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March 20, 2020
File: 210800843

Attention: Julia Godtfredsen, Conservation Administrator
City of Newburyport
Newburyport Conservation Commission
60 Pleasant Street
Newburyport, MA 01950

Reference: Request for Amended Order of Conditions DEP File #051-0920

Dear Commission Members:

On behalf of the City of Newburyport, Stantec Consulting Services Inc. files this Request for Amended Order of Conditions for the Shoreline Resiliency Critical Infrastructure Protection and Clipper City Rail Trail Project. The following provides information with respect to the project purpose, history, design features, impact assessment, construction means and methods and construction term mitigation measures.

INTRODUCTION AND PROJECT PURPOSE

As informally discussed during recent months, the City of Newburyport is proposing to re-construct a higher stone revetment shoreline stabilization and resiliency structure and an associated berm to protect against further erosion of the coastal bank, potential undermining of the existing underground electric lines, and potential storm surge and sea level rise wave action impacts and flooding of the City's Wastewater Treatment Facility (WWTF). The final section of the Phase 2 Clipper City Rail Trail will be constructed on top of the berm. The construction of the stone revetment wall, berm, and 1,100-linear-foot section of rail trail will be located between Water Street and the American Yacht Club in the City of Newburyport (Figure 1, 2, and 3).

An Order of Conditions was issued for the Clipper City Rail Trail Phase 2 Project in 2014 (FILE #051-0920) that included a 1.5-mile-long multi-use path along an abandoned rail corridor, most of which is in Newburyport. The project represented the second phase of a three-phase project. The Phase 2 rail trail project consists of three distinct portions or trail segments corresponding to adjacent land uses and rail bed conditions: a waterfront section, a residential section passing through the neighborhood between Water Street and High Street, and a section passing primarily through undeveloped City-owned land adjacent to the former railroad (Figure 2). To date, the trail has been constructed in the residential section, the city-owned undeveloped parcel, and a portion of the waterfront. However, construction of a 1,100-linear-foot segment of the waterfront trail along the manmade shoreline between Water Street and the American Yacht Club was delayed due to the identification and cleanup of PCB-contaminated soils and significant erosion in the area.

The proposed revetment and berm represent a climate adaptation project with a primary focus on enhancing the resilience of the WWTF to accommodate future sea level rise and storm surge. The improved shoreline section will include fill, reconstruction of a stone revetment seawall, shoreline stabilization measures, and a paved public pathway on top. The trail will be a 10-foot-wide asphalt trail with 2-foot shoulders that will be loamed and seeded with a coastal salt tolerant seed mix. The project also includes resetting existing granite

blocks and a section of stone retaining wall and concrete footing. The trail will include benches, signage, fencing, landscaping and other amenities.

The Phase 2 Trail project was reviewed, and an Order of Conditions issued in 2014. Three Minor Modifications to the Order of Conditions were issued in 2015, 2017 and 2018. An Extension Permit for the Order of Conditions was issued on 11/17/17.

Since the issuance of the Order of Conditions and Minor Modifications, the project has evolved with a broadened climate change adaptation focus that will protect not only the trail but the adjacent WWTF from future sea level rise and storm surge by incorporating a more robust revetment wall designed to prevent the continued erosion of the Coastal Bank that threatens this critical infrastructure. The revised project design results in more alterations to the existing manmade Coastal Bank than previously identified and approved, therefore an Amended Order of Conditions is requested.

PROJECT HISTORY

Through the ENF review for the project in 2014, the Office of Coastal Zone Management suggested that much of the coastal bank could be successfully stabilized with an alternative softer approach using coir rolls and plantings to stabilize the bank. The City attempted to follow these recommendations by repairing approximately 50 linear feet of seawall and designing a coir log approach for the rest of the shoreline stabilization. However, in 2017 when the City mobilized its contractor and landscaping subcontractor to the site, multiple conflicts between the coir logs and the existing uneven substrate and jumbled riprap along the shoreline were identified. Coir logs plugged with wetland plants can only be installed effectively on level soils, and the City requested and received a Minor Modification of the Conservation Commission's Order of Conditions to reduce the coir logs to areas where they could potentially be installed on level ground. However, construction was delayed by the identification of PCB-contaminated soils in this area. After additional testing and planning, and just before the contractor mobilized to excavate the contaminated soils, a number of significant winter storms occurred in early 2018 that lead to particularly severe erosion in five locations as well as the entire length of this 1,100-linear-foot section of shoreline. Some of the erosion extended across the old rail corridor to within several feet of the WWTF's Chlorination Building and Chlorine Contact Tanks.

It has become clear that this Coastal Bank is not relatively stable, and the riverbank's established vegetation and existing mature shrubs and root systems are not able to withstand the wave action and erosive forces at this site. Emergency temporary shoreline stabilization measures were installed in 2018 consisting of stone-filled gabion baskets in the most significantly eroded areas in order to prevent further erosion that could cause the migration of PCB-impacted soils into the Merrimack River, expose the underground electric lines, and further undermine the Coastal Bank and slope. After discussion with local regulators, consultants and other stakeholders, it was determined that it would not be responsible to build the trail facility as originally designed and permitted, as it would not only leave the new trail vulnerable to erosion but it would not protect the adjacent critical infrastructure of the WWTF from storm surge and sea level rise. Since then, the City has worked with its consultants to develop plans for a stone revetment and berm along this shoreline that will protect not only the anticipated rail trail but the critical infrastructure of the adjacent WWTF and underground electric lines.

The general pursuit of softer nature-based shoreline stabilization is reasonable only for appropriate sites that have lower energy, less exposure to prevailing wind and wave direction, lower rates of erosion, level grades

and/or more modest slopes, and sites that lack immediately adjacent critical infrastructure. Furthermore, in recent years, research and meta-analysis of the ecological consequences of shoreline hardening has found a general distinction between vertical seawalls and sloped riprap revetments: while vertical seawalls may generally have less biodiversity and organism abundance, riprap shorelines are not significantly different from natural shorelines. In addition, it is demonstrable that the existing hard structures along the shoreline to the south and north of this location have not had a negative impact on the existing salt marsh.

Since the original project was permitted in 2014, there have been several state-funded studies, analyses, and plans that have systematically shifted the approach for this shoreline area due to the community's increased awareness and focus on potential storm surge, sea level rise, and flooding of the WWTF, which would result in severe and costly consequences for public health and the environment. These include the Merrimack Valley Regional Planning Commission's Multi-Hazard Mitigation Plan Update (2015), the Great Marsh Coastal Adaptation Plan (2017), the Newburyport Municipal Vulnerability Preparedness Workshop Summary of Findings (2018), and the Wastewater Treatment Plant Climate Change Resilience – Climate Change Vulnerability Report (2019). This stretch of shoreline is a high energy site with exposure to prevailing wind and waves, uneven grades, a relatively steep slope, a significant erosion rate, and limited physical space between the salt marsh, underground electric lines, and the WWTF buildings, facilities, and equipment. Nature-based shoreline stabilization measures are not able to withstand Federal Emergency Management Agency (FEMA) indicated storm surge, wave action, and flood levels to protect this critical infrastructure. The shoreline is below the FEMA Base Flood Elevation (BFE) and needs to be protected and raised for at least the expected useful life of the WWTF.

These planning stages led to reorganizing the Project as part of an integrated phased approach:

1. Remediate the soil contamination;
2. Rebuild the sloped stone revetment and a raised berm with the trail on top;
3. Build perpendicular floodwalls back to Water Street;
4. Divert stormwater and build a pump station inside the WWTF; and
5. Conduct a feasibility study of the long-term approach of either raising the street and neighborhood vs. relocating the WWTF inland.

The updated design represents a hardened shoreline in place of the previously approved living shoreline due to the previously described circumstances. The City's design will construct a sloped stone revetment to protect the existing infrastructure, the new rail trail, and the WWTF. The design is like three other projects along the Merrimack River in Newburyport, including Cashman Park, Kane Revetment and the NGRID revetment. It is not an option to allow the shoreline in this location to significantly erode as the infrastructure and City's WWTF are at risk. The existing shoreline is below the current FEMA BFE, see Figure 4, for much of the WWTF, and future sea level rise and storm surge will increase the risk of erosion and inundation, potentially shutting down the WWTF and causing sewage overflows into the Merrimack River and ocean potentially resulting in major public health and environmental impacts. The updated design location of the rail trail remains the same as it cannot be shifted away from the River due to the location of the WWTF.

PROPOSED REVETMENT AND RAIL TRAIL

The elevation of the rail trail on top of the proposed berm in the current design (see attached 25% design plans) will facilitate avoiding future washouts. The trail will transition to meet existing grades on either end

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and the other sections of existing public trail. By raising the elevation of the berm and revetment to address the FEMA BFE, storm surge, and sea level rise, the footprint of the facility has increased. The stone revetment provides both slope protection and reduces the extent of grading necessary.

Approximately 879 linear feet of stone revetment is proposed. In addition, at the southern end of the project 36- linear feet of new wall and 15- linear feet of existing wall to be reset will be required to join the existing wall to the new revetment. Various options were reviewed for the revetment design, including a vertical (1:1) design. The sloped revetment at 1.5:1 is preferred because it provides a more gradual transition along the shoreline like existing conditions, whereas a vertical wall could potentially influence wave redirection. More importantly, the footprint of the revetment cannot extend any further seaward as there is salt marsh located along this length of the shoreline. The revetment cannot extend any further landward due to the presence of the existing concrete encased underground electric lines. Similar stone revetments in Newburyport have functioned very well in terms of preventing erosion and maintaining healthy adjacent salt marsh. The key factors governing the selection of the revetment as permanent slope treatment includes the following:

1. Rough face sloped revetment reduces wave energy and minimizes wave reflection back into the river which can potentially cause scour and erosion.
2. The increased elevation of the revetment will provide greater resilience to coastal storms and flooding events anticipated with climate change and sea level rise predictions.
3. A short section of vertical stone wall extension is proposed at the southern transition end to avoid impacts to the existing salt marsh and the existing electric duct bank. The proposed stone wall will transition from the existing stone wall to the proposed stone sloped revetment.
4. The project also involves the removal of unsuitable rip rap and debris (bituminous, concrete and steel) along the shoreline and within the wetland resource areas. The removal of the unsuitable stone and debris will restore the area to a more natural state and provide more opportunity for vegetation growth, including salt marsh.
5. The proposed revetment will allow for the beneficial reuse of existing stones. It is anticipated that approximately 25% of the revetment stones will consist of on-site existing salvaged stone.
6. The project will include a vegetated buffer between the stone revetment and rail trail.

Revetment

The proposed shoreline stabilization work includes the construction of approximately 879- linear feet of sloped stone revetment, construction of approximately 36- linear feet of stone block wall with reinforced cast-in-place concrete footing and the reconstruction/resetting of up to 15- linear feet of existing stone block seawall adjacent to the proposed wall and revetment at the southern project limits as the project design transitions or ties into the existing wall.

The new revetment will incorporate 4- to 6-ton toe stones, located below grade on the water side, providing support for a 3-foot-thick layer of 3- to 5-ton armor as the face of the revetment. The slope will transition to a horizontal surface or flat stone at the top of the revetment to match the proposed trail grades. The various layers of stone will be underlain with filter fabric and a 1.5-foot-thick layer of 12- to 18-inch bedding stone. A variable width strip of loam and seed will run along the top of the structure between the revetment and the rail trail. The southern and northern ends of the revetment will vary slightly to accommodate an existing retaining wall and existing outfall, respectively.

The design and height of the revetment has been driven by consultants' recommendations based on the best available climate science in the National Oceanic and Atmospheric Administration's (NOAA) sea level rise scenarios within a time horizon of approximately 50 years, which is approximately the expected useful life of the WWTF. Based upon the consultant's comprehensive analysis of climate change risk and existing conditions and constraints and recommendations for practical and cost-effective solutions, the WWTF needs to be protected by installation of a shoreline revetment to elevation 14 feet and a berm to 14.5 feet (the current project). Future phases of work will include installation of perpendicular side floodwalls at 13+ feet back to Water Street to prevent future sea level rise and storm surge from going around the berm, plus a stormwater pump system. The recommended solution considers the site-specific constraints of this area, which limit the level of flood protection up to a certain elevation. With numerous privately-owned structures and properties built tight to the street, the elevation of Water Street in this area is between 13 and 14 feet, and it would not be effective to construct these structures above about 14 feet as flooding higher than that level would encircle and enter the WWTF from the street regardless of the height of those structures. The current FEMA BFE is 12 feet for the WWTF. This initiative will provide protection to the FEMA BFE level and allow for an additional 1–2 feet of future sea level rise. Sloped stone revetments and berms are inherently modular and can potentially be raised in the coming decades if the community determines to fund keeping the WWTF in place and elevating Water Street and the adjacent private structures. Building the revetment and berm structures at a cost-effective and appropriate height now with some room for sea level rise will protect the WWTF and its critical services to the region for decades and allow the City to plan for future decisions regarding wholesale neighborhood elevation and/or WWTF relocation towards the end of the facility's expected useful life.

Rail Trail

The 10-foot-wide trail will consist of asphalt pavement with 2-foot-wide shoulders. A 3:1 loam and seed slope will transition from the shoulders' edge to the existing grade. Trail amenities will include benches, sculptures, and interpretive signs.

The elevation of the rail trail on top of the proposed berm in the updated design will facilitate avoiding future washouts. The trail will transition to meet existing grades on either end and the other sections of existing public trail. By raising the elevation of the berm and revetment to address the FEMA BFE, storm surge, and sea level rise, the footprint of the facility increased. The stone revetment provides both slope protection and reduces the extent of grading necessary.

RESOURCE AREAS AND IMPACT ASSESSMENT

The initial rail trail project and shoreline stabilization was issued an Order of Conditions (DEP File #051-0920) by the Newburyport Conservation Commission in 2014. Subsequent to the issuance of Order, Minor Modifications and an Extension Permit were issued by the Commission for repairs to the eroded bank. The updated design will be included in a Request for Amended Order of Conditions filed herein with the Commission.

RESOURCE AREAS

Resource areas within or adjacent to the project site include Coastal Bank, Riverfront Area, Flood Zone or Land Subject Coastal Storm Flowage (LSCSF) and Velocity Zone; Land Subject to Tidal Action, Salt Marsh, Coastal Beach; Tidal Flat and Land Under Ocean. The elevations associated with the resource areas were derived based on NOAA tide Station 8440452, where mean high water (MHW) elevation is 4.02 feet NAVD88; high tide elevation is 5.80 feet NAVD88; and mean low water (MLW) is -4.07 feet NAVD88. Land Containing Shellfish is mapped below the salt marsh, beyond the project site. A summary description of each resource area to be temporarily or permanently impacted is provided as follows.

- Coastal Bank is located along the entire project shoreline and was determined based on field observations and topography. The identification of the Coastal Bank was based on Massachusetts Department of Environmental Protection (MassDEP) Policy 92-1 where the break in slope and slope itself dictates the upper boundary of the Coastal Bank.
- The project site in its entirety is located within the 200-foot Riverfront Area associated with the Merrimack River.
- As mapped by FEMA, portions of the project site are mapped within the 100-year flood zone AE elevation 12 feet NAVD88, and VE velocity zone elevation 14 feet NAVD88. Both identified as LSCSF under the MA WPA.
- Land Subject to Tidal Action is elevation 5.80 feet NAVD88.
- The upper or landward limit of Salt Marsh was field delineated in 2019.
- Coastal Beach extends from MLW, landward to the Coastal Bank or seaward edge of manmade structure. The strip of Coastal Beach located between the landward edge of salt marsh and the toe of Coastal Bank, consists of remnant storm debris.
- Land under the Ocean is seaward of MLW or elevation -4.07 feet

IMPACT ASSESSMENT

Portions of the revetment toe will be located below MHW elevation 4.02 feet NAVD88. The revetment toe elevation ranges from 2.5 feet to 6 feet NAVD88, variable throughout the length, based on the tie in or transition in grading to existing elevations. The debris and stones that are located along the Coastal Beach and Bank will be removed in order to clean up the area from the aftermath of the storm and to facilitate construction of the revetment. The construction of the revetment and rail trail will result in permanent impacts to Coastal Bank, Riverfront Area, Coastal Beach, and Flood Zone or LSCSF.

Permanent Impacts

Coastal Bank: The project in and of itself represents the replacement of an existing eroded coastal bank that is no longer functioning with respect to storm damage prevention and flood control. The bank has eroded to the point where it no longer acts as a vertical buffer to waves and storm events. Historically, a riprap revetment protected this bank from erosion, but the structure has largely unraveled and is not functional due to lack of

maintenance for many decades. The entire 879 -linear foot section of eroding coastal bank will be impacted by the replacement of an armored revetment that will withstand erosive forces.

Riverfront Area: The entire project will be constructed within the Riverfront Area as there are no alternative locations for the rail trail and the existing bank must be reconstructed to protect the WWTP.

Coastal Beach: Portions of the revetment will be constructed within coastal beach.

Flood Zone/LSCSF: The project in its entirety will be located within the 100-year flood zone or LSCSF. The top of the revetment will be set at the same elevation as the VE zone elevation 14 feet NAVD88.

Impacts to Jurisdictional Resource Areas

Jurisdictional Resource Area	Temporary Impacts	Permanent Impacts
Coastal Bank	0 sf	930 lf (consisting of 36 lf new wall and 15 lf resetting existing wall at connection to new revetment -south end of project; and 879 lf of new revetment)
Riverfront Area	0 sf	55,610 sf
Coastal Beach	0 sf	3,800 sf
Land Subject to Coastal Storm Flowage/Flood Zone	0 sf	55,610 sf

FISHERIES AND WILDLIFE

The revetment, berm and rail trail are mapped within Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife. According to the Natural Heritage and Endangered Species Program, this area includes potential habitat for the Atlantic Sturgeon (*Acipenser oxyrinchus*) and Bald Eagle (*Haliaeetus leucocephalus*). See Figure 3.

In October 2019, a letter was sent to Mass Wildlife describing the revisions to the project along with supporting plans. The MassWildlife responded that the project will not adversely affect resource area habitat of state protected wildlife species and will not result in a prohibited take of state-listed rare species (see attached copy of letter). As requested by MassWildlife, a copy of the Request for an Amended Order of Conditions will be jointly submitted to NHESP for review.

STORMWATER MANAGEMENT

The project will meet the MassDEP Stormwater Management Standards to the maximum extent practicable since it qualifies as a “footpaths, bike paths and other paths for pedestrian and/or nonmotorized vehicle access.

