stations will be active and operational each day, or if only a limited number will be selected for daily operation based on prevailing wind direction and the locations of nearby sensitive receptors.

Response: In the preparation of the RAWP, we have assumed remedial construction, intrusive soil disturbance activities, and soil management activities will be occurring concurrently through-out the Site. Given this assumption, it is our intent to operate all 11 air monitoring stations each day during the performance of the remedial work.



In the event the project is sequenced in such a manner where intrusive and earth disturbing activities are strictly limited to only one portion of the Site, then the actual number of air monitoring stations used and their layout may be modified to sufficiently surround the perimeter of the work area. Prior to the start of the work, National Grid will provide the Department an updated Site plan that depicts the sequence of work and any modifications to the layout of the air monitoring program.

RIDEM Comment 3: Air Quality Monitoring — General Comment — Please include plans to provide the Department with weekly Perimeter Air Quality Monitoring Reports suitable for posting to the Department's Tidewater web page, similar to the reports being generated and submitted for National Grid's 642 Allens Avenue, Providence Site.

Response: GZA will provide the Department weekly Perimeter Air Quality Monitoring Reports similar to the reports being generated and submitted for National Grid's 642 Allens Avenue, Providence Site.

RIDEM Comment 4: As discussed with representatives of National Grid and GZA at the December 13, 2018 Site visit, please consider options for placement of monitoring wells downgradient of the containment wall. This remedial approach has been implemented at several other Sites in Rhode Island and provides a way to demonstrate that the containment wall is functioning as designed to prevent the off-site migration of contaminated groundwater.

Response: As shown on the attached updated Figure 18 from the RAWP, the central portion (approximately 580 feet) of the approximately 1,125-foot long containment wall will serve as a bulkhead between the land-based portion of the Site and the Seekonk River. In this portion of the containment wall, it is not feasible to install monitoring wells downgradient of the containment wall.

In the remaining sections of the containment wall, it will be feasible to install monitoring wells in a few isolated locations where land is available between the downgradient side of the containment wall and Mean High Water (MHW). As indicated on the attached updated Figure 18 from the RAWP, we anticipate the installation of 4 monitoring wells downgradient of the containment wall (2 wells downgradient of the northern portion of the containment wall and 2 wells downgradient of the southern portion of the containment wall). These wells will be equipped with screens extending from the top of the glacial till across the groundwater table to monitor for the presence of light and dense non-aqueous phase liquids (NAPLs).

RIDEM Comment 5: Please provide updates regarding the status of all other regulatory permits required from offices/agencies outside the jurisdiction of the Department's Office of Waste Management.

Response: On April 19, 2019, GZA and National Grid participated in a pre-application permit meeting with representatives from the Office of Waste Management (OWM), the Office of Water Resources (OWR), the Office of Customer Service and Technical Assistance, and CRMC to discuss the scope of work and the anticipated permitting requirements. Based on the discussions during this meeting, we anticipate submitting a combined permit application package to OWM, OWR, CRMC, and the United States Army Corp of Engineers (ACOE). We anticipate submittal of this combined permit application package in the mid to late June 2019 timeframe. GZA will provide the OWM copies of these approvals/permits upon receipt.

We also note that the RAWP indicated that a Narragansett Bay Commission (NBC) Sewer alteration permit was required since installation of the containment wall will require alterations to the existing NBC combined sewer overflow (CSO) line that runs through the FPPA and discharges into the Seekonk River. This outfall was installed within Tidewater Street (which originally extended to the river) in the late 1800s and was originally owned by the City of Pawtucket. As part of a 1913 agreement between the former property owner and the City of Pawtucket, the owner of the property



(at that time) assumed responsibility for maintenance of the CSO pipe in exchange for ownership of the abandoned portion of Tidewater Street. Given this agreement, National Grid is responsible for maintenance and repair of the CSO line. We note any work performed on the CSO line will be performed consistent with NBC's standards.

RIDEM Comment 6: Please provide documentation showing that the Remedial Action Approval Application Fee was submitted in accordance with Section 1.11.2 of the Remediation Regulations.

Response: Attached is the Letter of Transmittal for the June 2018 RAWP indicating both the report and check were delivered to RIDEM and a remittance copy of the check with the check number. However, based on a review of our account, it does not appear that the check has been cashed by the State. We will cancel the previous check and submit another check with the RAWP Application Fee of \$1,000 with this RAWP Addendum.

RIDEM Comment 7: The Rhode Island Coastal Resources Management Council (CRMC) provided written comments on the Draft RAWP to National Grid and GZA on January 24, 2019. Please include responses addressing all CRMC's comments in the RAWP Addendum.

Response: The following lists the comments provided by CRMC in their January 24, 2019 email and our responses.

- **CRMC Comment #1:** As the project is currently solely site remediation activities, the Metro Bay SAMP requirements are not entirely applicable. That said, please bear in mind that future development of this will be subject to the Metro Bay SAMP requirements, including vegetated buffer zone, setback area, stormwater treatment and public access and that remediation activities should be undertaken in a manner to best provide consistency with future regulatory requirements.

Response: Understood.

- **CRMC Comment #2:** Minimization of the seaward extent of any riprap/seawall/sheetpiling repair and maintenance is required. An ACOE review through the CRMC application process will apply for work below MHW. The inland edge of coastal feature shall be clearly delineated on all future Assent plans to differentiate between hardened shoreline types and vegetated features (riprap, seawall, bulkhead, beach, wetland, riverbank, etc.). All areas of coastal and/or freshwater wetland shall be avoided.

Response: The containment wall has been designed to minimize the loss of watersheet to the extent practical; however, due to the presence of foundations and remnants of former waterfront structures and infrastructure associated with the former MGP and electrical power plant station along the shoreline of the Site, the central portion of the containment wall will be installed seaward of the existing bulkhead. We anticipate that approximately 5,100 square feet (sf) of water sheet will be lost during installation of the containment wall in the central portion of the Site. This loss of watersheet will be offset by creation of approximately 13,300 sf of water sheet in the northern portion of the Site where the riverbank will be sloped back. We understand ACOE review of the work below the Mean High Water (MHW) line will be required.

The combined permit application package will include drawings that clearly identify the existing and the proposed coastal features.

A freshwater wetland that is apparently fed by groundwater seepage is present in the northern portion of the Site (see the attached updated Figure 18 from the RAWP). Consistent with the upland remedy for the Site, this freshwater wetland area will be capped to mitigate direct contact with potential impacted soils. The cap in this area will be



designed as a permeable cap to allow groundwater to continue to support the wetland vegetation and the area will be restored with wetland soils and plantings.

We do not anticipate performing work within the tidal wetland identified in the southeastern portion of the Site (see the attached updated Figure 18 from the RAWP).

- **CRMC Comment #3:** Restoration of vegetated areas within 200' of the coastal feature is required post-remediation as follows. Current site conditions range from forested slope (southern extreme) to old field/sapling conditions (northern extreme) including development/asphalt/remnant structures. Proposed remediation includes an impermeable geotextile layer. Based on the above, reforestation is not a requirement for this site. However, a re-planting of disturbed areas with shallow-root native vegetation (shrubs and perennial grasses) is possible and will be required as part of Assent review. Any mature trees which can be retained on-site (specifically the southern area was noted to remain undisturbed) should be preserved. The width of the revegetation shall be based on current lot size. Parcels 80,000-200,000 sf on Type 4 waters required a 125' revegetated buffer zone. Parcels <200,000 sf require a 150' vegetated buffer zone. This revegetation shall only apply to those areas currently vegetated for purposes of this upcoming Assent review.

Response: As discussed during the April 2019 pre-application meeting, a 25-foot vegetated buffer will be installed along the entire riverfront. The vegetation within this buffer zone will consist of native species consistent with CRMC's Coastal Buffer Zone Planting Guide, Revised August 2008 with shallow root systems compatible with the engineered cap.

In the northern and southern portions of the Site, the upland area to the west of the 25-foot wide buffer will be re-vegetated with a meadow grass seed mix to minimize the maintenance of the engineered cap in these areas.

At the request of the City of Pawtucket, vegetation will also be planted to the north and east of the substation area to screen the substation from the river and the northern portion of the Site. This screening vegetation will also consist of native low maintenance species with a shallow root system compatible with the engineered cap.

A preliminary Overall Final Conditions Plan showing the extent of the buffer zone, the extent of the upland meadow, and the substation screening is attached for reference. The combined permit application package submitted to the regulatory agencies will include an updated version of this plan that identifies the type and density of plant species within the buffer zone and for the substation screen.

- **CRMC Comment #4:** Depending on future development needs, a reduced buffer zone (based on UCG requirements in the Metro Bay SAMP) could be applied for depending on the proposals and will include public access and stormwater requirements.

Response: Understood.

- **CRMC Comment #5--**Please be reminded that any work on the NBC or City or State-owned storm/sewer outfalls within the parcel will require Assent from CRMC prior to undertaking any work. A signoff from National Grid would be required as part of the application.



Response: Understood.

RIDEM Comment 8: Please submit a RAWP addendum that addresses the abovementioned comments on or before June 1, 2019.

Response: This letter serves as the RAWP Addendum.

RIDEM Comment 9: The draft Environmental Land Usage Restrictions (ELURs) and draft SMP are currently under review, and any Department comments resulting from that review will be forwarded promptly.

Response: Understood.

PROPOSED MODIFICATIONS TO THE REMEDY

The following section outlines certain proposed modifications to the remedy described in the June 2018 RAWP for Department's approval. Certain of these proposed modifications are necessary due to the presence of existing below grade infrastructure and identified wetland areas.

- GZA's licensed soil scientist performed a survey of the Site as part of the remedy design and permitting process. Based on this survey, a tidal wetland was identified in the southeastern portion of the Site proximate to the proposed southern section of the containment wall. In addition, we have also become aware of the presence of electrical distribution submarine cables proximate to the south transmission tower. These submarine cables extend from a utility pole on the Site, below the river and to the eastern shore of the Seekonk River. As described in our April 2, 2019 letter which is attached to this RAWP Addendum, in order to minimize impacts to the tidal wetlands and due to concerns regarding installation of a steel sheet containment wall proximate to submarine cables, we propose to replace the southern section of the containment wall in the southeastern portion of the Site with a row of seven (7) 4-inch diameter recovery wells installed approximately at the mid-slope of the riverbank. This well based recovery system is adequate to address the limited NAPL observed in this area of the Site. The recovery wells will be spaced approximately every 20 feet between well couplets farther up the slope where NAPL impacts were not observed during previous investigation activities (i.e., MW-318S/D and MW-319S/D). The bottom of each new well screen will be set at an elevation consistent with monitoring well MW-320D (Elevation -18.1 NAVD 88). In addition, the riverbank will be re-graded to create a uniform slope from the top of the riverbank to the edge of the tidal wetlands and capped with a reactive core mat as a precaution to mitigate the potential migration of NAPL to the shallow river sediments. Figure 18 from the RAWP was updated to depict the approximate layout of these recovery wells.
- GZA's licensed soil scientist also identified a freshwater wetland in the northern portion of the Site which appears to be supported by groundwater seeping from the steep slope directly west of the wetland area. As indicated above, consistent with the upland remedy for the Site, this freshwater wetland area will be capped to mitigate direct contact with the potentially impacted soils in this area. The cap will be designed as a permeable cap to allow groundwater to continue to support the wetland and the area will be restored with wetland soils and plantings. Figure 18 from the RAWP was updated to depict the approximate extent of the freshwater wetland area.
- The June 2018 RAWP indicated that most of the engineered cap installed within the FGPA, the FPPA, and the SFA would be designed as an impermeable cap to mitigate further degradation of groundwater quality. As part of the



design of the remedy, the impermeable cap will now be conservatively extended across the balance of the FGPA and the NFA to further mitigate the potential for groundwater quality degradation. In addition, to further enhance the protectiveness of the remedy, reactive core matting will be installed beneath the armoring (i.e., riprap or marine matting) installed on the slopes of the river in the northern and southern portions of the Site. The reactive core matting will consist of an organo-clay material encapsulated between layers of non-woven geotextile fabric. Figure 18 from the RAWP was updated to depict the updated approximate extent of the impermeable liner and the approximate extent of the armored riverbank slopes equipped with reactive core matting.

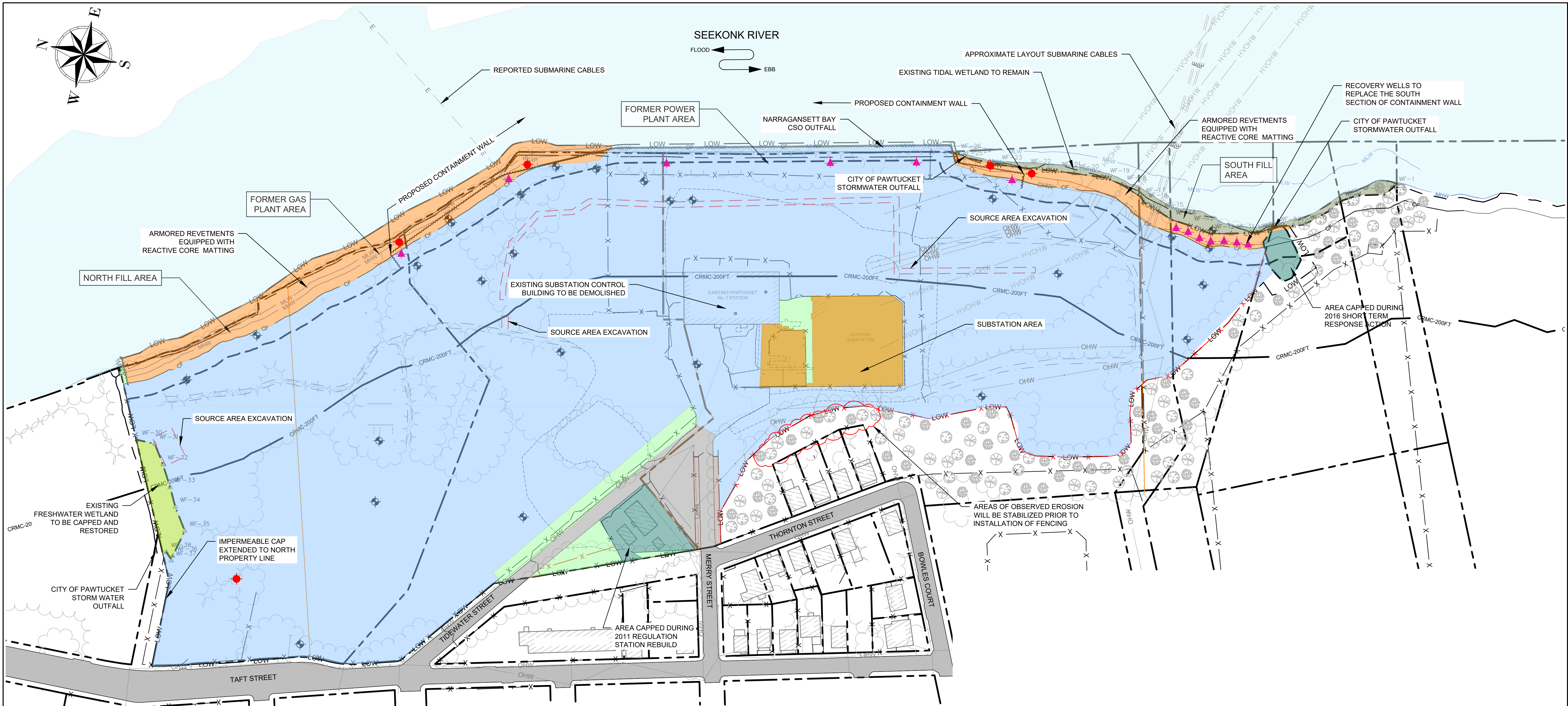
- Localized areas of erosion have been recently observed within the on-Site slopes directly east of the residences located on Thornton Street. As described in the RAWP, the existing vegetation on these slopes will be left in place and access to the slopes restricted via installation of fencing at the toe of the slope to supplement the existing fencing at the top of the slope. Prior to installation of the fencing, these localized areas of erosion will be stabilized to mitigate further erosion/destabilization of the slope. Stabilization methods will likely include installation of a geotextile in the areas of observed erosion followed by a layer of riprap, soil or stone.
- As indicated in the RAWP, the Site remedy will be integrated with pending upgrades/expansion of the active electrical substation at the Site. These upgrades include construction of an approximately 1,080 square foot control house building directly east of the existing fenced substation area, demolition of the existing Pawtucket No. 1 substation building, and re-routing of below grade conductors. Additional substation upgrades are anticipated to include construction of a paved access road around the perimeter of the expanded substation, installation of new fencing with gates equipped with electronic card readers, potential removal of existing fencing, installation of a larger grounding grid, and filling/capping of certain areas with the existing substation area. A preliminary Overall Final Conditions (attached Figure C-22) depicting these anticipated substation improvements is attached for reference. National Grid is still however in the process of designing these substation upgrades and the actual layout of the loop road and fencing may be modified. We also note, as indicated in updated Figure 18 from RAWP, an impermeable engineered cap will be installed below the footprint of the expanded substation area including over the footprint of the existing Pawtucket No. 1 substation building after this building has been demolished. Upon completion of the substation design, National Grid will provide RIDEM with an overall project schedule for the implementation of the Site remedy and the planned substation improvement activities.
- As part of the planned substation upgrades, Coneco Engineers & Scientists (Coneco) recently completed a hazardous building material survey of the existing Pawtucket No. 1 substation building. Based on the results of this survey, PCBs were detected in samples of interior building materials including concrete (1 sample on the 3rd floor of the building), paint, caulk, floor mats, and window glazing at concentrations in excess of 10 mg/kg. Reportedly, Coneco indicated no direct evidence of a release of PCBs to the environment (soil, groundwater, or surface water) was identified as a result of these detections; however, additional sampling will be required to further evaluate the extent of these impacts. Upon completion of this sampling, the identified hazardous building materials will be abated/removed and disposed off-Site prior to demolition of the Pawtucket No. 1 substation building. We currently anticipate abatement and demolition activities will be performed in the winter of 2021/2022. As indicated above, National Grid will provide RIDEM with a schedule for the implementation of the Site remedy and the planned building abatement and substation improvement activities once National Grid completes the design. As indicated above, after demolition, the footprint of the Pawtucket No. 1 substation building will be capped with an impermeable engineered cap.
- NBC is in the process of designing upgrades to their CSO system in the Pawtucket area. These upgrades are anticipated to include installation of a diversion structure proximate to the existing CSO line adjacent to the intersections of Tidewater and Merry Streets and an approximately 900-foot-long, 48-inch consolidation conduit