The introduction of new impervious surface associated with the asphalt rail trail will require stormwater management. The City-owned WWTF abutting the project contains several existing catch basins that collect runoff from the plant and conveys it to a series of existing storm drain lines that cross beneath the rail trail and discharges to the Merrimack River. The area to the south of the rail will be regraded to create a series of high points where stormwater will be conveyed via shallow vegetated swales to existing catch basins that drain to the Merrimack. No new point source discharges are proposed as the project will rely on the existing stormwater management structure at the WWTF to convey overland flows to the River. The following section discusses project conformance with the Stormwater Management Standard. A copy of the Stormwater Management Checklist is provided as an attachment.

Standard 1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

No new point source discharges are proposed as the project will rely on the existing stormwater management structure at the WWTF to convey overland flows to the River.

Standard 2. Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Because the project site is located within the 100-year coastal flood zone and land subject to coastal storm flowage, the control of peak discharge rates is not required.

Standard 3. Loss of annual recharge to groundwater shall be eliminated or minimized using infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

There will be some infiltration of runoff into the proposed swales/drainage channels.

Standard 4. Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

- a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;**
- b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and**
- c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.**

The requirement for the removal of 80% TSS does not apply to this project. The use of the rail trail by pedestrians and bicyclists will not require the use of sanding nor will the paved surface be exposed to other potential pollutants. The trail will be owned and maintained by the City and trash and other debris will be collected, including the provision of pet waste bags.

Standard 5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

The revetment and rail trail are not considered land uses with higher potential pollutant loads.

Standard 6. Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

The existing stormwater discharges are not located within a Zone II or Interim Wellhead Protection Area.

Standard 7. A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Although the Project does not qualify as redevelopment because it will result in an increase of impervious area, this standard is not applicable because the Project qualifies to meet all standards to the maximum extent practicable because it is a public path.

Standard 8. A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

A stormwater pollution prevention plan was prepared for the remediation portion of the Project and the document will be updated to include the revetment and rail trail project components. The plan will include measures to prevent erosion and minimize sediment.

Standard 9. A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

The supporting stormwater infrastructure is already owned by the City of Newburyport and the system is maintained in accordance with the City's MS4 permit.

Standard 10. All illicit discharges to the stormwater management system are prohibited.

The Project will not result in illicit discharges to the existing stormwater management system.

MITIGATION

Planting of salt tolerant species in the strip of vegetation between the top of the revetment and the rail trail is proposed; the planting plan will be provided to the Commission prior to the public hearing. The eroding Coastal Bank and portions of Coastal Beach will be reconstructed as a revetment.

ALTERNATIVES ANALYSIS

There will be impacts to resource areas including coastal bank that are unavoidable since the bank itself requires reconstruction and permanent stabilization, and the design has minimized impacts to resource areas as much as practicable. The following discusses project alternatives considered during the design process.

Alternatives analysis: The chosen phased approach balances needs, risks, and costs. The City and its consultants have considered several alternatives to the selected phased project, including:

- i. *No build.* The "no build" alternative is not considered appropriate for multiple reasons as it would not provide any protection for the adjacent vulnerable critical infrastructure and lead to undermining, wave damage, and flooding with severe consequences, shutting down the treatment plant and causing raw sewage overflows into the streets, Merrimack River, and ocean, producing major negative public health impacts, environmental and habitat damage, and requiring millions of dollars of lengthy repairs. In addition, the "no build" alternative would not allow the public to capitalize on the substantial investment made in cleaning up the site, and would not address the needs of pedestrians and bicyclists who would otherwise continue to use a temporary detour along a narrow busy road which could be the site of avoidable accidents or deaths.
- ii. *Build the riverfront facility as originally designed and permitted in 2014 with short-term solutions inside the WWTF (e.g., doorway barriers).* This alternative is not considered appropriate as it would provide insufficient protection for the vulnerable critical infrastructure to wave action and significant storm surge, and lead to undermining, wave damage, and flooding with all of the severe consequences outlined above, as well as a waste of public resources invested.
- iii. *Build the riverfront facility as originally designed and permitted and build a berm inside of the WWTF property away from the riverfront.* This alternative is not physically feasible as consultants have confirmed there is insufficient space inside the WWTF property inland of the shoreline rail corridor for a stable berm at an appropriate height, and such a trail would be at risk in the near term for erosion and consequent undermining, damage, and closure.

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- iv. *Enclose the WWTF with concrete flood walls inside the WWTF facility to Water Street.* This alternative is not considered cost-effective or appropriate, as cost estimates from consultants indicate that it would add millions of dollars, and would not address erosion from an unprotected high energy shoreline that would risk undermining the walls; this alternative would also not provide for a stable public riverfront pathway.
- v. *Rebuild a sloped stone revetment and elevated berm, but below FEMA BFE.* This alternative is not appropriate because it would leave the facility at more risk to the impacts of storm surge in the near term, much less future sea level rise.
- vi. *Build a sloped stone revetment and berm higher than the proposed project to prepare for more sea level rise.* This alternative is not considered appropriate or cost-effective due to the existing height and site constraints of the Water Street side of the WWTF (and multiple adjacent private properties), which would continue to allow floodwaters to encircle the plant at that height. Therefore, building the revetment, berm and associated side walls higher than 14 feet would not provide any additional protection.
- vii. *Raise WWTF's power system, equipment, buildings (with or without raising the street and neighborhood at Water Street).* This alternative is not considered to be appropriate or cost effective at this point as consultants have indicated that it would be extremely expensive compared to the preferred alternative. It should instead be part of a long-term feasibility study of how the community should address the WWTF in 50 years.
- viii. *Wholesale relocation of the WWTF and all associated sewer connections to an inland site.* This alternative is not considered to be appropriate or cost effective as consultants have indicated that it would be extremely expensive (20X or more) compared to the preferred alternative. Furthermore, \$37M in federal, state, and local funding has recently been invested in the WWTF. It should instead be part of a long-term feasibility study of how the community should address the WWTF in 50 years when the useful life of the upgraded facilities, buildings, and equipment have been utilized.

Planning since 2014: Since the original riverfront project was permitted in 2014, there have been several state-funded studies, analyses, and plans that have systematically shifted the approach for this shoreline area due to the community's increased awareness and focus on potential storm surge, sea level rise, and flooding of the WWTF, which would result in severe and costly consequences for public health and the environment. These include the MVPC Multi-Hazard Mitigation Plan Update (2015), the Great Marsh Coastal Adaptation Plan (2017), the Newburyport Municipal Vulnerability Preparedness Workshop Summary of Findings (2018), and the Wastewater Treatment Plant Climate Change Resilience – Climate Change Vulnerability Report (2019). This stretch of riverfront is a high energy site with exposure to prevailing wind and waves, uneven grades, a relatively steep slope, a significant erosion rate, and limited physical space between the salt marsh, underground electric lines, and the WWTF buildings, facilities, equipment. Nature-based shoreline stabilization measures are not able to withstand FEMA indicated storm surge, wave action and flood levels to protect this critical infrastructure. The shoreline and the WWTF is below the FEMA BFE and needs to be protected and raised for at least the expected useful life of the WWTF. All of this planning had led to reorganizing the project as part of an integrated phased approach:

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- Remediate the soil contamination
- Rebuild the sloped stone revetment and a raised berm with the trail on top
- Build perpendicular floodwalls back to Water Street
- Divert stormwater and build a pump station inside the WWTF
- Conduct a feasibility study of the long-term approach of either raising the street and neighborhood vs. relocating the WWTF inland.

While the project has been revised, it is important to note that it addresses the same area, uses similar materials as previously designed and permitted, and has similar objectives of stabilizing the shoreline, installing fill to raise the grade, and installing a handicapped accessible public trail, with the important difference of the increased height of the berm, the robustness of the shoreline stabilization, and an expanded rationale and priority for the work (i.e., priority protection of critical infrastructure).

GENERAL CONSTRUCTION METHODS AND PHASING

The following sections describe the anticipated construction phasing and phasing.

CONSTRUCTION DESCRIPTION AND PHASING

Project construction is expected to occur over 6-month period between April 2021 and September 2021. The general construction procedure for the proposed shoreline stabilization work consists of installation of top of slope erosion and sedimentation control measures, removal and stockpiling of visible and accessible stone and general debris along the shoreline of the project site, disposal of unsuitable stone and debris, construction of the new stone block wall with cast-in-place concrete footing, in-kind reconstruction/resetting of the adjacent stone wall as necessary to facilitate the construction of the proposed new wall, and construction of the sloped stone revetment, berm, and trail.

The proposed work is anticipated to be accessed from the north end adjacent to the American Yacht Club, and from the south end at Joppa Park. The staging and stockpiling of equipment and materials will be along the proposed alignment of the Rail Trail, above MHW and the High Tide Line. Equipment and materials will be stored such that they will be protected from rising water when not in use.

Land-based equipment will be used to perform the work. Worker access within the intertidal zone may be necessary to facilitate the proposed stake-out work but will be kept to a minimum; the physical work in the intertidal zone will be limited to workers on foot with hand tools. Excavations for the toe of the revetment can be accomplished from the top of the slope without having equipment access along the water side. Excavations will be phased with the tide, and all work will be performed in the dry. Excavated sections will be constructed within the tidal cycle to prevent inundation and potential erosion.

The proposed construction will likely start at the southern end for the proposed new stone block wall. The work will progress northerly towards the American Yacht Club. The proposed revetment will be constructed in a uniform manner starting at the toe and moving landward up the slope. It is likely that the proposed filling for the berm and Rail Trail will be performed sequentially during the revetment construction. In some areas

along the proposed Rail Trail landward filling and grading would be performed as the proposed revetment is constructed. This would allow for even filling of the area to achieve target elevations.

CONSTRUCTION METHODS

1. *Removal and stockpiling of visible and accessible stone and general debris along the shoreline of the project site:* Construction equipment will be utilized to remove visible and accessible unraveled stone and debris along the shoreline to restore the area to a more natural state and provide more opportunity for vegetation growth, including salt marsh. Approximately 25% of the revetment stones will be salvaged from existing on-site stone. Stone and debris are anticipated to be lifted and removed from the ground surface. No excavation will be necessary. This work will be phased with the revetment construction work.
2. *Construction of new stone block wall:* A new stone block wall with cast-in-place concrete footing is proposed adjacent to the existing stone block seawall and proposed revetment. A reinforced cast-in-place footing will be constructed below grade and new stone blocks will be installed above the concrete footing. At the top of the wall existing stone will be placed to match the slope of the revetment. Additionally, a portion of the existing stone block seawall may need to be rebuilt to facilitate the proposed work. This work will likely include resetting and chinking wall stones. The proposed wall work is landward of MHW and the landward edge of the salt marsh.
3. *Construction of stone sloped revetment:* The proposed revetment will be constructed by first excavating and preparing the subgrade, placing woven geotextile fabric over the prepared subgrade including at the toe, backfilling with bedding stone, then placing armor stone with placing efforts concentrated on setting each stone firmly and well supported by underlying and adjacent stones. The face of the revetment shall be left rough. The proposed revetment will be constructed landward of the edge of existing salt marsh. Most of the revetment is landward of MHW except at north end; approximately 295 square feet of work will occur below MHW. Rail trail subgrade work may be performed at the time of revetment construction.
4. *Construction of trail:* The area to the south of the trail and the trail bed itself will be graded to accommodate the surface flows for stormwater management and the paved trail surface, respectively. The trail subsurface will be compacted and paved. Final landscaping between the top of the revetment and trail will include salt tolerant plantings. The areas regraded to direct stormwater to the existing catch basins will be stabilized with loam and seed. Finally, site amenities including benches and interpretive displays will be installed.

Measures to Minimize Resource Area Impacts will include the following:

- Temporary barriers, fencing and signage will be placed at the work site during construction.
- Contractor will have a spill kit/absorbent pads on each piece of equipment.
- Each vehicle shall be inspected daily for leaks; leaking equipment shall be removed from the site immediately and shall not return to service until repaired.
- The work area will be left in a condition such that rising water and/or adverse weather will not cause damage to the work area or adjacent areas.

March 20, 2020

Page 14 of 14

Reference: Request for Amended Order of Conditions DEP File # 051-0920

- The contractor will perform the work during favorable tides for the various aspects of the work. The contractor will work the tides to minimize impacts to resource areas.

Summary

In summary, we believe that the revised project meets the performance standards and the Special Conditions issued for the project to date. The revised plans provide designs that will protect the WWTF from future sea level rise and storm surge by incorporating a more robust revetment wall to prevent the continued erosion of the Coastal Bank that threatens this critical infrastructure. We look forward to discussing this Request for an Amended Order with the Commission.

Regards,



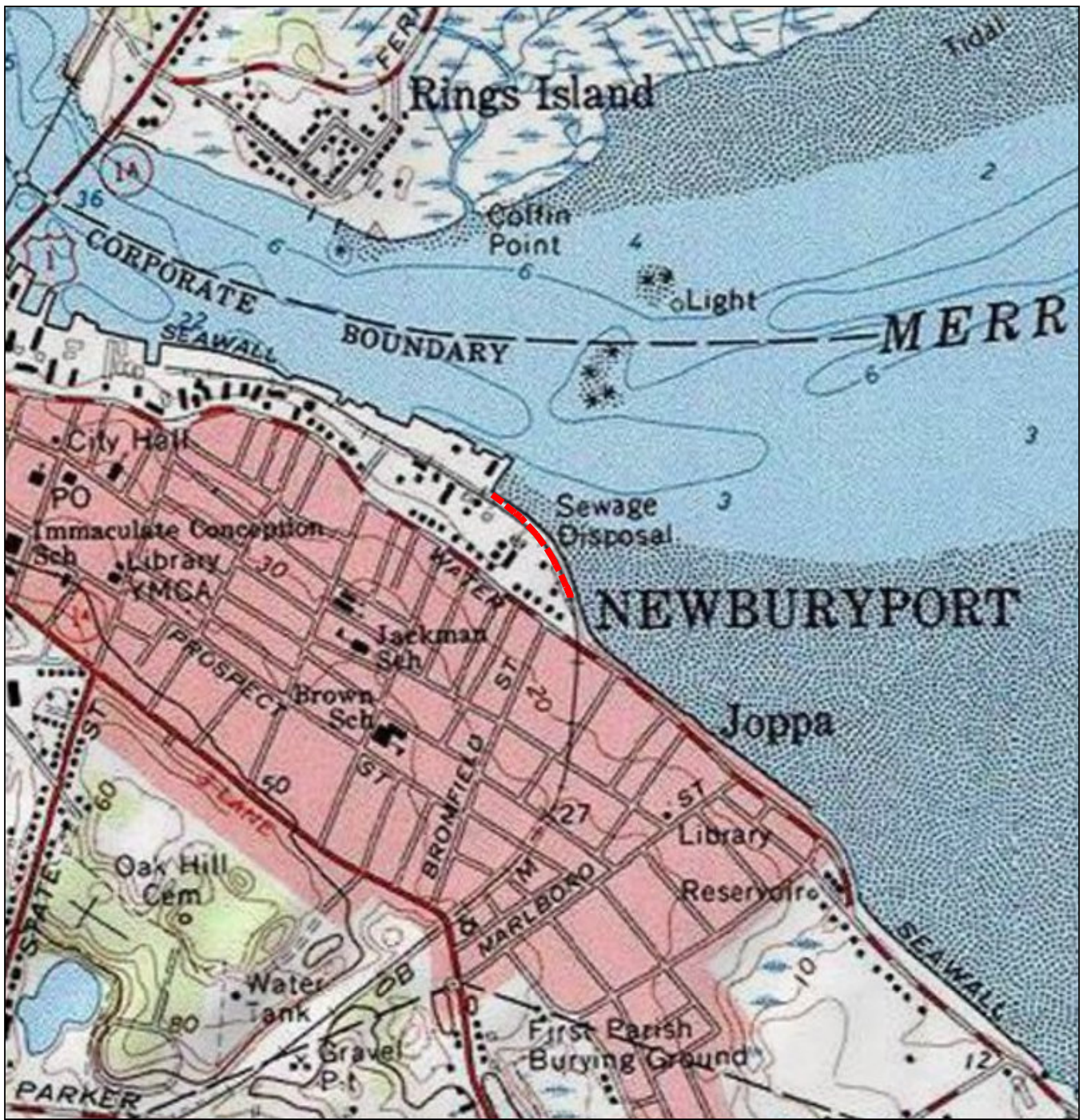
Ann McMenemy

Senior Wetland Scientist

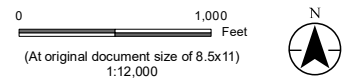
Phone: 617-620-6961

Ann.McMenemy@stantec.com

Attachments: Figures 1 through 4
 MassWildlife Review Letter
 Stormwater Management Report Checklist
 Abutter Information
 Project Plans



Legend
 Shoreline Resiliency Project Area



Project Location
 Newburyport, Massachusetts

Prepared by REM on 2019-09-24
 TR by KWH on 2019-09-24
 IR Review by LC on 2019-09-24

Client/Project
 City of Newburyport

210800843

Figure No.
1

Title
USGS Topographic Map

Notes
 1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet
 2. Data Sources: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.
 3. Background: USGS Topo provided by The National Map Mapping Service (<http://basemap.nationalmap.gov/arcgis/services/USGSImageryTopo>).