Attachments: Figure 18 – Overall Remedial Action Plan
Figure C-2 – Existing Conditions Plan
Figure C-22 – Overall Final Conditional Plan
Letter of Transmittal for RAWP
Remittance Copy of Check
April 2, 2019 Letter to RIDEM



FIGURES

GZA--\\A:ENVA 43654.40\CAD\01_CURRENT\PLANS\RIDEM-WRAP-COMMENTS-2019-05-14\43.645.40_CD_C-REA-OVERALL.DWG 31 OVERALL REMEDIAL ACTION PLAN MAY 30, 2019 1:29PM SCOTT BUXTON



ENGINEERED CONTROL LEGEND:

LEGEND

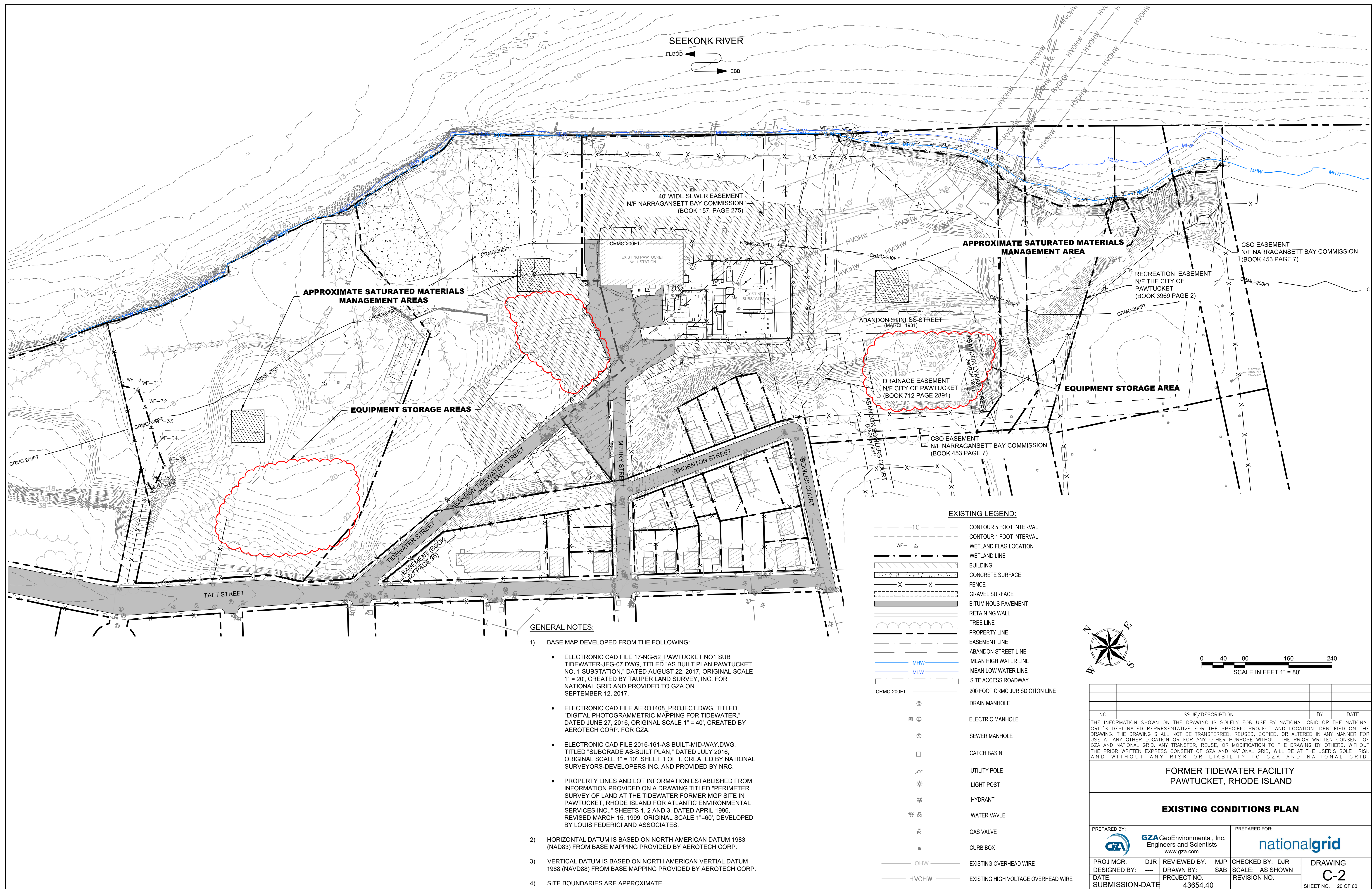
- GEOMEMBRANE LINER (IMPERMEABLE)
- NON WOVEN GEOTEXTILE LINER (PERMEABLE)
- PAVED (ENGINEERED CAP)
- NON WOVEN GEOTEXTILE LINER (WETLAND RESTORATION) (PERMEABLE)
- REACTIVE CORE MAT LINER
- PREVIOUSLY CAPPED AREA
- EXISTING WETLAND AREA TO REMAIN
- EXISTING CRUSHED STONE (EXISTING SUBSTATION AREA)
- PAVEMENT WITH WARNING BARRIER
- EXISTING MONITORING WELL (TO REMAIN)
- PROPOSED MONITORING WELL
- PROPOSED RECOVERY WELL
- COASTAL FEATURE
- LIMIT OF WORK
- PROPOSED LIMITED SOURCE REMOVAL

EXISTING LEGEND:

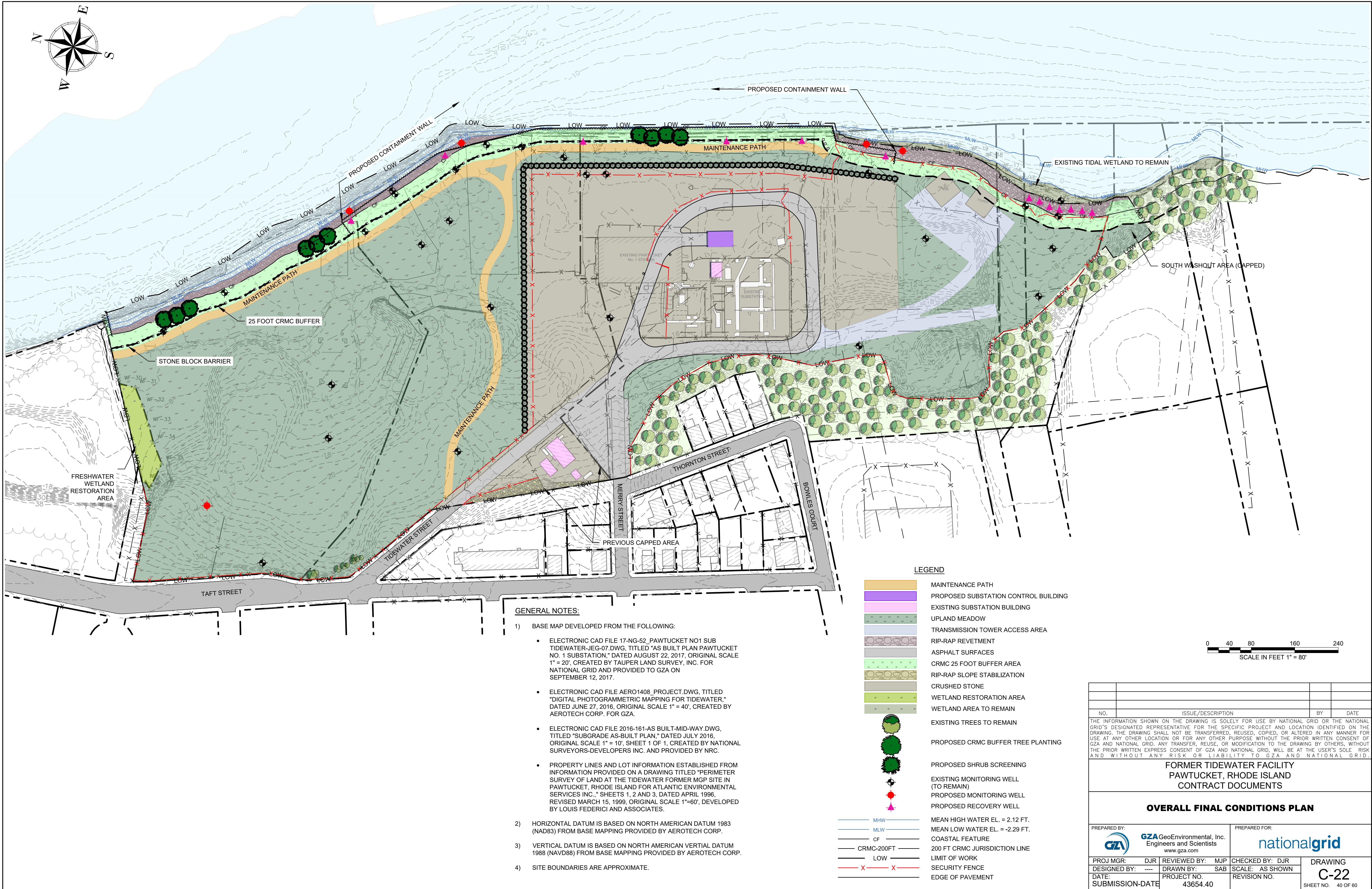
- WETLAND FLAG LOCATION
- WETLAND LINE
- BUILDING
- FENCE
- GRAVEL SURFACE
- BITUMINOUS PAVEMENT
- TREE LINE
- PROPERTY LINE
- SITE ACCESS ROADWAY
- 200 FOOT CRMC JURISDICTION LINE
- OHW
- HVOHW

0 40 80 160 240
SCALE IN FEET 1" = 80'

NO.		ISSUE/DESCRIPTION		BY	DATE
THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.					
FORMER TIDEWATER FACILITY PAWTUCKET, RHODE ISLAND					
OVERALL REMEDIAL ACTION PLAN					
PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com			PREPARED FOR: 		
PROJ MGR: DJR		REVIEWED BY: MJP		DRAWING	
DESIGNED BY: ---		DRAWN BY: SAB		SCALE: AS SHOWN	
DATE:		PROJECT NO.		REVISION NO.	
SUBMISSION-DATE		43654.40		18	
				SHEET NO. 31 OF 60	



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LETTER OF TRANSMITTAL AND REMITTANCE COPY OF CHECK



GZA GeoEnvironmental, Inc.
530 Broadway
Providence, Rhode Island 02909
401.421.4140 (fax) 401.751.8613

TRANSMITTAL

To: Rhode Island Department of Environmental Management
Office of Waste Management
235 Promenade 3rd Floor
Providence, Rhode Island 02908

Date: 06/15/18	Job No. 43654 Task 49
Attention: Mr. Joseph Martella	
Re: Former Tidewater Facility	
Pawtucket, Rhode Island	
File No. SR-26-0934A	
(Formerly RIDEM Case No. 95-022)	

We are sending you:

☐ Shop Drawings	☒ Attached	☐ Change Order	☐ Samples
☐ Copy of Letter	☐ Prints	☐ Plans	☐ Specifications
☐ Under Separate Cover, the following Items:	via:		

How Shipped:

☐ Overnight	☒ Courier	☐ Regular Mail	☐ Hand Delivered/Picked Up
------------------------------------	---	---------------------------------------	---

Copies	Date	No.	Description
1	June 15, 2018		Remedial Action Work Plan Report with CD
1	June 13, 2018		Remedial Action Approval Application Fee Form & Check

THESE ARE TRANSMITTED as Checked Below:

☐ For Approval	☐ Approved as Submitted	☐ Resubmit Copies for Approval
☐ For Your Use	☐ Approved as Noted	☐ Submit Copies for Distribution
☐ As Requested	☐ Returned for Corrections	☐ Return Corrected Prints
☒ For Review and Comment		☐ PRINTS RETURNED AFTER LOAN TO US
☐ FOR BIDS DUE:		

PRINT NAME:

SIGNATURE:

DATE:

Cheyenne Briggs
Cheyenne Briggs
6/15/18

Comments:

Copy To: Kenneth Lento (National Grid)

Signed:

David Rusczyk

Associate Principal

If enclosures are not as noted, kindly notify us at once.

Tuesday, May 21, 2019
9:44:49 AM

Remittance Advice

GZA GeoEnvironmental, Inc.

To	Rhode Island General Treasurer	Vendor Number	852525
	Rhode Island Dept of Environmental Management	Check Number	0272337
	Office of Water resources	Check Date	6/13/2018
	235 Promenade Street		
	Providence, RI 02908		
	US		

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
061118	6/11/2018	0438099	1,000.00			1,000.00
Totals			1,000.00			1,000.00



APRIL 2, 2019 LETTER TO RIDEM



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April 2, 2019
GZA File No. 05.0043654.40

Via E-Mail and U.S. Mail

Mr. Joseph Martella
Rhode Island Department of Environmental Management (RIDEM)
Office of Waste Management
235 Promenade Street
Providence, Rhode Island 02908

Re: Former Tidewater Facility
200 Taft Street
Pawtucket, Rhode Island
RIDEM Case No. 95-022 / Site Remediation File No. SR-26-0934

Dear Mr. Martella:

As discussed during our March 13, 2019 call, GZA GeoEnvironmental, Inc. (GZA) has prepared this letter on behalf of The Narragansett Electric Company d/b/a National Grid (National Grid) describing certain modifications to the subsurface containment wall design described in our June 2018 *Remedial Action Workplan* (RAWP) for the former Tidewater Facility located in Pawtucket, Rhode Island (herein referred to as the Site).

As described in the RAWP, the Tidewater remedy includes among other activities the installation of a subsurface containment wall designed to mitigate potential migration of non-aqueous phase liquid (NAPL) impacts to the Seekonk River coupled with manual recovery of observed NAPL from a network of monitoring and recovery wells. The subsurface containment wall was proposed to consist of two sections (a north and a south section) with an approximately 220-foot gap between each section proximate to the electric transmission towers. The north section of the containment wall is approximately 1,100-feet long extending across the Former Gas Plant Area (FGPA) and the Former Power Plant Area (FPPA) where the majority of the observed NAPL impacts have been observed. The southern section of the containment wall was proposed to be approximately 180 feet long extending from the southern electric transmission tower across the northern portion of the South Fill Area (SFA). The attached Figure 1 depicts the layout of the containment wall as presented in the RAWP.

Subsequent to the preparation of the RAWP, GZA's licensed soil scientist performed a survey of the Site as part of the remedy design and permitting process. Based on this survey, the southern section of the containment wall is located within a tidal wetland area. In addition, we have also recently become aware of the potential presence of



electrical distribution submarine cables proximate to the south transmission tower. These submarine cables reportedly extend from a vault on the Site, below the river and to the eastern shore of the Seekonk River. These cables were used to provide electrical power to the east side of the river prior to construction of the transmission towers. The attached Figure 2 depicts the layout of the containment wall as presented in the RAWP, including the edge of the tidal wetland, the approximate location of the vault for the submarine cables, and the approximate layout of the submarine cables within the Seekonk River.