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Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

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Legend
- - - Shoreline Resiliency Project Area

0 200 Feet
(At original document size of 8.5x11)
1:2,400



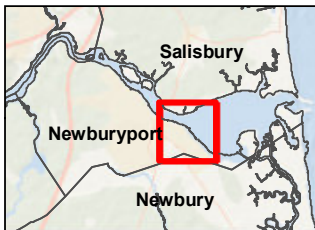
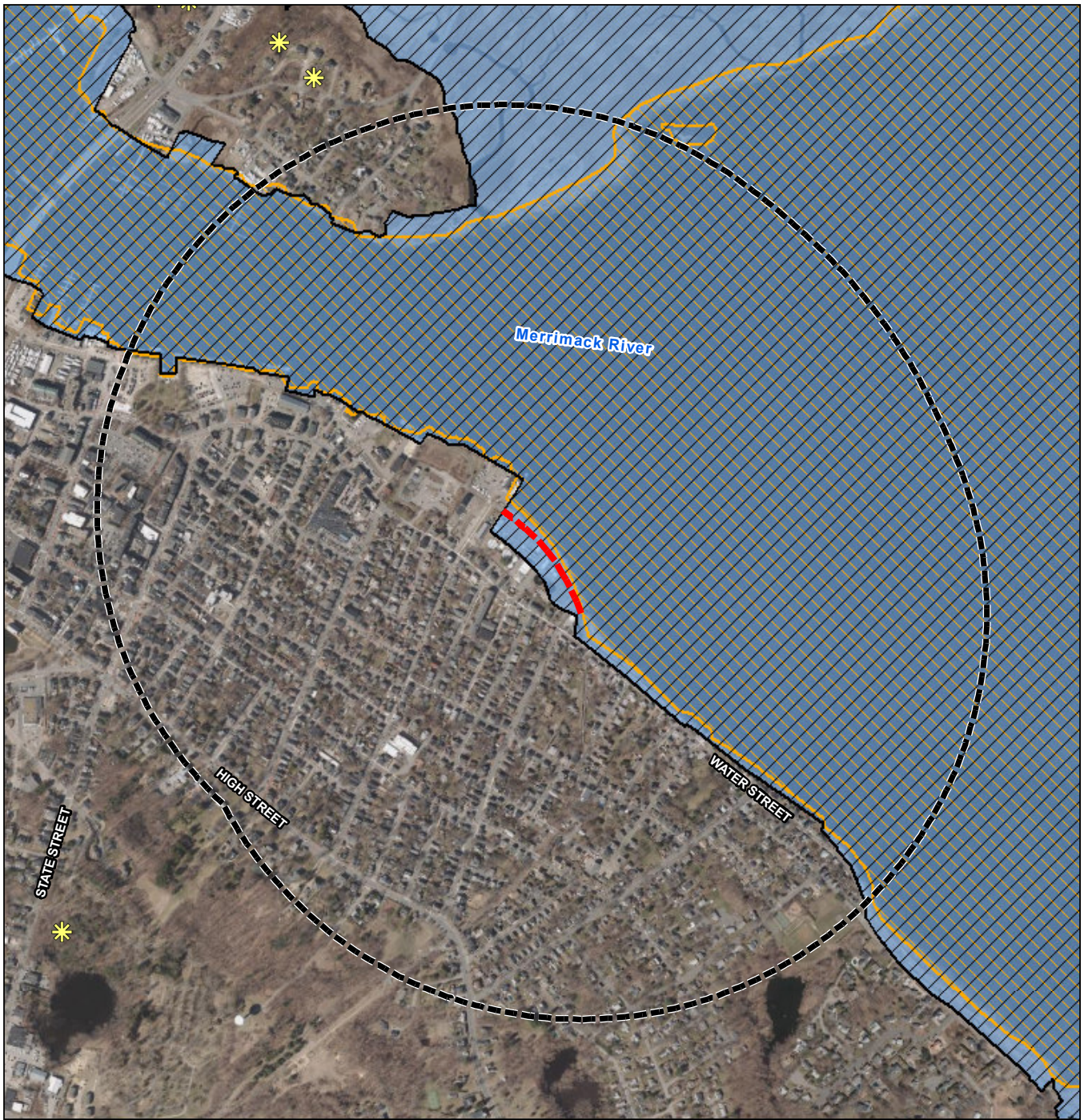
Project Location: Newburyport, Massachusetts
Prepared by REM on 2019-09-24
TR by KWH on 2019-09-24
IR Review by LC on 2019-09-24

Client/Project: City of Newburyport 210800843

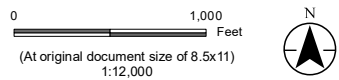
Figure No. 2
Title Aerial Location Map

Notes
1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet
2. Data Sources: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.
3. Background: Massachusetts 2019 USGS Color Ortho Imagery

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- Legend**
- Shoreline Resiliency Project Area
 - 1/2-Mile Study Area
 - NHESP Potential Vernal Pool
 - NHESP Certified Vernal Pool
 - NHESP Priority Habitat of Rare Species (August 2017)
 - NHESP Priority Habitat of Rare Wildlife (August 2017)
 - Outstanding Resource Waters
 - Areas of Critical Environmental Concern (ACEC)
 - MassDEP 2012 Integrated List of Waters (305(b)/303(d))
 - 5 - Impaired - TMDL required



Project Location: Newburyport, Massachusetts
 Prepared by REM on 2019-09-24
 TR by KWH on 2019-09-24
 IR Review by LC on 2019-09-24

Client/Project: City of Newburyport
 210800843

Figure No. 3

Title: Natural Resources Map

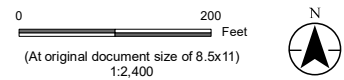
Notes

1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet
2. Data Sources: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.
3. Background: Massachusetts 2019 USGS Color Ortho Imagery

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- Legend**
- - - Shoreline Resiliency Project Area
 - AE: 1% Annual Chance of Flooding
 - VE: High Risk Coastal Area



Project Location
Newburyport, Massachusetts

Prepared by REM on 2019-09-24
TR by KWH on 2019-09-24
IR Review by LC on 2019-09-24

Client/Project
City of Newburyport

210800843

Figure No.
4

Title
FEMA National Flood Hazard Map

Notes

1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001 Feet
2. Data Sources: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.
3. Background: Massachusetts 2019 USGS Color Ortho Imagery

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.



MASSWILDLIFE

DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581

p: (508) 389-6300 | f: (508) 389-7890

MASS.GOV/MASSWILDLIFE

October 25, 2019

City of Newburyport
60 Pleasant St
Newburyport MA 09150

RE: Project Description: Clipper City Rail Trail Phase II
DEP Wetlands File No.: 051-0920
NHESP File No.: 06-19545

Dear Applicant:

The Natural Heritage & Endangered Species Program of the MA Division of Fisheries and Wildlife (the "Division") has received and reviewed revised plans (dated 9/11/2019) for the subject project.

The Division finds that the revised plans do not change our previous determination that this project **will not adversely affect** the actual Resource Area Habitat of state-protected rare wildlife species and **will not result in a prohibited Take** of state-listed rare species (Division letter dated October 28, 2014) and that previous determination stands. Issuance of an Order of Conditions approving the project as currently designed is consistent with the Interests of the WPA strictly related to rare species. A copy of any final Order of Conditions shall be mailed or hand delivered to the Division simultaneous with sending to the applicant as required pursuant to 310 CMR 10.05(6)(e)).

We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. Any activity not included in the current filing and located within *Priority Habitat* may require an additional filing with the Division for review if not otherwise exempt. If no physical work is commenced on the above proposed project within five years from the date of issuance of our original letter or there is a material change in the plans that were submitted to the Division, updated information and/or plans must be sent to the Division for review prior to any work.

Please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6385 with any questions or comments.

Sincerely,

Everose Schlüter, Ph.D.
Assistant Director

cc: Newburyport Conservation Commission
Stantec Consulting
MA DEP Northeast Region

MASSWILDLIFE



Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

No new point source discharges are proposed as the project will rely on the existing stormwater management structure at the WWTP to convey overland flows to the River.

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge There will be some Infiltration of runoff into the proposed swales/drainage channels.

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality see below

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

The requirement for the removal of 80% TSS does not apply to this project. The use of the rail trail by pedestrians and bicyclists will not require the use of sanding nor will the paved surface be exposed to other potential pollutants. The trail will be owned and maintained by the City and trash and other debris will be collected, including the provision of pet waste bags.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated. The revetment and rail trail are not considered land uses with higher potential pollutant loads.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas The existing stormwater discharges are not located within a Zone II or Interim Wellhead Protection Area.

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance; The supporting stormwater infrastructure is owned by the City of Newburyport and the system is maintained in accordance with the City's MS4 permit.
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

**Notification to Abutters Under the
Massachusetts Wetlands Protection Act and the
Newburyport Wetlands Ordinance**

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40 and the City of Newburyport's Wetlands Ordinance, you are hereby notified of the following.

- A. The name of the applicant is the City of Newburyport.
- B. The applicant has filed a Request for an Amended Order of Conditions with the Conservation Commission for the City of Newburyport seeking permission to remove, fill, dredge, or alter an Area subject to Protection Under the Wetlands Protection Act (General Laws Chapter 131, Section 40) and the City of Newburyport's Wetlands Ordinance.
- C. The address of the lot where the activity is proposed is: Merrimack River Shoreline between Joppa Park at Water Street and the American Yacht Club.
- D. Copies of the Notice of Intent may be examined at the Newburyport Planning Office between the hours of 8am and 4pm Monday through Wednesdays, Thursdays from 8am to 8pm, and Fridays from 8am to noon. **See note below**
- E. Copies of the Notice of Intent may be obtained from either (check one) the applicant_____ or the applicant's representative X, by calling this telephone number (617) 620-6961 between the hours of 9 am and 5 pm, on the following days of the week: Monday through Friday.
- F. The Public Hearing will be held on April 7, 2020 at 7pm at the Newburyport Senior/Community Center (or otherwise posted) located at 331 High Street, Newburyport, MA **See note below**

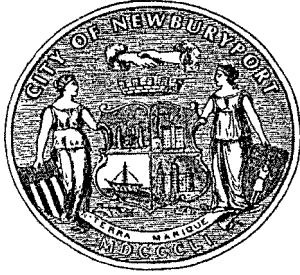
NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the Newburyport Daily News.

NOTE: Notice of the public hearing, including its date, time, and place, will be posted in Newburyport City Hall not less than forty-eight (48) hours in advance.

NOTE: You also may contact the Newburyport Conservation Commission or the Department of Environmental Protection Northeast Regional Office for more information about this application or the Wetlands Protection Act. To contact the Newburyport Conservation Commission, please call 978-465-4462. You may also contact the Newburyport Planning Office for meeting dates at 978-465-4400.

Copies of the Request for Amended Order may be examined on the City's website. As part of the COVID-19 Public Health Crisis, the Planning Office is currently closed to the public.

The location of the Public Hearing may be changed due to Public Health Crisis; please check the City's web site to confirm the location.



City of Newburyport
Office of the Assessor
60 Pleasant Street / P.O. Box 550
Newburyport, MA 01950
Ph 978-465-4403 / Fax 978-462-8495

March 5, 2020

To: Newburyport Conservation Commission
From: Newburyport Board of Assessors
Re: Abutters List: OLD RAIL CORRIDOR

Newburyport Map: 23 Lots: 22A, 22B, 22C, 23, 24 & portion of B&M

The following are the abutters of the above mentioned property:

Board of Assessors

A handwritten signature in cursive script, reading "Jill Brennan".

The Assessors Office is certifying that the persons listed in the foregoing list of abutters are the owners of record of the foregoing properties as of January 1st, 2020. The city Assessor is not certifying that the persons so listed are the persons who are required to receive notification under applicable law.

20/ 8/ / /
CITY OF NEWBURYPORT
C/O SEWER DEPARTMENT
16C PERRY WAY
NEWBURYPORT, MA 01950

23/ 22/C / /
CITY OF NEWBURYPORT
60 PLEASANT ST
NEWBURYPORT, MA 01950

26/ 51/ / /
FRENCH STEVEN
164 WATER ST
NEWBURYPORT, MA 01950

20/ 12/ / /
AMERICAN YACHT CLUB
P O BOX 1360
NEWBURYPORT, MA 01950

23/ 23/ / /
CITY OF NEWBURYPORT
60 PLEASANT ST
NEWBURYPORT, MA 01950

26/ 52/ / /
SZYMURA ANNA R.
3 BROMFIELD STREET
NEWBURYPORT, MA 01950

23/ 11/ / /
CITY OF NEWBURYPORT
SEWER TREATMENT PLANT
157 WATER STREET
NEWBURYPORT, MA 01950

23/ 24/ / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN RD
WALTHAM, MA 02451

26/ 57/C / /
CITY OF NEWBURYPORT
60 PLEASANT ST
NEWBURYPORT, MA 01950

23/ 19/ / /
LEBLANC JASON G TRS
JASON G LEBLANC REVOCABLE TRUST
3 LUCEY DR
NEWBURYPORT, MA 01950

26/ 47/ / /
SCHWARTZ PHILIP L
TAMARA A T/E
178 WATER ST
NEWBURYPORT, MA 01950

26/ 100/ / /
CITY OF NEWBURYPORT
JOPPA PARK
60 PLEASANT ST
NEWBURYPORT, MA 01950

23/ 20/ / /
GRIGG CHARLES R
92 LAKESHORE RD
BOXFORD, MA 01921

26/ 48/ / /
DANIELS LLOYD N TRUSTEE
174-176 WATER ST REALTY TRUST
174 WATER ST
NEWBURYPORT, MA 01950

23/ 21/ / /
GRIGG CHARLES
92 LAKESHORE ROAD
BOXFORD, MA 01921

26/ 48/A / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN DR
WALTHAM, MA 02451-2286

23/ 22/ 1/ /
BURRITT WADE E
JO B BURRITT T/E
179 WATER ST
NEWBURYPORT, MA 01950

26/ 48/B / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN DR
WALTHAM, MA 02451-2286

23/ 22/ 2/ /
NELSON ROBERT
181 WATER ST
NEWBURYPORT, MA 01950

26/ 48/C / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN RD
WALTHAM, MA 02451-2286

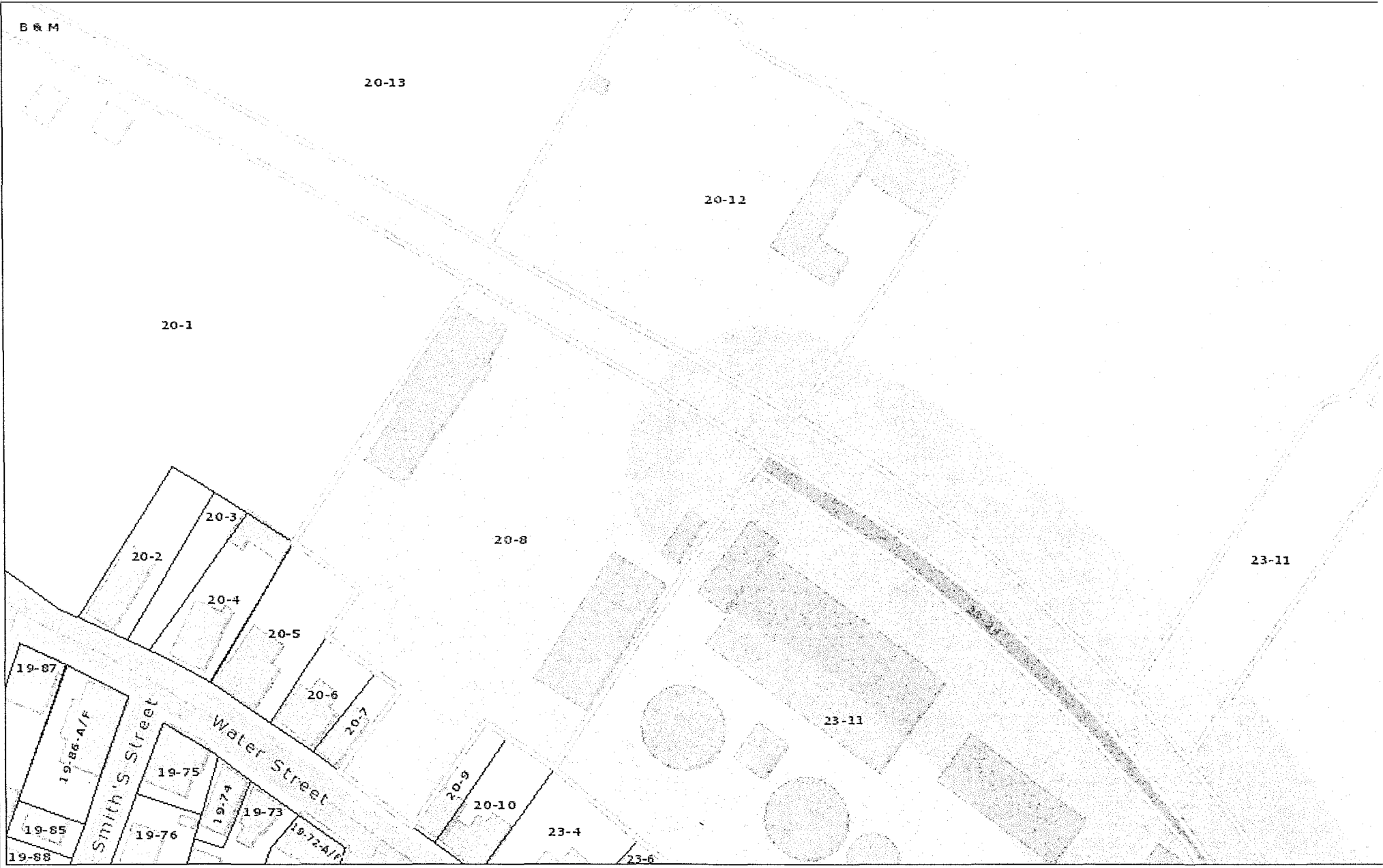
23/ 22/A / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN RD
WALTHAM, MA 02451

26/ 49/ / /
BADGER JENNIFER B
172 WATER ST
NEWBURYPORT, MA 01950

23/ 22/B / /
MASSACHUSETTS ELECTRIC CO
C/O PROPERTY TAX DEPT
40 SYLVAN RD
WALTHAM, MA 02451

26/ 50/ / /
WYSER WENYON W & BARBARA J TRS
WYSER FAMILY TRUST
170 WATER ST
NEWBURYPORT, MA 01950

City of Newburyport



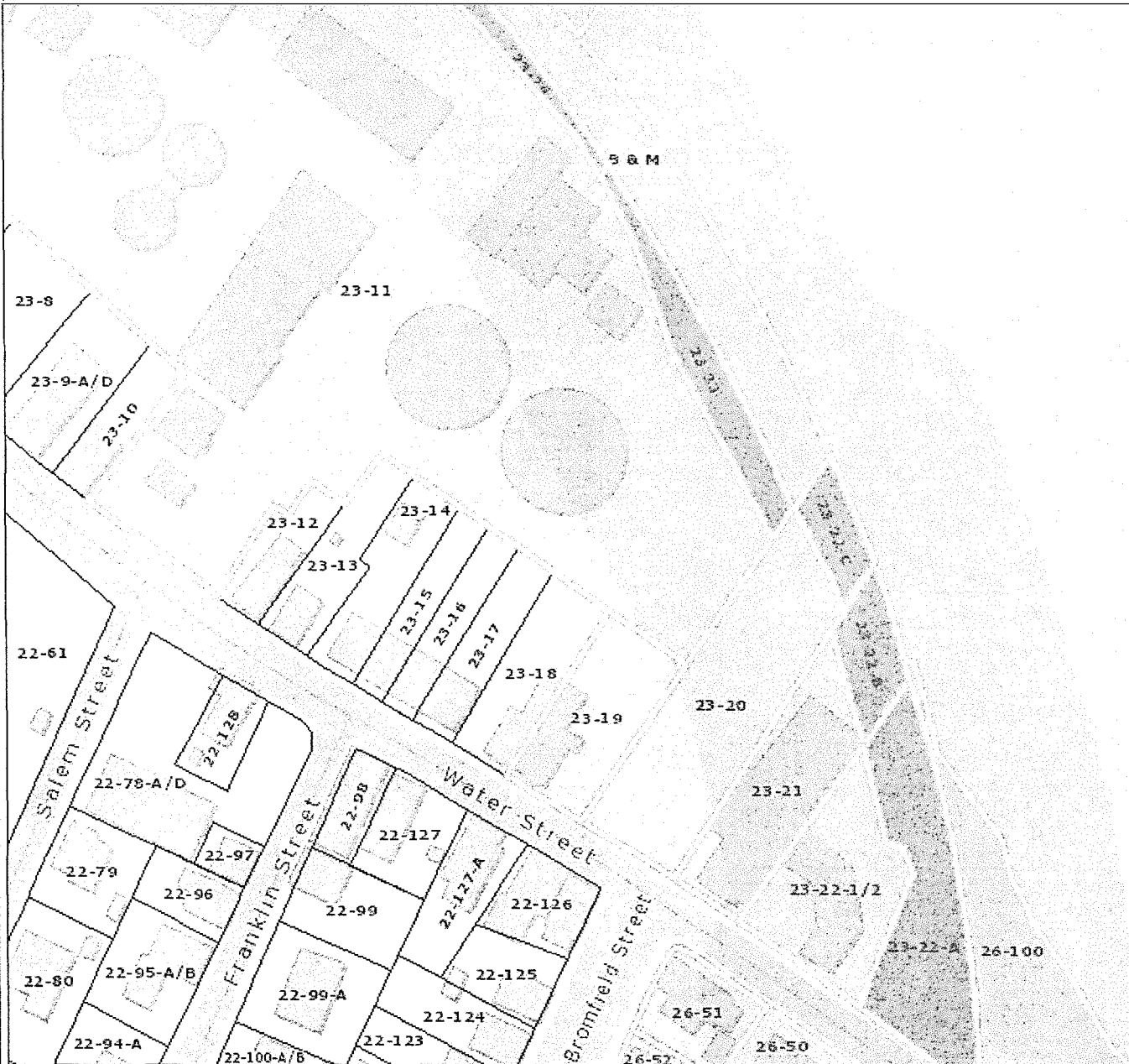
Data Sources: Produced by Merrimack Valley Planning Commission (MVPC) using data provided by the City of Newburyport & MassIT/MassGIS. MVPC AND THE CITY OF NEWBURYPORT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF THESE DATA. THE CITY OF NEWBURYPORT AND MVPC DOES NOT ASSUME ANY LIABILITY ASSOCIATED WITH THE USE OR MISUSE OF THIS INFORMATION.