Due to the presence of the tidal wetland and the submarine cables, we have re-evaluated the plan for addressing the limited NAPL observed in this area with the southern section of the containment wall. Since July 2011, GZA has performed NAPL gauging and recovery activities at the Site on an approximately quarterly basis. The observations made during these activities indicate NAPL impacts are limited to the presence of dense non-aqueous phase liquid (DNAPL)¹ within 3 of the 12 monitoring wells (MW-1, MW-320S and MW-320D) in the SFA. As indicated in attached cross sectional profiles B-B' and G-G' (Figures 6 and 11 from the January 2011 *Site Investigation Data Report*), with the exception of monitoring wells MW-318S and MW-318D, these NAPL detections are generally consistent with the limited extent of visible soil impacts previously observed in this area during the various rounds of environmental investigations. Monitoring wells MW-318S and MW-318D are located approximately 60 feet to the north of monitoring well MW-1 and visible soil impacts were also observed at this location similar to those observed at monitoring wells MW-1, MW-320S, MW-320D. However, NAPL has not been observed within these 2 monitoring wells to date. Given these observations, the southern section of the containment wall was designed to address the observed measurable DNAPL impacts within monitoring wells MW-1, MW-320S and MW-320D. However, as indicated on Figure 2, monitoring well MW-1 is located at the top of the riverbank (outside the wetlands) and DNAPL has only been periodically observed within this well at trace levels (less than 0.01 feet) since July 2011. DNAPL has also been observed at monitoring wells MW-320S and MW-320D within the wetlands at the bottom of the riverbank. DNAPL thicknesses within monitoring well MW-320S have ranged from trace levels (less than 0.01 feet) to 2.5 feet; however, as a result of quarterly recovery efforts, the observed DNAPL thicknesses within monitoring well MW-320S decreased to trace levels in 2018. DNAPL thicknesses in well MW-320D have historically ranged from approximately 1 foot to 14.5 feet. The DNAPL within this deeper monitoring well is viscous and recovery efforts with a peristaltic pump to date have not been successful in removing the DNAPL from this well. We also note that groundwater monitoring wells act as collection points for NAPL and therefore the thickness measured within wells is often significantly greater than what is actually present in the subsurface. Consistent with the relatively immobile nature and the observed viscosity of the DNAPL in this area, GZA has not observed the presence of sheens in the waterfront area adjacent to monitoring wells MW-320S/D.

If the southern section of the containment wall was installed as currently described in the RAWP, the tidal wetlands would be severely impacted during the installation process. In addition, the wall would have to be shortened at a minimum to avoid the subsurface electrical infrastructure still in place at the site. In an effort to minimize impacts to the tidal wetlands in this portion of the Site and due to concerns regarding installation

¹ Note, LNAPL has not been historically observed within the SFA.



of a steel sheet containment wall proximate to the submarine cables, we propose to replace the southern section of the containment wall with a row of seven (7) 4-inch diameter recovery wells installed approximately at the mid-slope of the riverbank. This well based recovery system is adequate to address the limited NAPL observed in this area of the Site. The recovery wells will be spaced approximately every 20 feet between well couplets farther up the slope where NAPL impacts were not observed during previous investigation activities (i.e., MW-318S/D and MW-319S/D). The bottom of each new well screen will be set at an elevation consistent with monitoring well MW-320D (Elevation -18.1 NAVD 88). In addition, the riverbank will be re-graded to create a uniform slope from the top of the riverbank to the edge of the tidal wetlands and capped with a reactive core mat as a precaution to mitigate the potential migration of NAPL to the shallow river sediments. The approximate layout of these recovery wells and a preliminary grading plan for the riverbank is attached as Figure 3. We will also evaluate the use of alternative recovery techniques to remove the observed DNAPL at monitoring well MW-320D as well as any observed DNAPL that may collect in these proposed recovery wells.

We believe this alternative approach is still protective of the environment based on the viscous and immobile nature of the DNAPL in this area and will also minimize impacts to the tidal wetlands and risks associated with the existing submarine cable. We therefore request your approval of this alternative approach.

Should you have any questions or comments regarding the information presented herein, please do not hesitate to contact the undersigned or Kenneth Lento from National Grid at (781) 907-3655.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in blue ink, appearing to read 'David Rusczyk'.

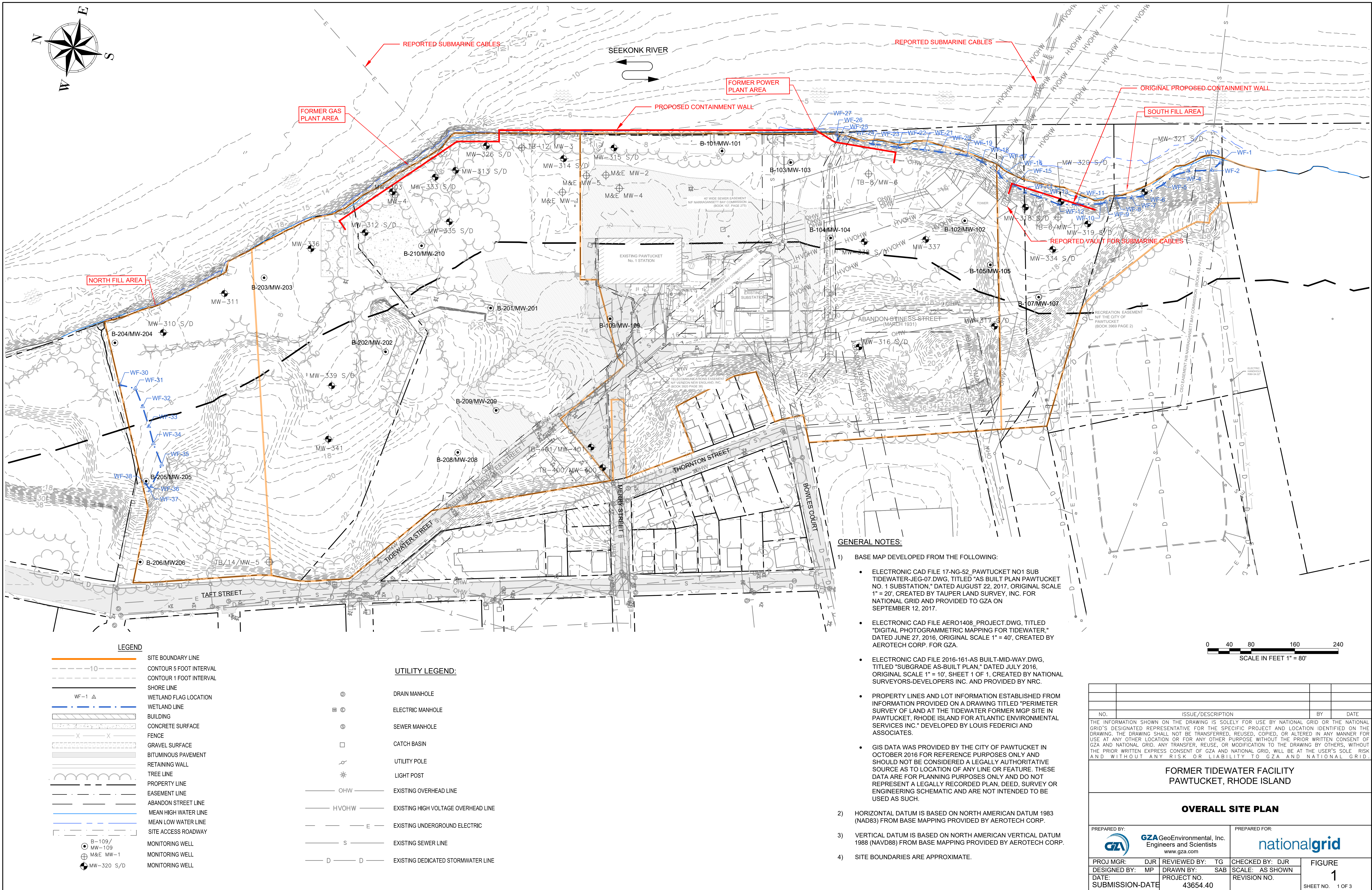
David Rusczyk, P.E.
Associate Principal

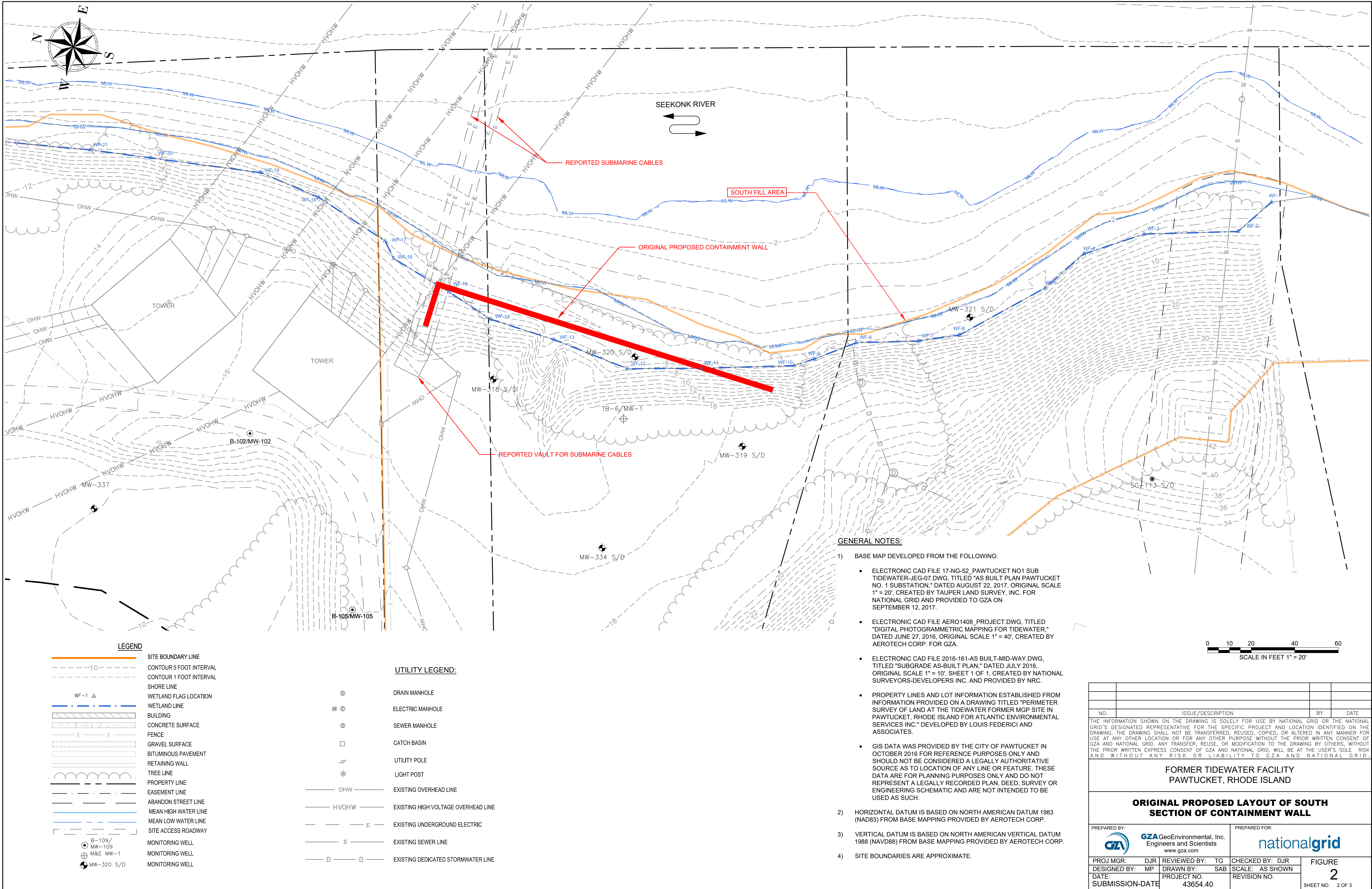
A handwritten signature in blue ink, appearing to read 'James J. Clark'.

James J. Clark, P.E.
Senior Principal

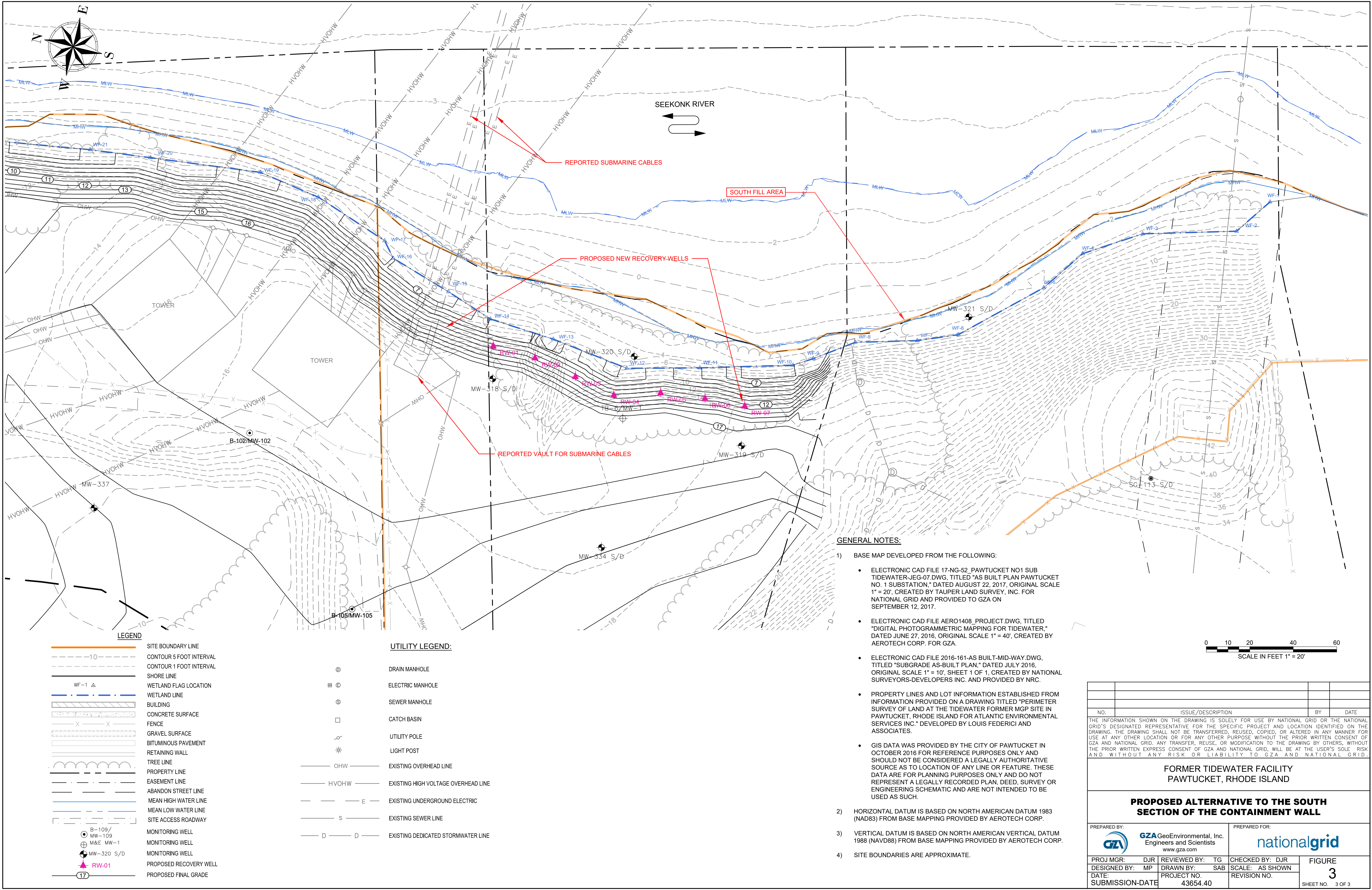
Attachments: Figure 1: Overall Site Plan
 Figure 2: Original Proposed Layout of South Section of Containment Wall
 Figure 3: Proposed Alternative to the South Section of Containment Wall
 Figure 6: Cross Sectional Profile B-B'
 Figure 11: Cross Sectional Profile G-G'

cc: Kenneth Lento, National Grid





GZA--\\A:\ENV\43654.40\CAD\01_CURRENT\PLANS\RIDEM WALL REMOVAL-REQUEST\43645.40_PROPOSED-ALTERNATIVE TO WALL.DWG ORIGINAL PROPOSED APRIL 2, 2019 4:36PM SCOTT BUXTON