Municipal Boundary	Paved
Roads	Unpaved
Interstate	Hydrographic Featu
Major Road	Streams
Local Road	Stream

Legend



City of Newburyport

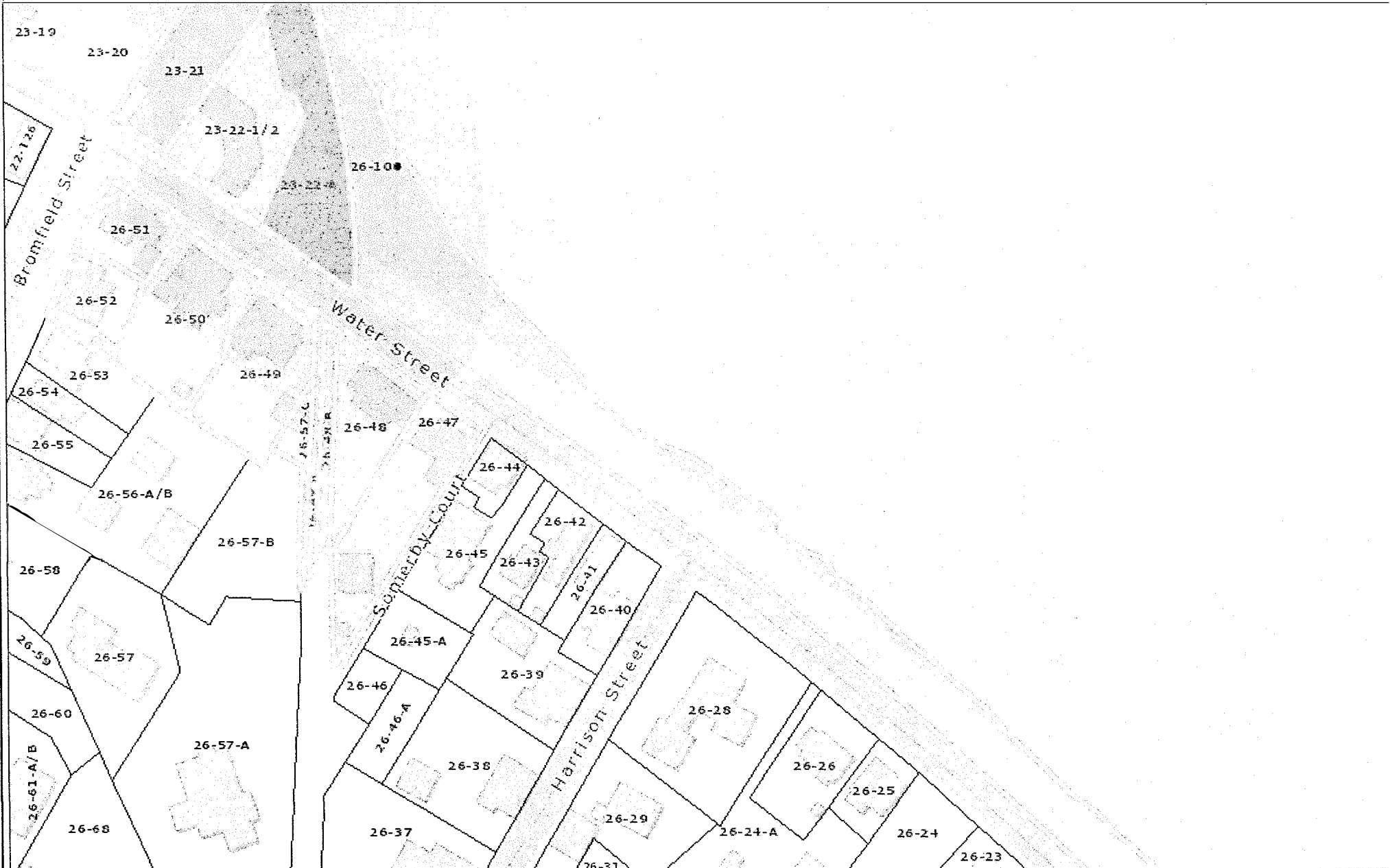


Data Sources: Produced by Merrimack Valley Planning Commission (MVPC) using data provided by the City of Newburyport & MassGIS. MVPC AND THE CITY OF NEWBURYPORT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF THESE DATA. THE CITY OF NEWBURYPORT AND MVPC DOES NOT ASSUME ANY LIABILITY ASSOCIATED WITH THE USE OR MISUSE OF THIS INFORMATION.

- Legend
- Municipal Boundary
 - Roads
 - Interstate
 - Major Road
 - Local Road
 - Paved
 - Unpaved
 - Hydrographic Feature
 - Stream
 - Stream



City of Newburyport



Data Sources: Produced by Merrimack Valley Planning Commission (MVPC) using data provided by the City of Newburyport & MassGIS/MassGIS. MVPC AND THE CITY OF NEWBURYPORT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF THESE DATA. THE CITY OF NEWBURYPORT AND MVPC DOES NOT ASSUME ANY LIABILITY ASSOCIATED WITH THE USE OR MISUSE OF THIS INFORMATION.

- | | |
|---|---|
| <ul style="list-style-type: none"> — Municipal Boundary — Roads — Interstate — Major Road — Local Road | <ul style="list-style-type: none"> — Paved — Unpaved — Hydrographic Feature — Streams — Stream |
|---|---|

Legend



SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	1	22
STANTEC PROJECT NO. 210800843		

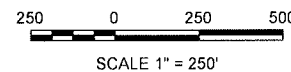
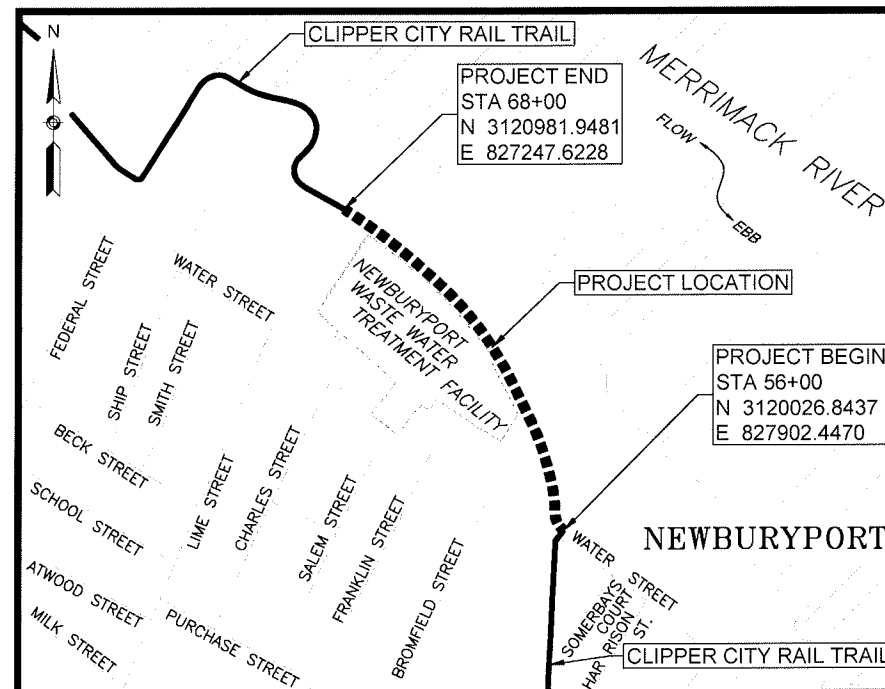
TITLE SHEET & INDEX

CITY OF NEWBURYPORT

PLAN AND PROFILE OF
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE PROTECTION
AND CLIPPER CITY RAIL TRAIL PROJECT
IN THE CITY OF
NEWBURYPORT
ESSEX COUNTY

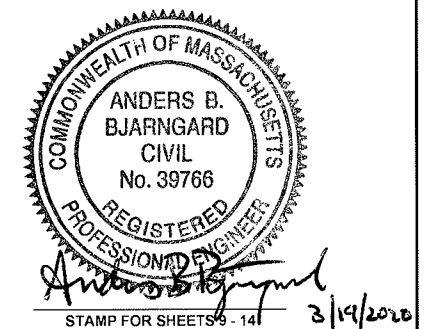
25% SUBMISSION

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	KEY PLAN
4	TYPICAL SECTIONS
5 - 6	CONSTRUCTION PLANS
7 - 8	PROFILES
9 - 14	SHORELINE STABILIZATION PLANS
15 - 17	CONSTRUCTION DETAILS
20 - 22	RAIL TRAIL CROSS SECTIONS



LENGTH OF PROJECT = 1,200.00 FEET = 0.227 MILES

THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.



SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	2	22
STANTEC PROJECT NO. 210800843		

LEGEND & ABBREVIATIONS

LEGEND

GENERAL SYMBOLS

EXISTING PROPOSED

	JIB OR BRJB	JERSEY BARRIER ON BRIDGE OR JERSEY BARRIER
	CB	CATCH BASIN
	CI	CURB INLET
	BUOY	BUOY
	FPL	FLAG POLE
		GAS PUMP
	DI	DROP INLET
	MB	MAIL BOX
	GRAN POST	GRANITE POST
	PLANTER	PLANTER
	POST	POST
	TBH	TELEPHONE BOOTH
	VLT	VAULT
	VLV	VALVE
	WELL	WELL
	EHH	ELECTRIC MANHOLE (HANDHOLE)
	GATE POST	GATE POST
	FL	FLOW LINE
		GAS GATE
	SP	SOIL PROBE
	MW	MONITORING WELL
	TB	TEST BORE
	CONC. HDWL	CONCRETE HEADWALL
		HANDHOLE
	STONE DHWL	STONE HEADWALL
	HYD	HYDRANT
	LPL	LIGHT POLE
	CO. BD	COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		OTHER MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
	MHB	MHD BOUND
	MON	MONUMENT
	SB	STONE BOUND
	TOWN OR CITY BD.	TOWN OR CITY BOUND
	TSN	TRAVERSE OR TRIANGULATION STATION
	TPL OR GUY	TROLLEY POLE OR GUY POLE
		TRANS. POLE
	UFB	UP WITH FIREBOX
	LPDL	POLE WITH DOUBLE LIGHT
	ULT	UP WITH 1 LIGHT
	UPL	UTILITY POLE
	BUSH	BUSH
	TREE	TREE
	SWAMP / MARSH	SWAMP / MARSH
	WG	WATER GATE
	FA	FIRE ALARM BOX
	PM	PARKING METER
		ELECTRICAL GROUND
	GV	GATE VALVE
		RIP RAP
		OVERHEAD CABLE
		DIRECT BURIAL CABLE
		CURBING
	185	CONTOURS
		DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		ELECTRIC DUCT
		GAS MAIN
		SEWER MAIN
		TELEPHONE DUCT
		WATER MAIN
		BALANCE STONE WALL
		CULVERT
		GUARD RAIL
		GUTTER LINE AT DRIVEWAYS
		CHAIN LINK FENCE
		STOCKADE FENCE

GENERAL SYMBOLS (CONT.)

EXISTING PROPOSED

	HAY BALES/SILT FENCE
	RETAINING WALL
	TREE LINE OR LIMIT OF CLEARING AND GRUBBING
	SAWCUT LINE
	TOP OR BOTTOM OF SLOPE
	LIMIT OF EDGE OF PAVEMENT OR COLD PLAN & OVERLAY
	BANK OF RIVER OR STREAM
	BORDER OF WETLAND
	100 FT WETLAND OR 200 FT RIVERFRONT BUFFER
	STATE HIGHWAY LAYOUT
	TOWN OR CITY LAYOUT
	COUNTY LAYOUT
	RAILROAD SIDELINE
	TOWN OR CITY BOUNDARY LINE
	PROPERTY LINE OR APPROXIMATE PROPERTY LINE
	EASEMENT
	MATTING FOR EROSION CONTROL

TRAFFIC SIGNAL SYMBOLS

EXISTING PROPOSED

	CONTROLLER PHASE ACTUATED
	TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
	WIRE LOOP DETECTOR (6'X 6' TYPICAL UNLESS OTHERWISE SPECIFIED)
	VIDEO SURVEILLANCE CAMERA
	MICROWAVE DETECTOR
	MAGNETOMETER (2 SHOWN)
	PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	OPTICOM CONFIRMATION STROBE LIGHT
	VEHICULAR SIGNAL HEAD
	VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
	FLASHING BEACON
	PEDESTRIAN SIGNAL HEAD (TYPE AS NOTED OR AS SPECIFIED)
	PEDESTRIAN SIGNAL HEAD, OPTICALLY PROGRAMMED
	PEDESTRIAN SIGNAL POST AND BASE
	RAILROAD SIGNAL
	SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	STEEL OR ALUMINUM MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
	HIGH MAST POLE OR TOWER
	SIGN AND POST
	SIGN AND POST (TWO POSTS)
	SIGNAL AND LIGHTING MAST ARM (OPTICOM)
	EMERGENCY PRE-EMPTION DETECTOR
	CONTROL CABINET, GROUND MOUNTED
	CONTROL CABINET, POLE MOUNTED
	FLASHING BEACON CONTROL & METER PEDESTAL
	LOAD CENTER ASSEMBLY
	PULL BOX 12"X12" (AND AS NOTED)
	ELECTRIC HANDHOLE 12" X 24"
	TRAFFIC SIGNAL INTERCONNECT CONDUIT
	TRAFFIC SIGNAL CONDUIT (TYPE AS NOTED)

PAVEMENT MARKINGS AND SIGNING SYSBOLS

EXISTING PROPOSED

	PAVEMENT ARROW - WHITE
	LEGEND "ONLY" - WHITE
	STOP LINE - 12"
	CROSSWALK
	SOLID WHITE LANE LINE
	BROKEN WHITE LANE LINE (10' LINE, 30' SPACE TYP.)
	SOLID WHITE EDGE LINE
	YELLOW GORE LINE - 12"
	DOUBLE YELLOW CENTER LINE
	SOLID WHITE CHANNELIZATION LINE - 8"
	WHITE GORE LINE - 12"
	SOLID YELLOW EDGE LINE
	BROKEN YELLOW CENTER LINE (10' LINE, 30' SPACE TYP.) - 4"
	SOLID YELLOW CENTER LINE
	DOTTED WHITE LANE LINE - 4" (2' LINE, 4' SPACE)
	DIRECTION OF TRAFFIC FLOW

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCH MARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
BS.	BOTTOM STAIR (EL.)
BW.	BOTTOM WALL (EL.)
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (OR EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (OR EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDPE	HIGH-DENSITY POLYETHYLENE
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACHING BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAIL BOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY

GENERAL (CONT.)