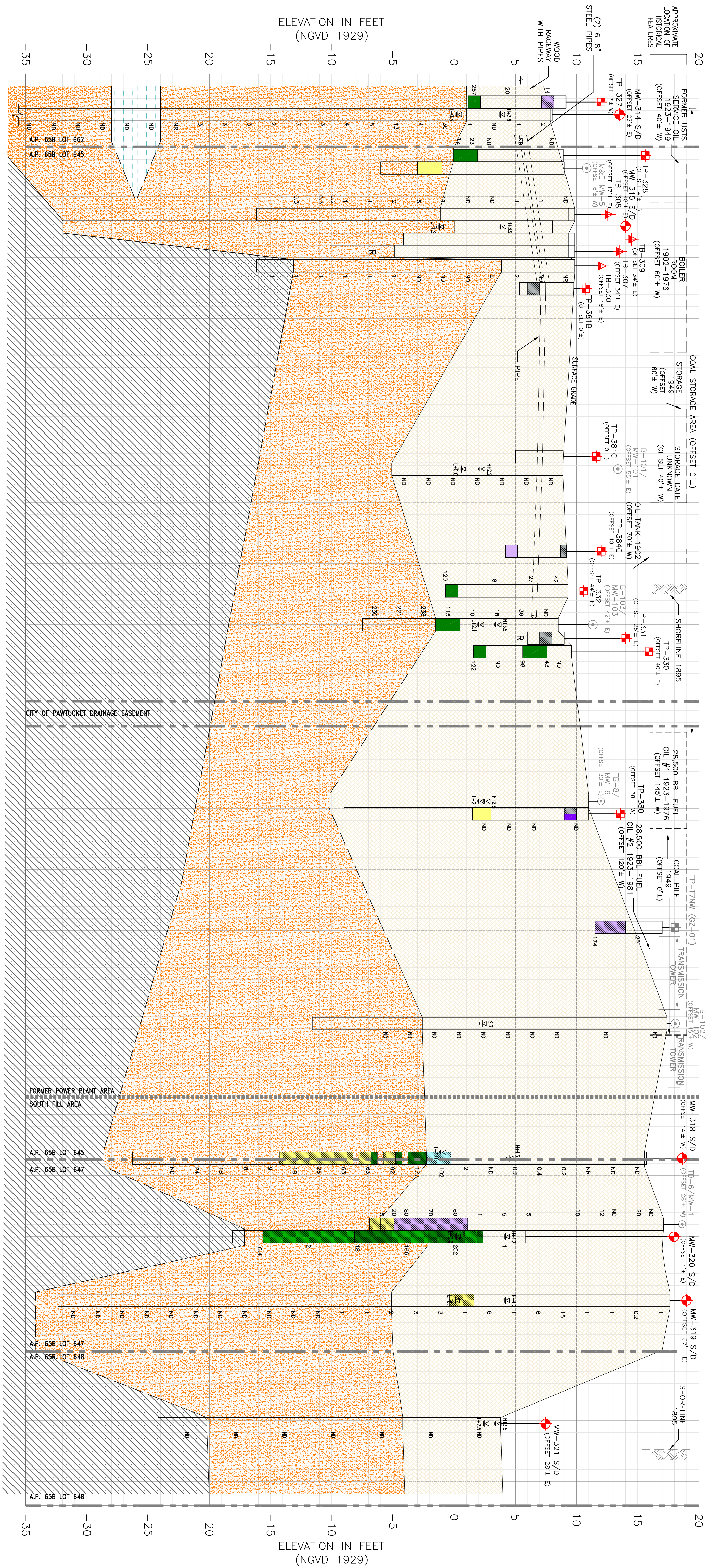


GENERAL NOTES:

- 1) BASE MAP DEVELOPED FROM THE FOLLOWING:
 - ELECTRONIC CAD FILE 17-NG-52_PAWTUCKET NO1 SUB TIDEWATER-JEG-07.DWG, TITLED "AS BUILT PLAN PAWTUCKET NO. 1 SUBSTATION," DATED AUGUST 22, 2017, ORIGINAL SCALE 1" = 20', CREATED BY TAUPER LAND SURVEY, INC. FOR NATIONAL GRID AND PROVIDED TO GZA ON SEPTEMBER 12, 2017.
 - ELECTRONIC CAD FILE AERO1408_PROJECT.DWG, TITLED "DIGITAL PHOTOGRAMMETRIC MAPPING FOR TIDEWATER," DATED JUNE 27, 2016, ORIGINAL SCALE 1" = 40', CREATED BY AEROTECH CORP. FOR GZA.
 - ELECTRONIC CAD FILE 2016-161-AS BUILT-MID-WAY.DWG, TITLED "SUBGRADE AS-BUILT PLAN," DATED JULY 2016, ORIGINAL SCALE 1" = 10', SHEET 1 OF 1, CREATED BY NATIONAL SURVEYORS-DEVELOPERS INC. AND PROVIDED BY NRC.
 - PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING TITLED "PERIMETER SURVEY OF LAND AT THE TIDEWATER FORMER MGP SITE IN PAWTUCKET, RHODE ISLAND FOR ATLANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED BY LOUIS FEDERICI AND ASSOCIATES.
 - GIS DATA WAS PROVIDED BY THE CITY OF PAWTUCKET IN OCTOBER 2016 FOR REFERENCE PURPOSES ONLY AND SHOULD NOT BE CONSIDERED A LEGALLY AUTHORITATIVE SOURCE AS TO LOCATION OF ANY LINE OR FEATURE. THESE DATA ARE FOR PLANNING PURPOSES ONLY AND DO NOT REPRESENT A LEGALLY RECORDED PLAN, DEED, SURVEY OR ENGINEERING SCHEMATIC AND ARE NOT INTENDED TO BE USED AS SUCH.
- 2) HORIZONTAL DATUM IS BASED ON NORTH AMERICAN DATUM 1983 (NAD83) FROM BASE MAPPING PROVIDED BY AEROTECH CORP.
- 3) VERTICAL DATUM IS BASED ON NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88) FROM BASE MAPPING PROVIDED BY AEROTECH CORP.
- 4) SITE BOUNDARIES ARE APPROXIMATE.

0 10 20 40 60
SCALE IN FEET 1" = 20'

NO.	ISSUE/DESCRIPTION	BY	DATE
THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY NATIONAL GRID OR THE NATIONAL GRID'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA AND NATIONAL GRID. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA AND NATIONAL GRID, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA AND NATIONAL GRID.			
FORMER TIDEWATER FACILITY PAWTUCKET, RHODE ISLAND			
PROPOSED ALTERNATIVE TO THE SOUTH SECTION OF THE CONTAINMENT WALL			
PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR:  nationalgrid	
PROJ MGR: DJR	REVIEWED BY: TG	CHECKED BY: DJR	FIGURE 3 SHEET NO. 3 OF 3
DESIGNED BY: MP	DRAWN BY: SAB	SCALE: AS SHOWN	
DATE: SUBMISSION-DATE	PROJECT NO. 43654.40	REVISION NO.	



APPROXIMATE
LOCATION OF
HISTORICAL
FEATURES

SHORELINE (1895)

TB-2
(OFFSET 43 ± S)

MW-318 S/D
(OFFSET 47 ± N)

MW-320 S/D
(OFFSET 16 ± S)

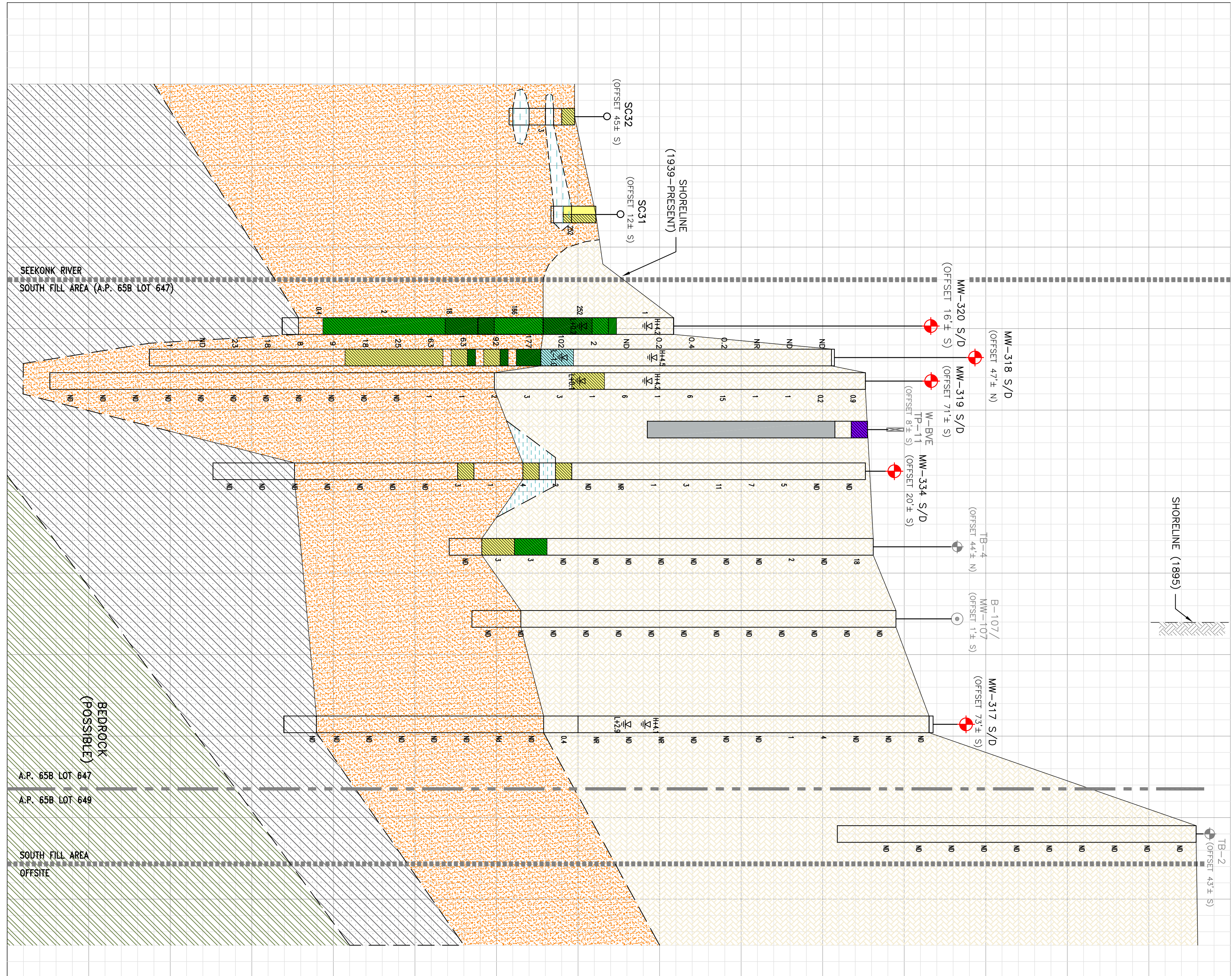
MW-319 S/D
(OFFSET 71 ± S)

W-BYE
TP-11
(OFFSET 8 ± S) (OFFSET 20 ± S)

TB-4
MW-107
(OFFSET 44 ± N) (OFFSET 1 ± S)

MW-317 S/D
(OFFSET 73 ± S)

ELEVATION IN FEET
(NGVD 1929)



ELEVATION IN FEET
(NGVD 1929)

GENERAL NOTES

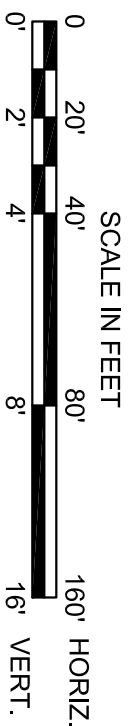
1. BASE MAP DEVELOPED FROM ELECTRONIC FILES FROM GEI CONSULTANTS, INC. (FORMERLY AES) ENTITLED "HISTORIC STRUCTURES AND SAMPLE LOCATIONS", ORIGINAL SCALE 1"=60', DATED JULY 1999 AND ELECTRONIC FILES FROM YAMASSE HANGEN BRUSTLIN, INC. ENTITLED "SOIL BORING, TEST PIT AND MONITOR WELL LOCATIONS", SCALE: 1"=60'.
2. PROPERTY LINES AND LOT INFORMATION ESTABLISHED FROM INFORMATION PROVIDED ON A DRAWING ENTITLED "PERIMETER SURVEY OF LAND AT THE TIDEWATER FORMER MGP SITE IN PAWUCKET, RHODE ISLAND FOR ATLANTIC ENVIRONMENTAL SERVICES INC." DEVELOPED BY LOUIS FEDERICI AND ASSOCIATES AND AN AUTO CAD FILE ENTITLED "MAX READ FIELD TRACK EXPANSION 2007" PROVIDED BY THE CITY OF PAWUCKET.
3. THE LOCATION(S) OF THE EXISTING STRUCTURE(S) ON THE EXISTING SITE WAS PROVIDED BY OTHERS AS INDICATED IN NOTE 1 AND HAS NOT BEEN VERIFIED BY GZA.
4. THE VISUAL OBSERVATIONS DESCRIPTIONS OF THE 2009/2010 SUPPLEMENTAL SITE INVESTIGATIONS ARE DEFINED IN THE CORRESPONDING TEXT. THE VISUAL OBSERVATIONS DESCRIPTIONS OF BORINGS PERFORMED PRIOR TO THE 2009/2010 SUPPLEMENTAL SITE INVESTIGATION ARE FROM INTERPRETATIONS MADE BY GZA AND ARE DEFINED IN THE CORRESPONDING REPORT TEXT.
5. GROUNDWATER ELEVATIONS ARE PRESENTED FOR MEASUREMENTS COLLECTED BETWEEN 08/10/2010 AND 08/12/2010 FOR THE MONITORING WELLS INDICATED.
6. ELEVATIONS ARE RELATIVE TO THE 1929 NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
7. HORIZONTAL DATUM IS BASED ON NAD 1983 FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.
8. VERTICAL DATUM IS BASED ON NGVD 1929 (MSL) FROM BASE MAPPING PROVIDED BY GEI CONSULTANTS, INC.

LEGEND:

- ±H+170
MULTI-LEVEL WELL LOCATIONS, GROUNDWATER LEVEL AT DEEP WELL LOCATION (PRESENTED)
GROUNDWATER LEVELS AT LOW TIDE BETWEEN 08/10/2010 AND 08/12/2010 (FOR MULTI-LEVEL WELL LOCATIONS, GROUNDWATER LEVEL AT DEEP WELL LOCATION PRESENTED)
TOTAL VOLITILE ORGANIC COMPOUND (TVOC) SOIL SAMPLE SCREENING RESULTS IN PARTS PER MILLION/ VOLUME AIR (PPMV)
NR INDICATES NO TVOC READING COLLECTED
ND INDICATES NO TVOC READING ABOVE INSTRUMENT DETECTION LIMIT OF APPROXIMATE 1 (PPMV) OBSERVED.
R INDICATES REFUSAL ON POSSIBLE STRUCTURE NOTED
MW-441 INDICATES 2010 MONITORING WELL LOCATION PERFORMED BY EXPEDITION DRILLING BETWEEN 05/03/10 AND 05/20/10 AND OBSERVED BY GZA PERSONNEL.
TB-302 INDICATES 2010 SOIL BORING LOCATION PERFORMED BY EXPEDITION DRILLING BETWEEN 03/03/10 AND 05/20/10 AND OBSERVED BY GZA PERSONNEL.
TP-306 INDICATES 2010 TEST PIT EXPLORATION LOCATION PERFORMED BY T. FORD BETWEEN 06/01/10 AND 06/16/10 AND OBSERVED BY GZA PERSONNEL.
B-109/ MW-109 INDICATES HISTORIC EXPLORATION LOCATION, TYPE OF EXPLORATION & DATE VARIES-SEE PLAN FOR DETAILS
TB-4 INDICATES HISTORIC EXPLORATION SOIL BORING LOCATION PERFORMED BY ATLANTIC, TYPE OF EXPLORATION & DATE VARIES-SEE PLAN FOR DETAILS
SC-31 O INDICATES ARCADIS SEDIMENT SAMPLE LOCATION (2008)
W-BYE TP-11 INDICATES WESTON/BLACKSTONE VALLEY ELECTRIC TEST PIT LOCATION
-- -- -- -- -- INDICATES INFERRED STRATIGRAPHY
- - - - - SITE AREA BOUNDARY LINE
- - - - - PROPERTY LINE

SOIL/BEDROCK STRATIGRAPHY LEGEND

- PETROLEUM -LIKE COAL TAR -LIKE MISCELLANEOUS
- FILL SHEEN
SILT STAINED
SAND COATED
CONCRETE BLUES
TILL SATURATED
BEDROCK OIL/TAR
- TRACE BLUE STAINING
HEAVY BLUE STAINING



PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists 590 BRIDGWAY PO BOX 1000 PAWUCKET, RHODE ISLAND 02860 (401) 421-1140				PREPARED FOR: NATIONAL GRID			
PROJ MGR: MSK	REVIEWED BY: WF	CHECKED BY: MSK	FIGURE 11	DESIGNED BY: WF	DRAWN BY: CRD	SCALE: 1"= 40'	
DATE: JANUARY 2011	PROJECT NO. 43654.00	REVISION NO. 0	SHEET NO. 12 OF 24				