R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT-OF-WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/
TE	TEMPORARY EASEMENT
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TS	TOP STAIR (EL.)
TYP	TYPICAL
UGE	UNDERGROUND ELECTRIC
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEELCHAIR RAMP
WG	WATER GATE
WM	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK - PORTLAND ORANGE
FDW	FLASHING DON'T WALK - PORTLAND ORANGE
FVY	FLASHING AMBER VERTICAL ARROW
FR	FLASHING CIRCULAR RED
FW	FLASHING WALK - LUNAR WHITE
FY	FLASHING CIRCULAR AMBER
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FRV	FLASHING RED VERTICAL ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
OP	OPTICOM
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RV	STEADY RED VERTICAL ARROW
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK - LUNAR WHITE
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW
YR	STEADY AMBER RIGHT ARROW
YV	STEADY AMBER VERTICAL ARROW

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	3	22
STANTEC PROJECT NO. 210800843		

KEY PLAN

CCRT_SHORELINE_GEMKEY PLAN) DWG 6-Mar-2020

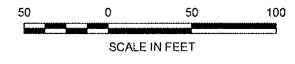


PROJECT BEGIN
STA 56+00
N3120026.8437
E827902.4470

PROJECT END
STA 69+00
N3120981.9481
E827247.6228

PLAN SHEET QUICK REFERENCE CHART

	PART 1	PART 2
CONSTRUCTION PLANS	5	6
PROFILES	7	8



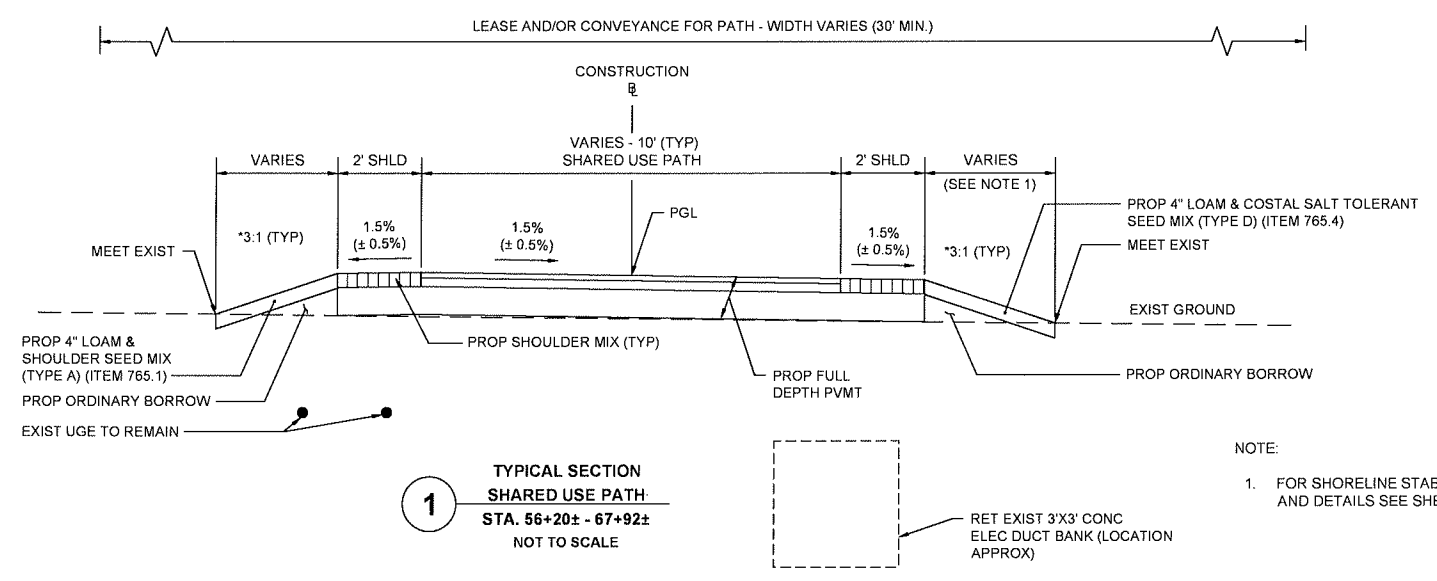
EBB ← FLOW →
MERRIMACK RIVER

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	4	22
STANTEC PROJECT NO. 210800843		

TYPICAL SECTIONS

CCRT_SHORELINE_HD(TYPICAL SECTIONS).DWG 6-Mar-2020



PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT

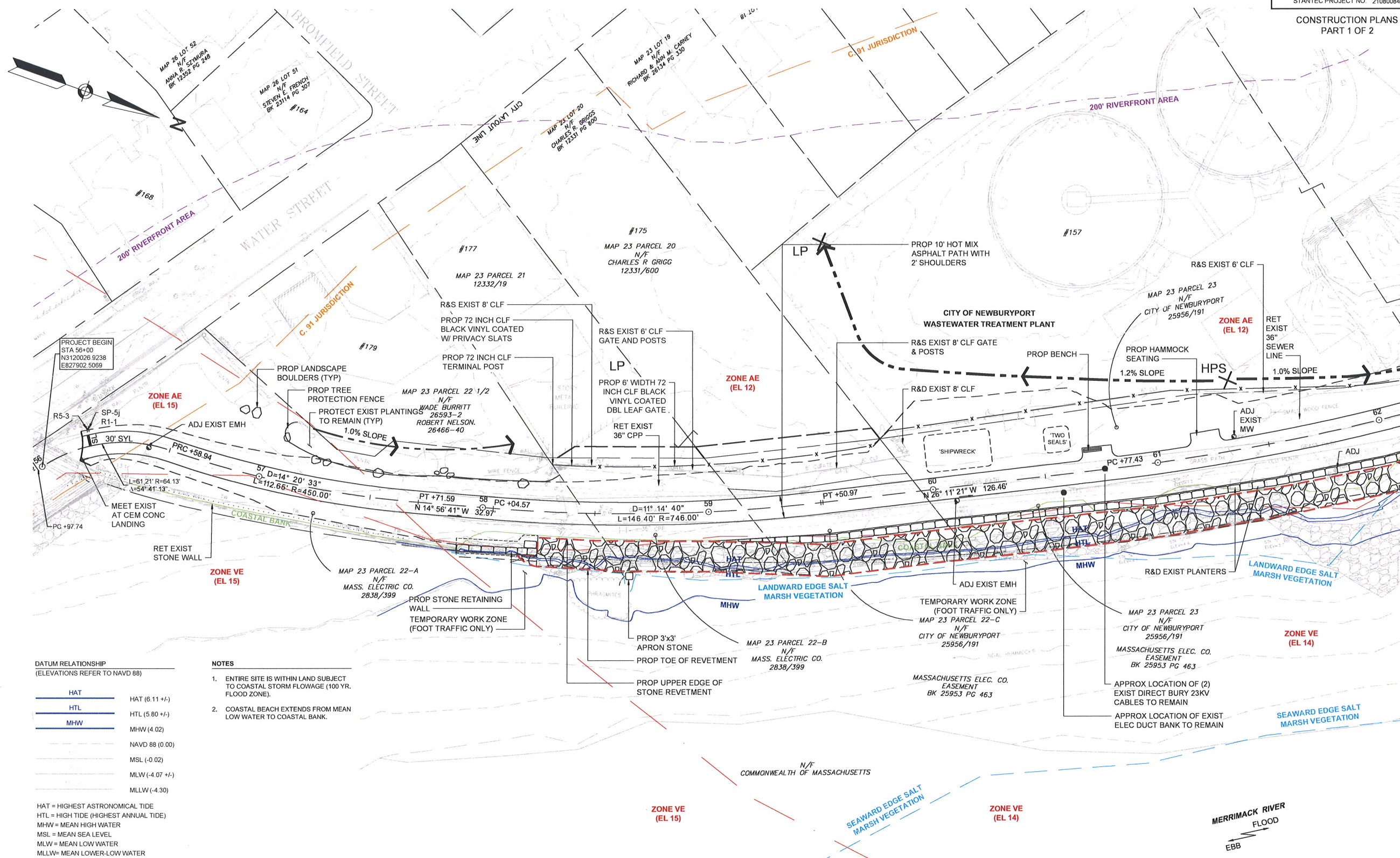
- SURFACE 1.5" SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER
2.5" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC-19.0)
- BASE 8" GRAVEL BORROW, TYPE b OR EXISTING GRAVEL
BORROW TO REMAIN
- SHOULDERS 4" DEPTH 'CRUSHED STONE AND LOAM MIX FOR SHOULDERS' (ITEM 402.121) +
SEED (ITEM 765.1 ON LANDWARD SIDE & ITEM 765.4 ON RIVER SIDE)

- NOTE:
1. FOR SHORELINE STABILIZATION LIMITS AND DETAILS SEE SHEET 9 - 14.

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	5	22
STANTEC PROJECT NO. 210800843		

CONSTRUCTION PLANS
PART 1 OF 2



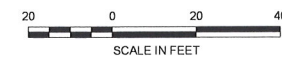
DATUM RELATIONSHIP
(ELEVATIONS REFER TO NAVD 88)

HAT	HAT (6.11 +/-)
HTL	HTL (5.80 +/-)
MHW	MHW (4.02)
	NAVD 88 (0.00)
	MSL (-0.02)
	MLW (-4.07 +/-)
	MLLW (-4.30)

HAT = HIGHEST ASTRONOMICAL TIDE
HTL = HIGH TIDE (HIGHEST ANNUAL TIDE)
MHW = MEAN HIGH WATER
MSL = MEAN SEA LEVEL
MLW = MEAN LOW WATER
MLLW = MEAN LOWER-LOW WATER

NOTES

- ENTIRE SITE IS WITHIN LAND SUBJECT TO COASTAL STORM FLOWAGE (100 YR. FLOOD ZONE).
- COASTAL BEACH EXTENDS FROM MEAN LOW WATER TO COASTAL BANK.



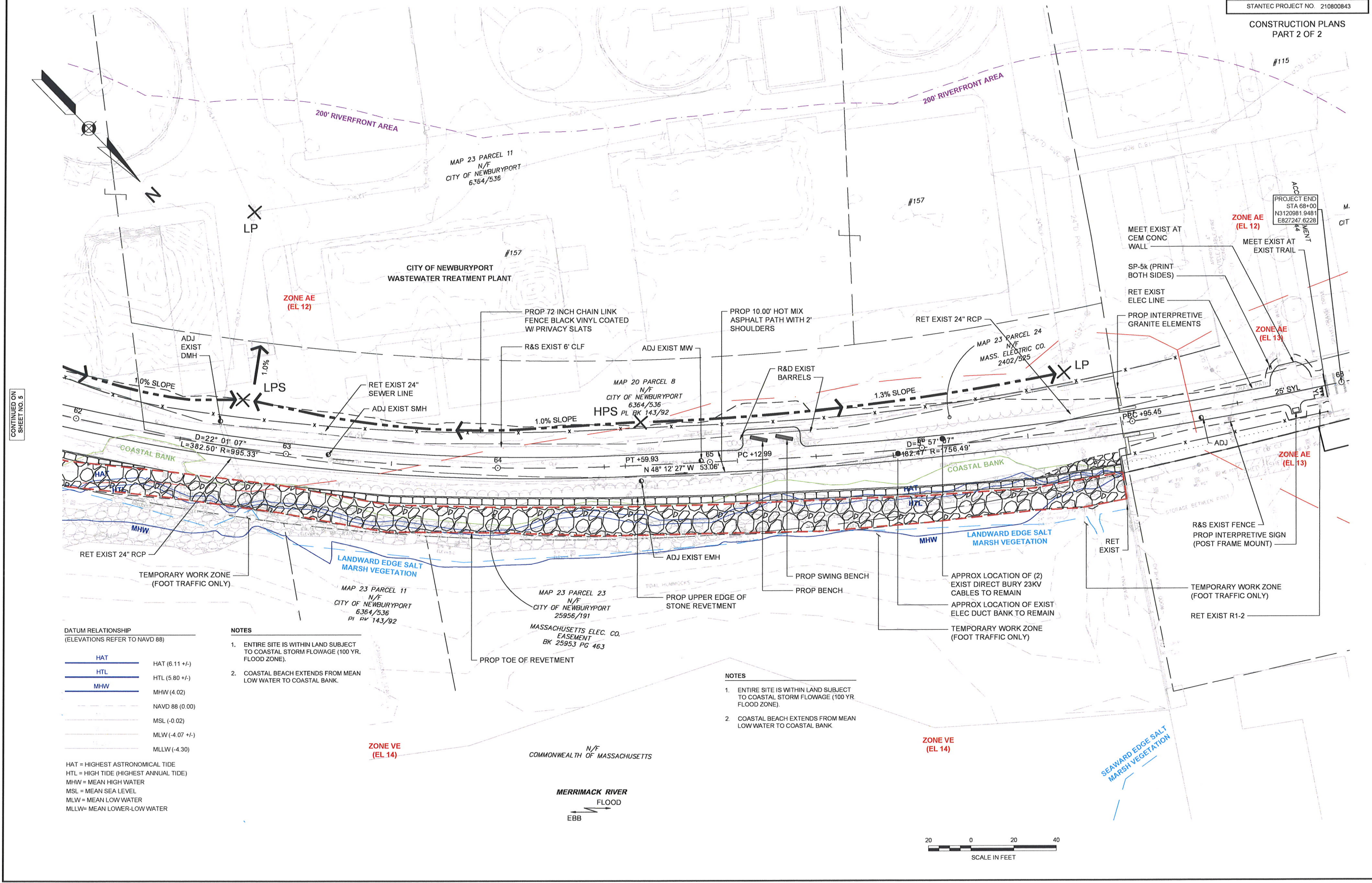
CONTINUED ON
SHEET NO. 6

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	6	22
STANTEC PROJECT NO. 210800843		

CONSTRUCTION PLANS
PART 2 OF 2

6-Mar-2020
CORT_SHORELINE_HD(CONSTRUCTION PLANS).DWG



CONTINUED ON
SHEET NO. 5

DATUM RELATIONSHIP
(ELEVATIONS REFER TO NAVD 88)

HAT	HAT (6.11 +/-)
HTL	HTL (5.80 +/-)
MHW	MHW (4.02)
	NAVD 88 (0.00)
	MSL (-0.02)
	MLW (-4.07 +/-)
	MLLW (-4.30)

HAT = HIGHEST ASTRONOMICAL TIDE
HTL = HIGH TIDE (HIGHEST ANNUAL TIDE)
MHW = MEAN HIGH WATER
MSL = MEAN SEA LEVEL
MLW = MEAN LOW WATER
MLLW = MEAN LOWER-LOW WATER

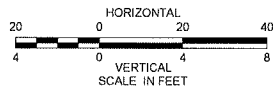
- NOTES**
- ENTIRE SITE IS WITHIN LAND SUBJECT TO COASTAL STORM FLOWAGE (100 YR. FLOOD ZONE).
 - COASTAL BEACH EXTENDS FROM MEAN LOW WATER TO COASTAL BANK.

- NOTES**
- ENTIRE SITE IS WITHIN LAND SUBJECT TO COASTAL STORM FLOWAGE (100 YR. FLOOD ZONE).
 - COASTAL BEACH EXTENDS FROM MEAN LOW WATER TO COASTAL BANK.

N/F
COMMONWEALTH OF MASSACHUSETTS

MERRIMACK RIVER
FLOOD
EBB

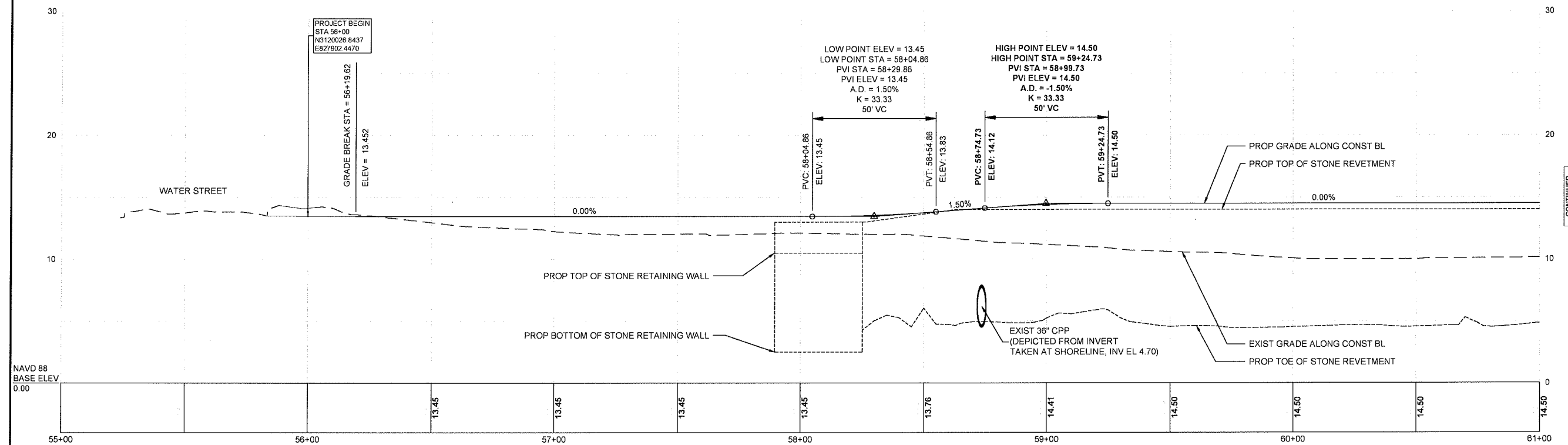




NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

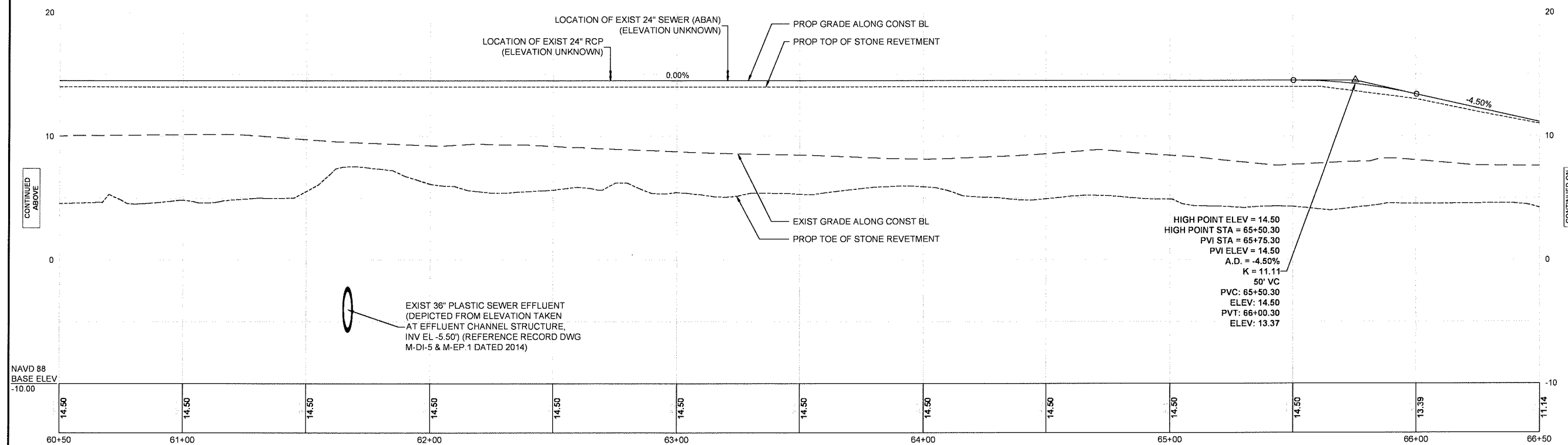
SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	7	22
STANTEC PROJECT NO. 210800843		

PROFILES
PART 1 OF 2



NAVD 88
BASE ELEV
0.00

CONTINUED
BELOW



NAVD 88
BASE ELEV
-10.00

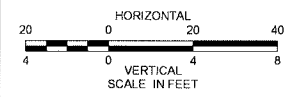
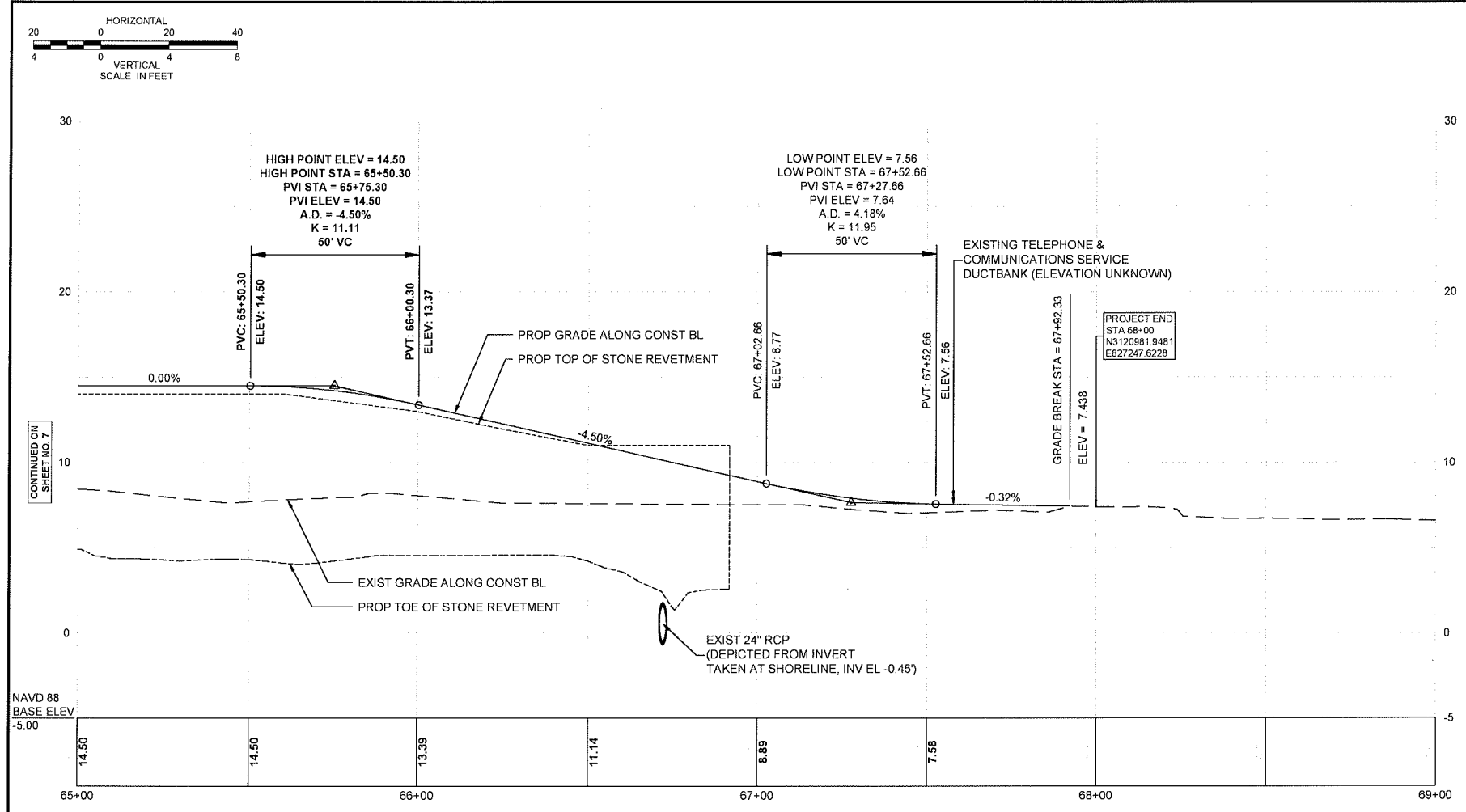
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SHEET NO. 8

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	8	22
STANTEC PROJECT NO. 210800843		

PROFILES
PART 2 OF 2

6-Mar-2020
CCRT_SHORELINE_HD(PROFILE).DWG



CONTINUED ON
SHEET NO. 7

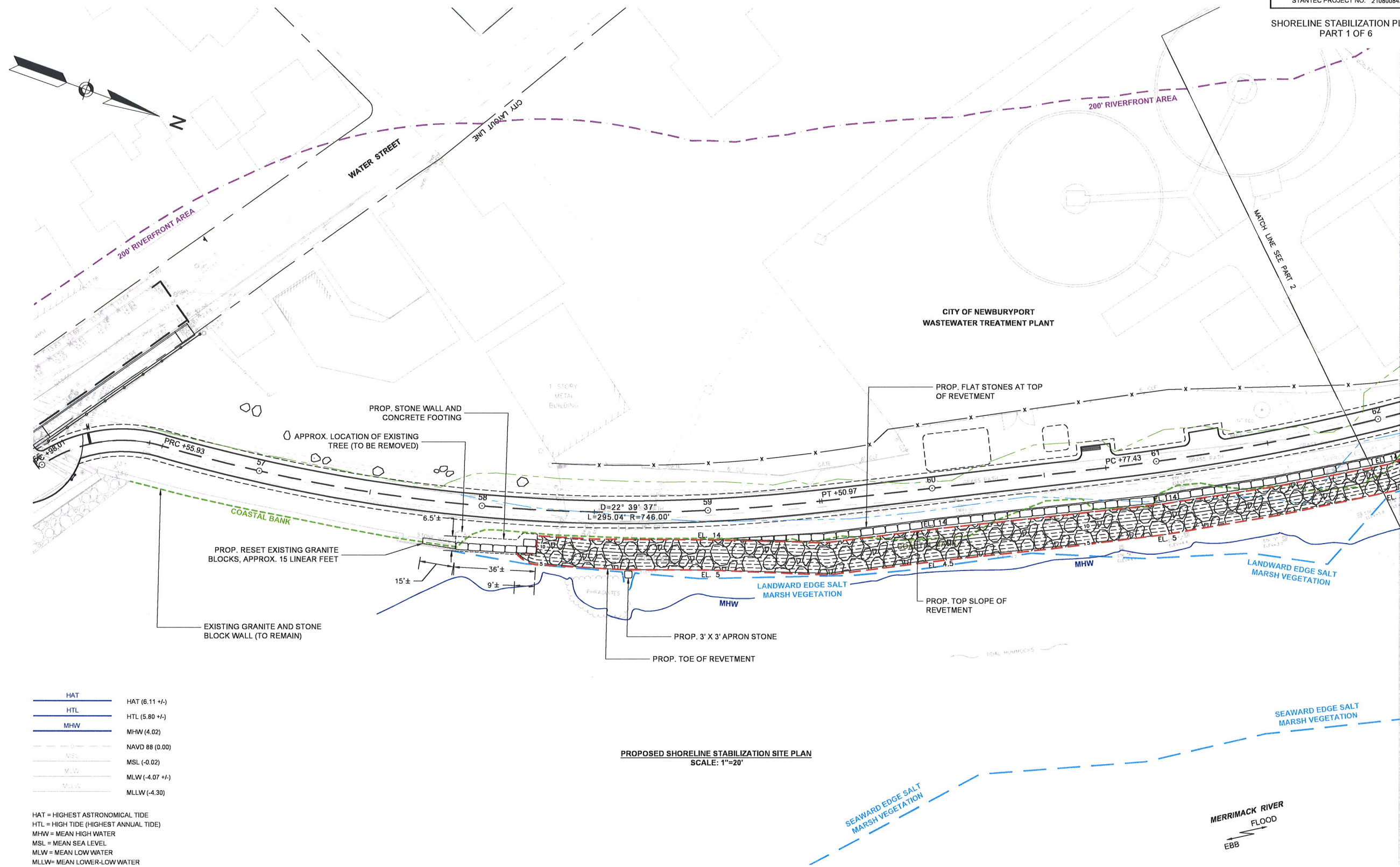
NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	9	22
STANTEC PROJECT NO. 210800843		

SHORELINE STABILIZATION PLANS
PART 1 OF 6

606503_HQ(SHORELINE CONSTRUCTION PLANS)_GZA_UPDATE.DWG 6-MAR-2020

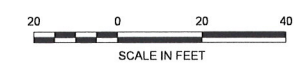
CONTINUED ON
PART 2



PROPOSED SHORELINE STABILIZATION SITE PLAN
SCALE: 1"=20'

	HAT	HAT (6.11 +/-)
	HTL	HTL (5.80 +/-)
	MHW	MHW (4.02)
	NAVD 88	NAVD 88 (0.00)
	MSL	MSL (-0.02)
	MLW	MLW (-4.07 +/-)
	MLLW	MLLW (-4.30)

HAT = HIGHEST ASTRONOMICAL TIDE
HTL = HIGH TIDE (HIGHEST ANNUAL TIDE)
MHW = MEAN HIGH WATER
MSL = MEAN SEA LEVEL
MLW = MEAN LOW WATER
MLLW = MEAN LOWER-LOW WATER

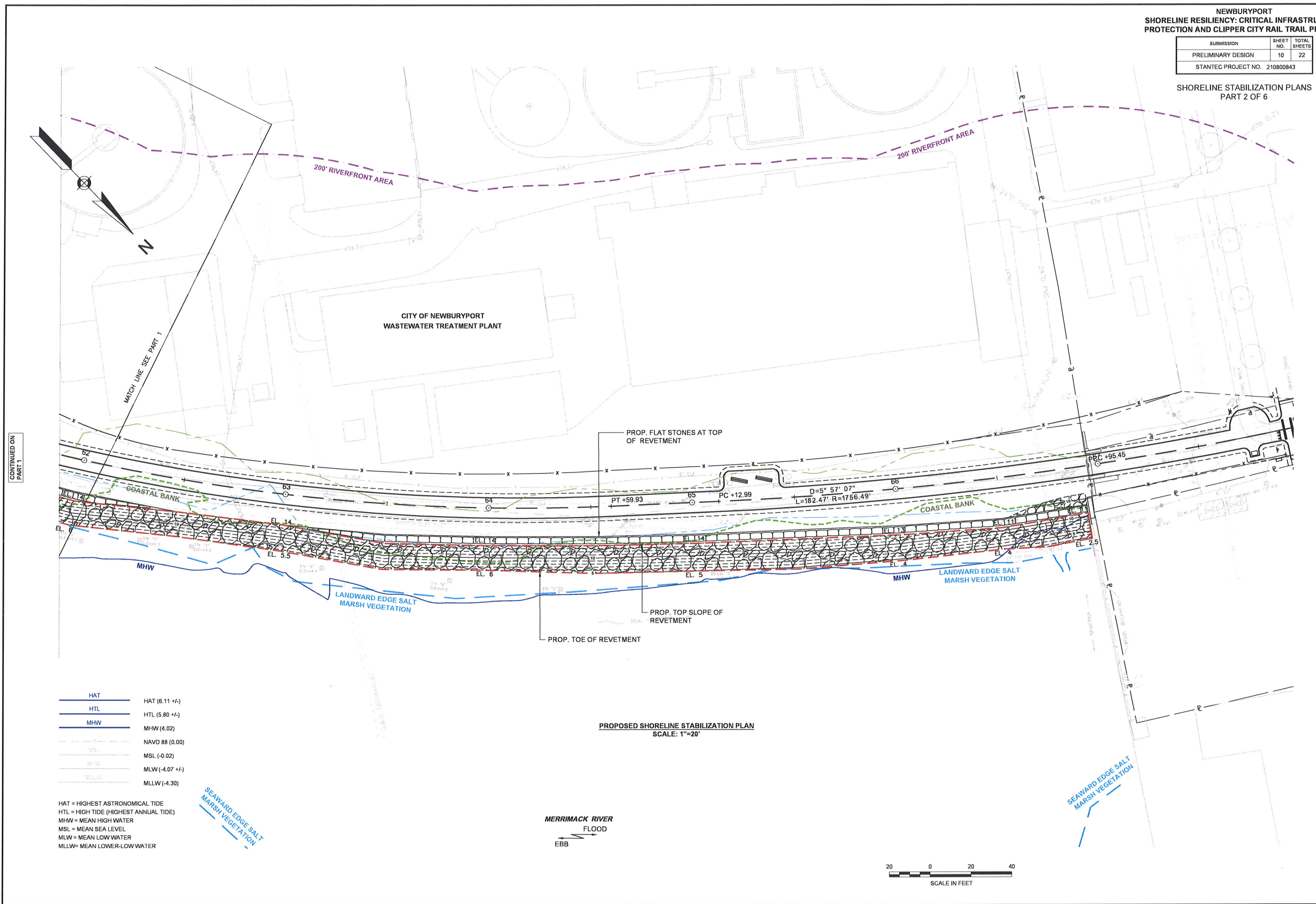


NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	10	22
STANTEC PROJECT NO. 210800843		

SHORELINE STABILIZATION PLANS
PART 2 OF 6

6-Mar-2020
808503_HD(SHORELINE CONSTRUCTION PLANS)_GZA_UPDATE.DWG



HAT	HAT (6.11 +/-)
HTL	HTL (5.80 +/-)
MHW	MHW (4.02)
NAVD 88	NAVD 88 (0.00)
MSL	MSL (-0.02)
MLW	MLW (-4.07 +/-)
MLLW	MLLW (-4.30)

HAT = HIGHEST ASTRONOMICAL TIDE
HTL = HIGH TIDE (HIGHEST ANNUAL TIDE)
MHW = MEAN HIGH WATER
MSL = MEAN SEA LEVEL
MLW = MEAN LOW WATER
MLLW = MEAN LOWER-LOW WATER

MERRIMACK RIVER
FLOOD
EBB

PROPOSED SHORELINE STABILIZATION PLAN
SCALE: 1"=20'

SCALE IN FEET

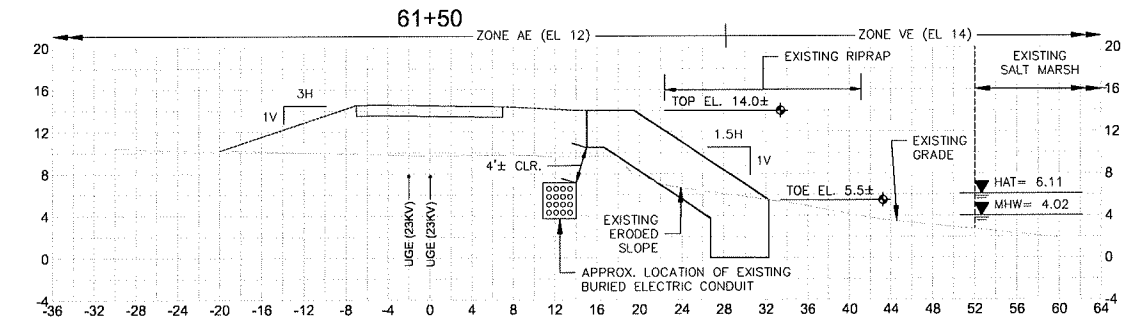
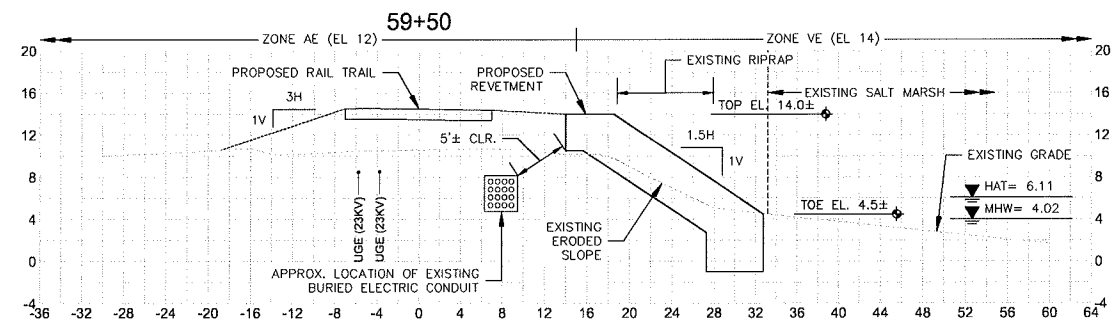
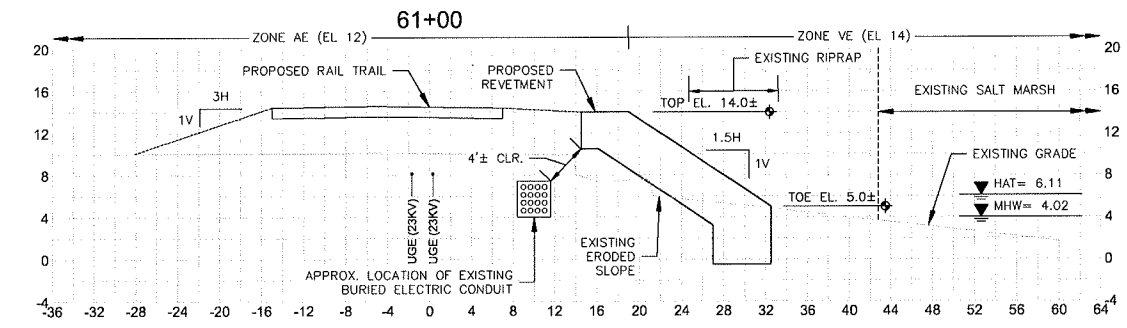
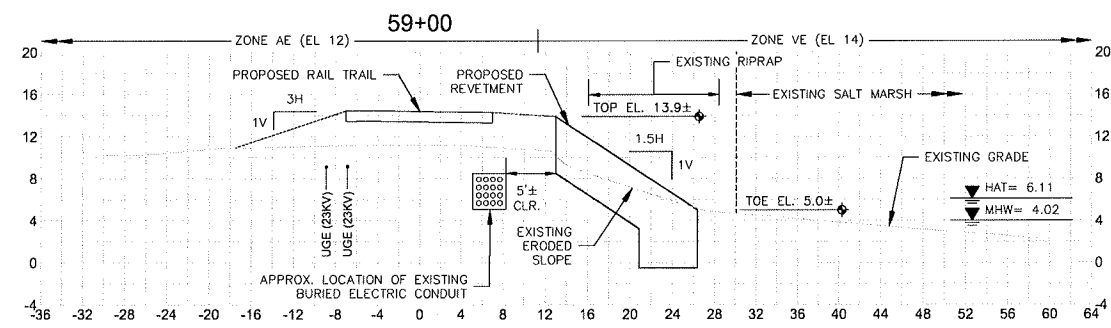
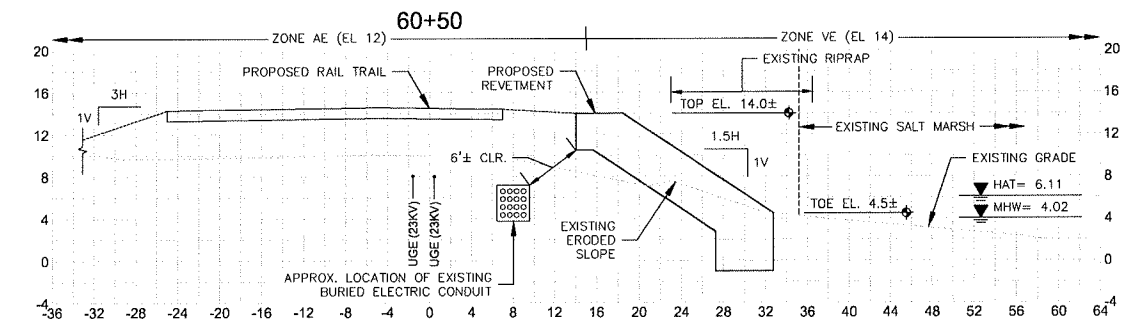
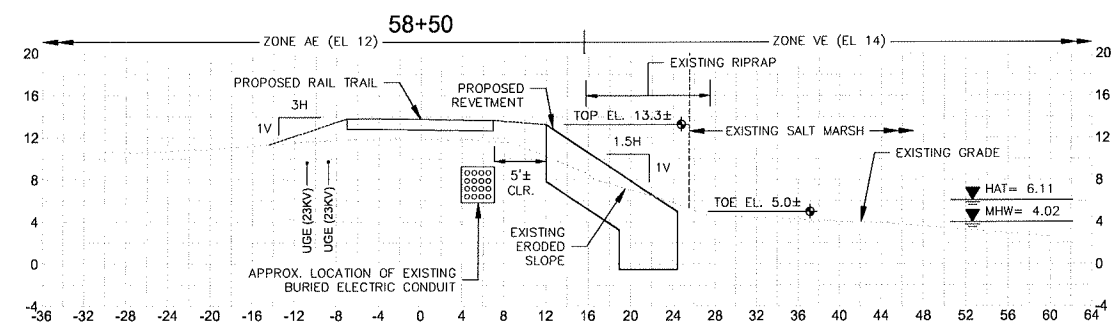
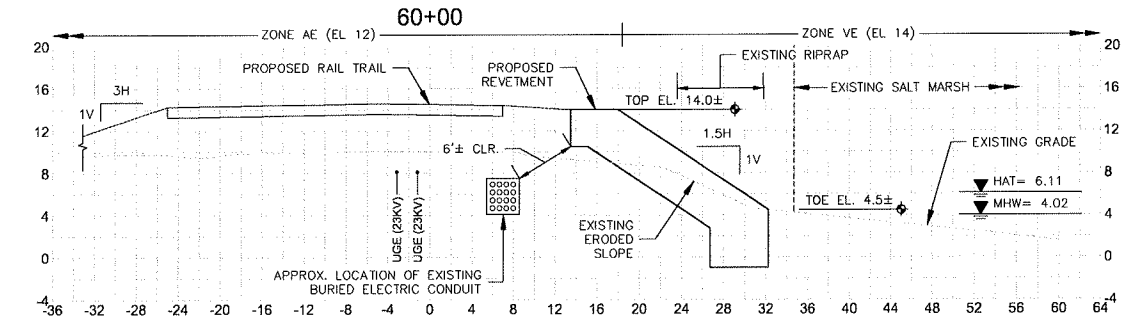
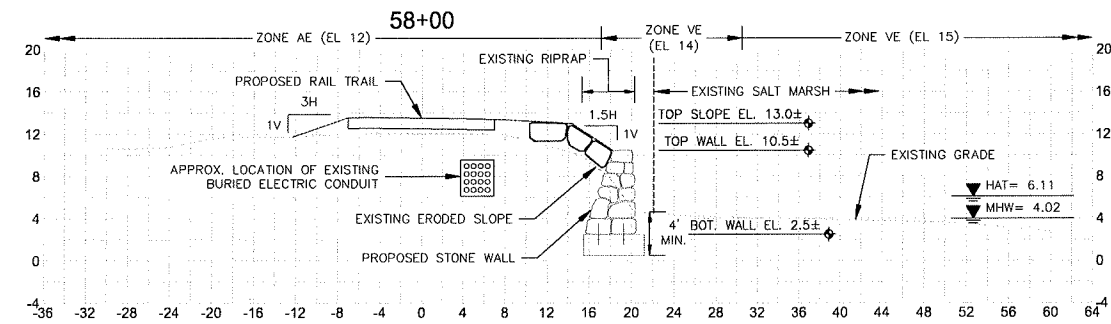
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PART 1

MATCH LINE SEE PART 1

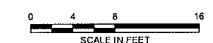
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	11	22
STANTEC PROJECT NO. 210800843		

**SHORELINE STABILIZATION PLANS
PART 3 OF 6**



**PROPOSED SHORELINE STABILIZATION SECTIONS
SCALE: 1"=8'**

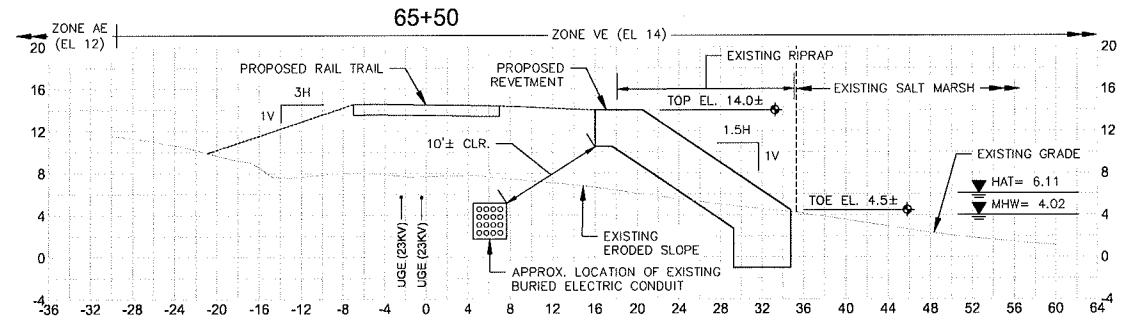
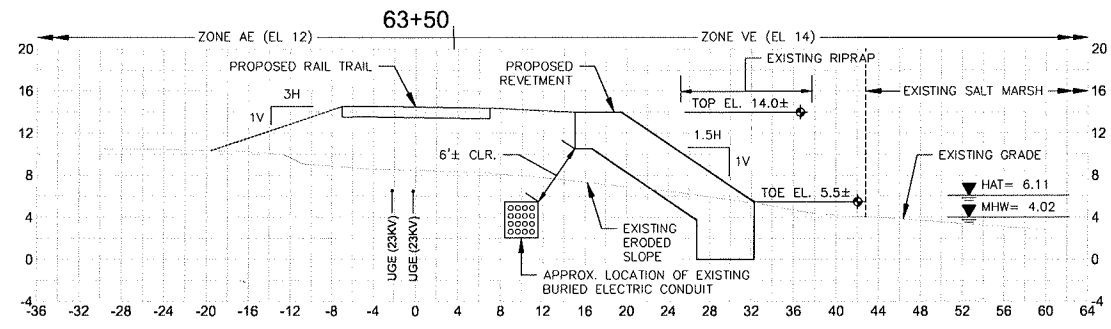
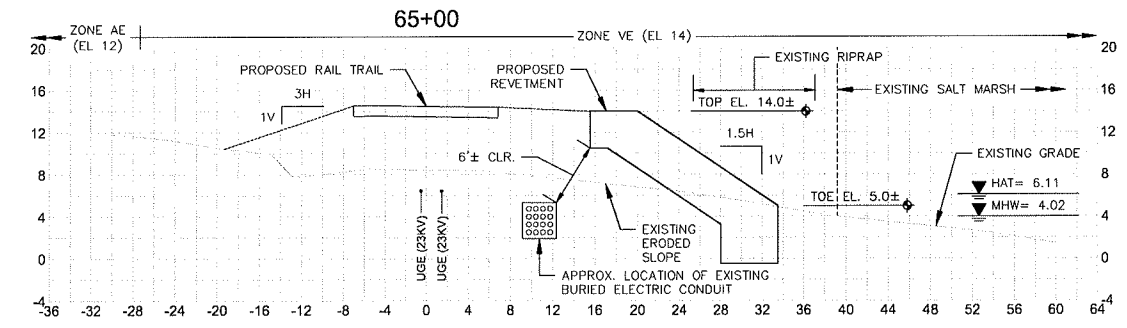
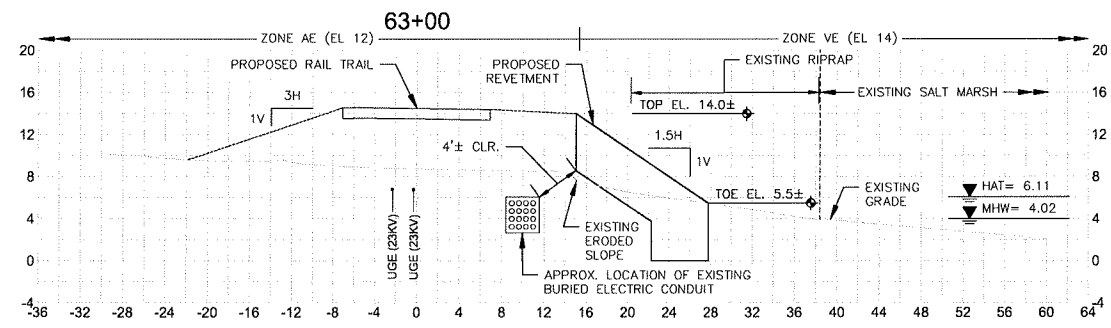
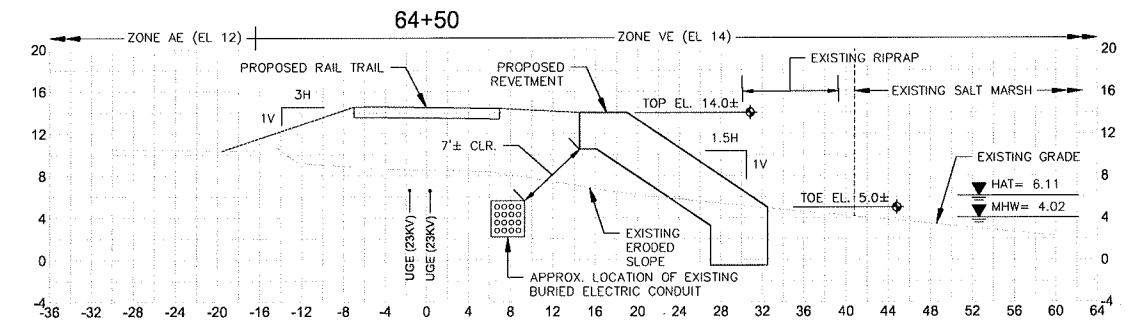
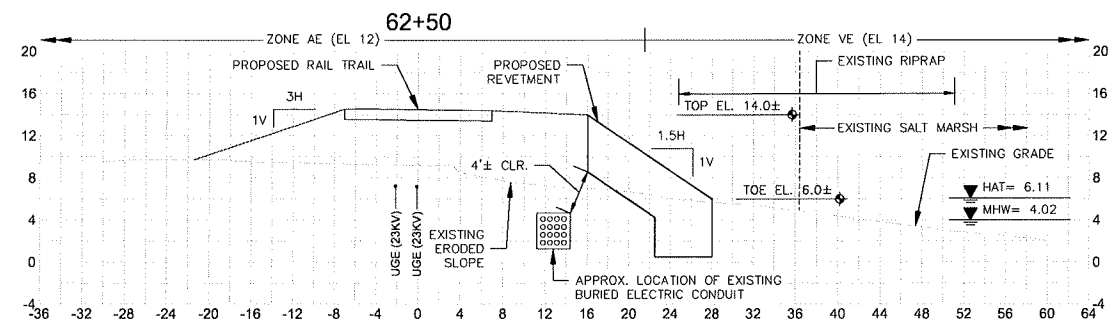
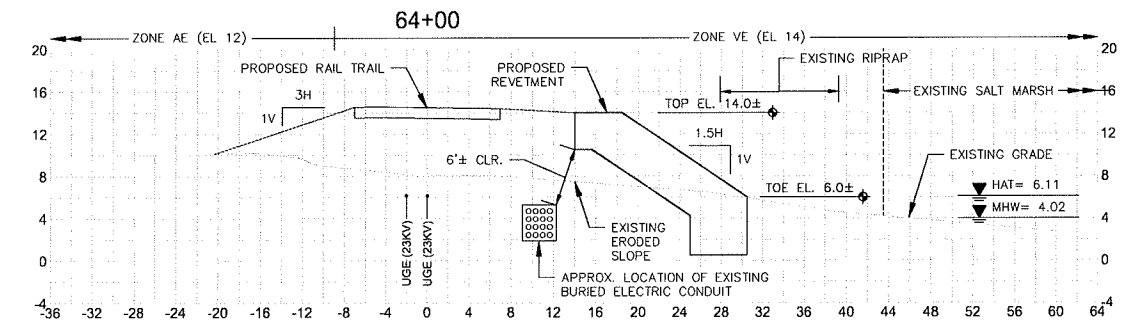
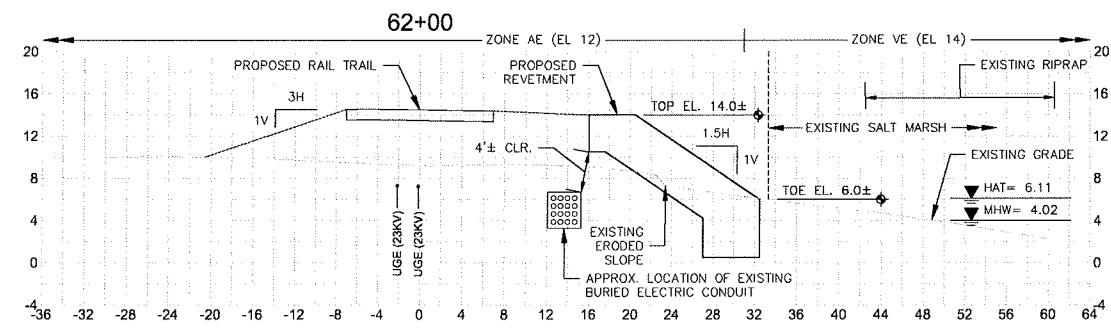


18.071603.02 RAIL TRAIL REVETMENT - SECTIONS & DETAILS DWG 26-Feb-2020

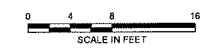
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	12	22
STANTEC PROJECT NO. 210800843		

SHORELINE STABILIZATION PLANS PART 4 OF 6



PROPOSED SHORELINE STABILIZATION SECTIONS
SCALE: 1"=8'



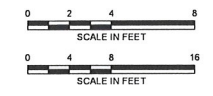
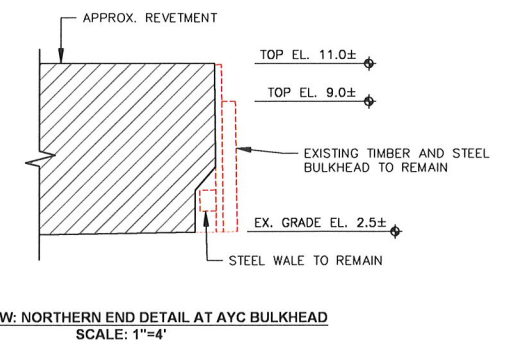
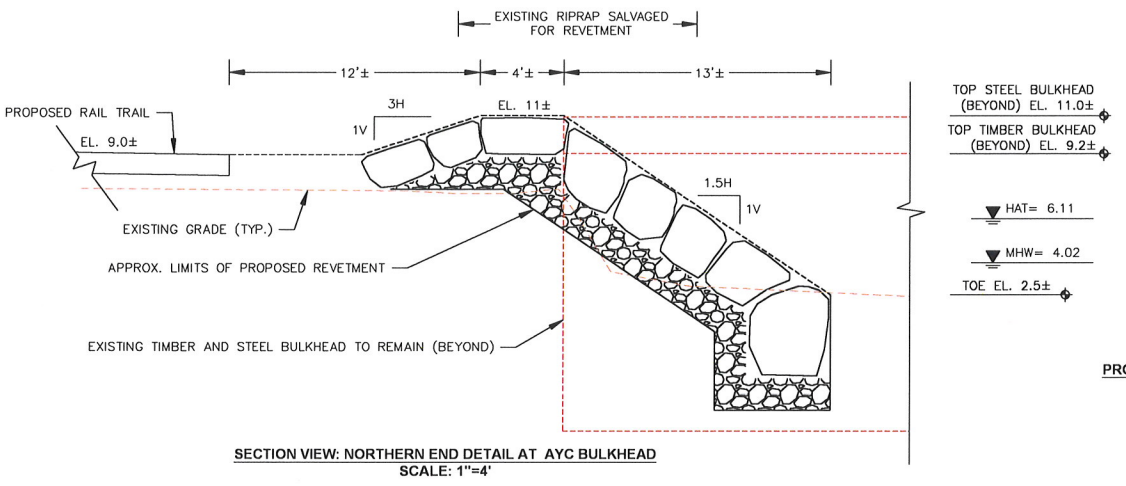
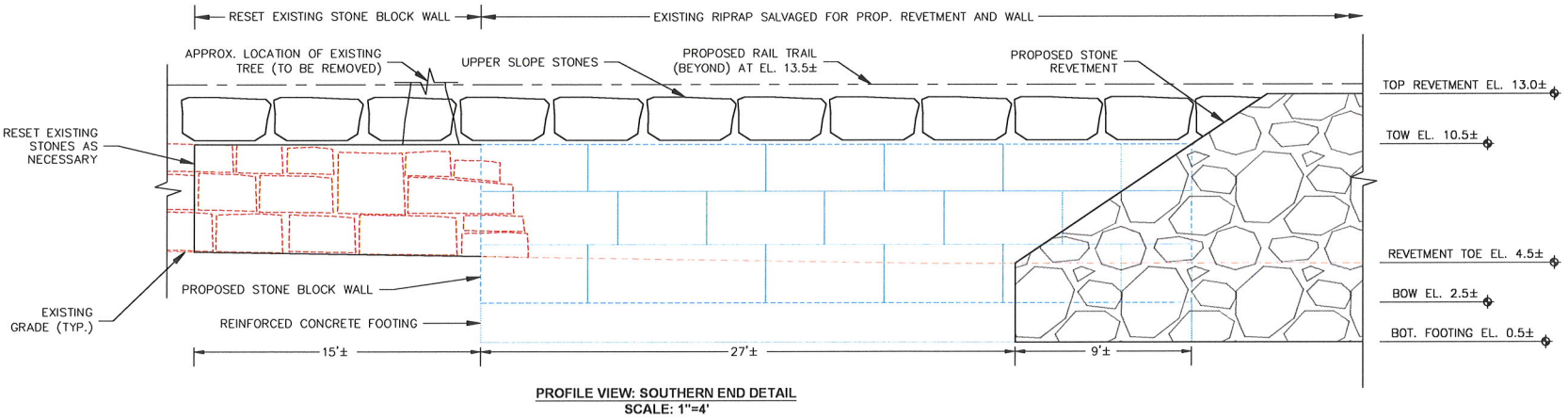
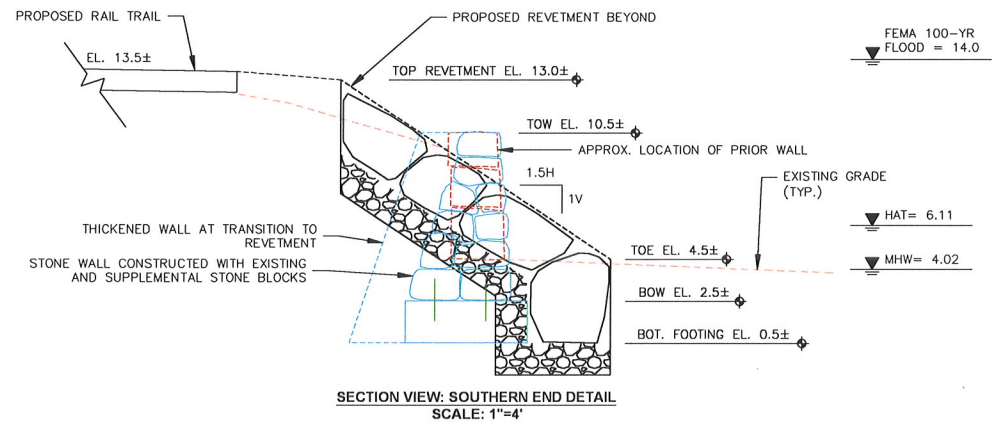
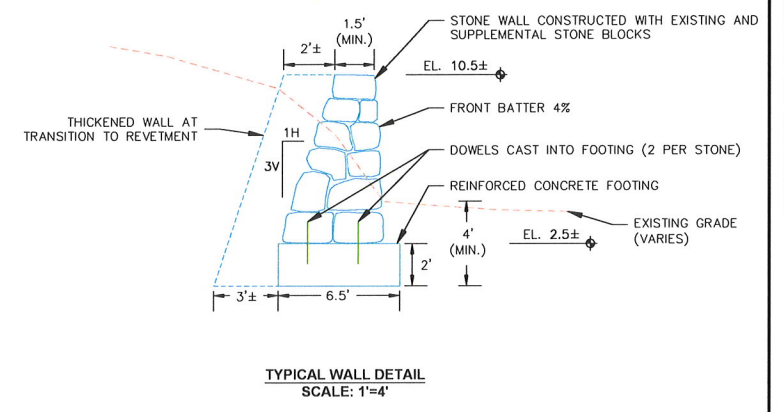
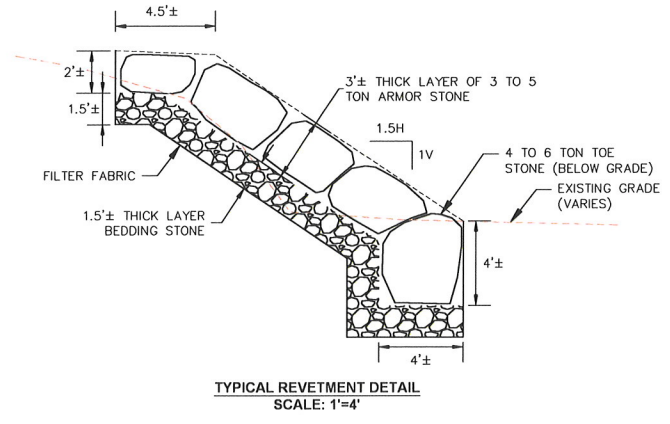
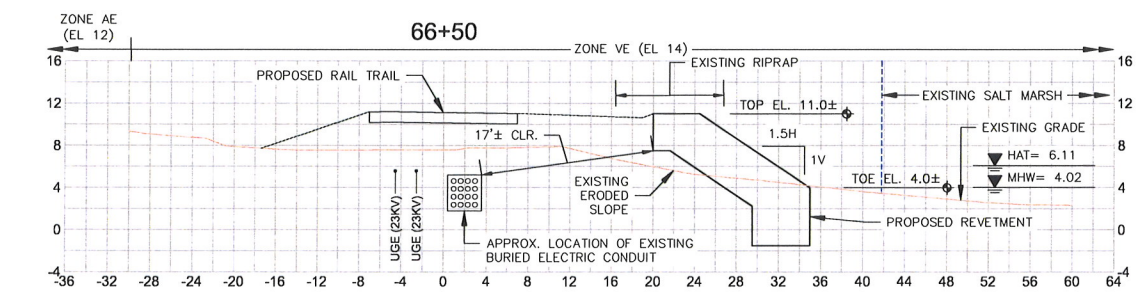
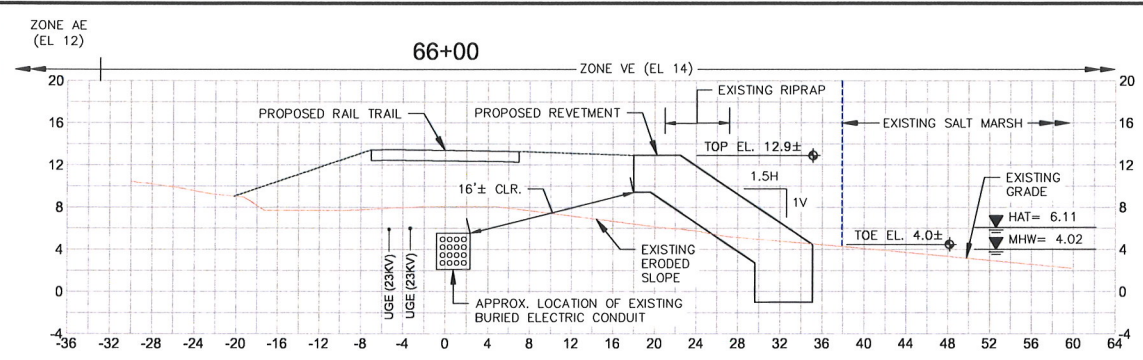
18.071803.02 RAIL TRAIL REVETMENT - SECTIONS & DETAILS.DWG 26-Feb-2020

SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	13	22
STANTEC PROJECT NO. 210800843		

**SHORELINE STABILIZATION PLANS
PART 5 OF 6**

18.071603.02 RAIL TRAIL REVETMENT - SECTIONS & DETAILS DWG 26-FEB-2020

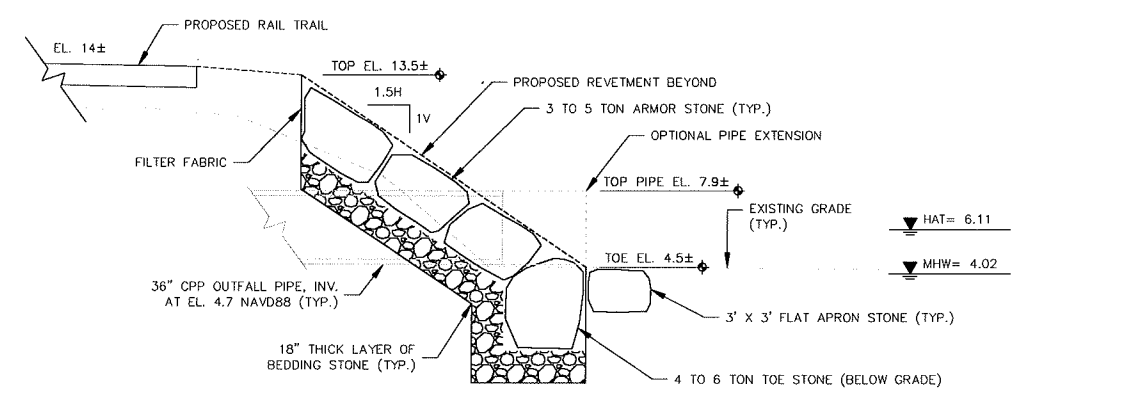


SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

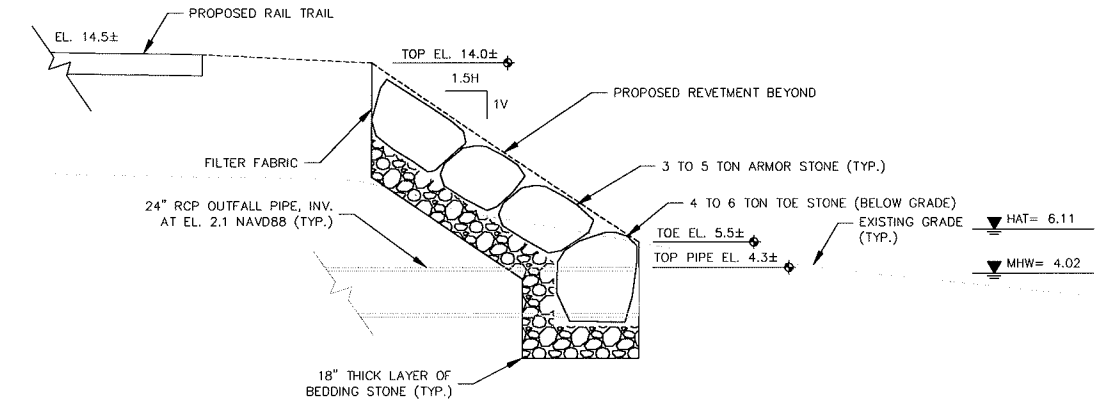
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PRELIMINARY DESIGN	14	22
STANTEC PROJECT NO. 210800843		

SHORELINE STABILIZATION PLANS
PART 6 OF 6

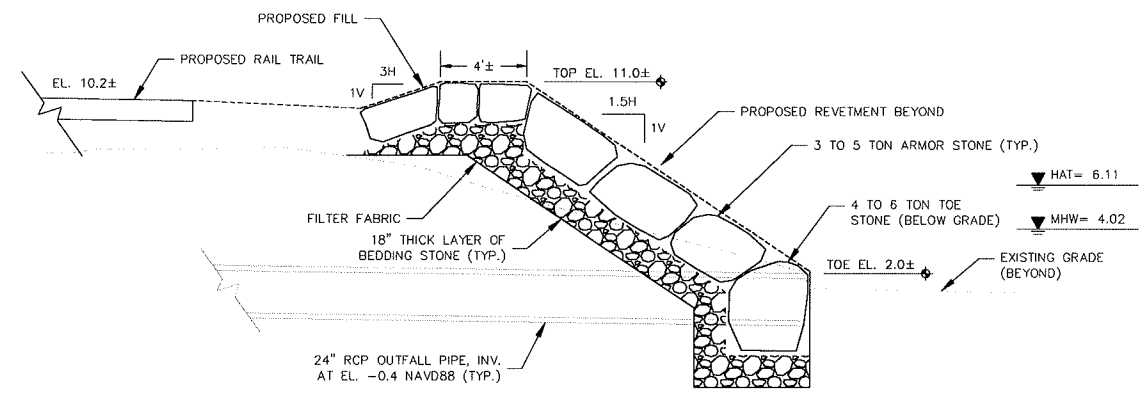
18-071503.02 RAIL TRAIL REVETMENT - SECTIONS & DETAILS DWG 26-Feb-2020



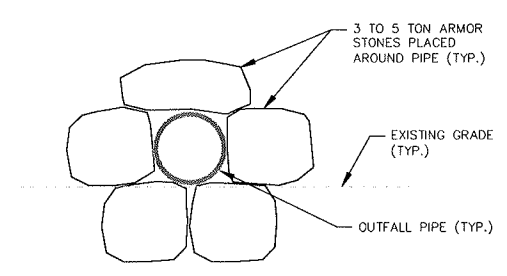
OUTFALL PIPE DETAIL: 36" CPP AT STA 58+62
SCALE: 1"=4'



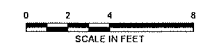
OUTFALL PIPE DETAIL: 24" RCP AT STA 62+72
SCALE: 1"=4'



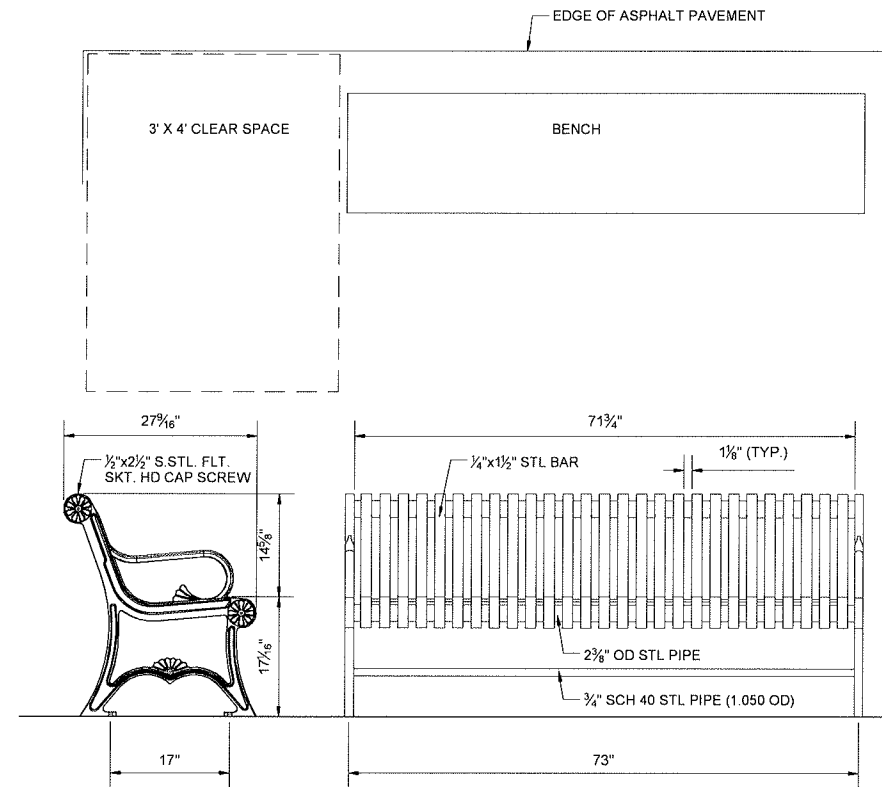
OUTFALL PIPE DETAIL: 24" RCP AT STA 66+72
SCALE: 1"=4'



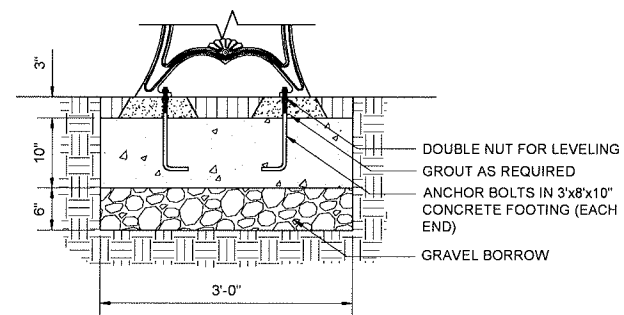
PROFILE VIEW: TYPICAL OUTFALL PIPE DETAIL
SCALE: N.T.S



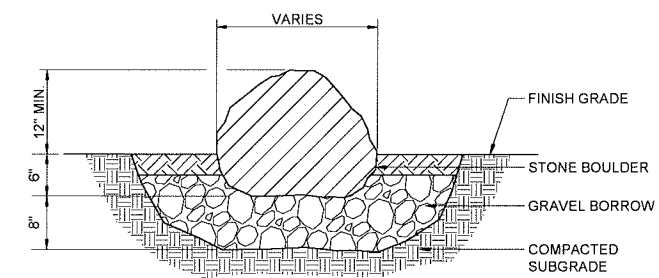
SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	15	22
STANTEC PROJECT NO. 210800843		



1 6' BENCH
SCALE: 1"=1'-0"

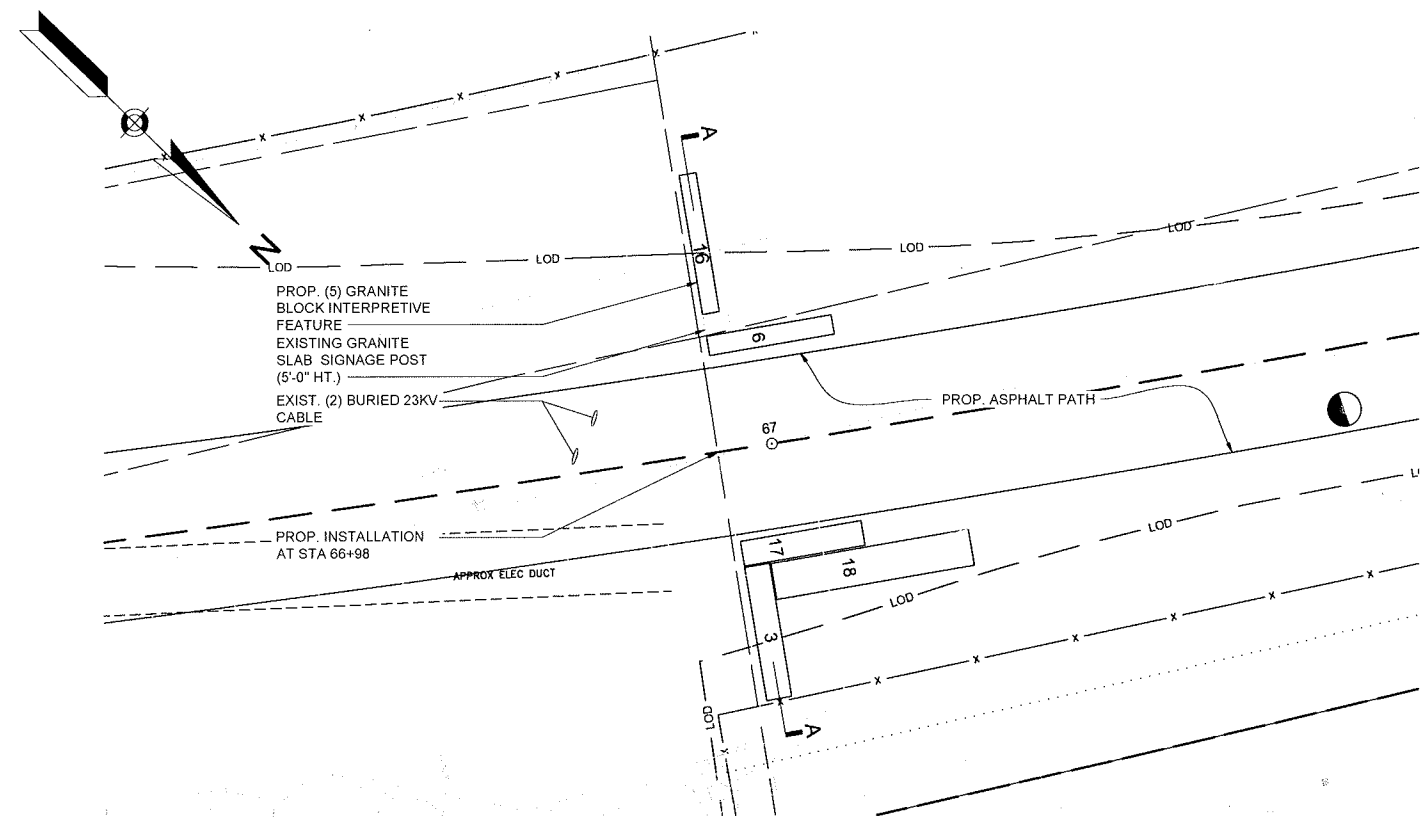


2 TYPICAL BENCH FOOTING
SCALE: 1"=1'-0"

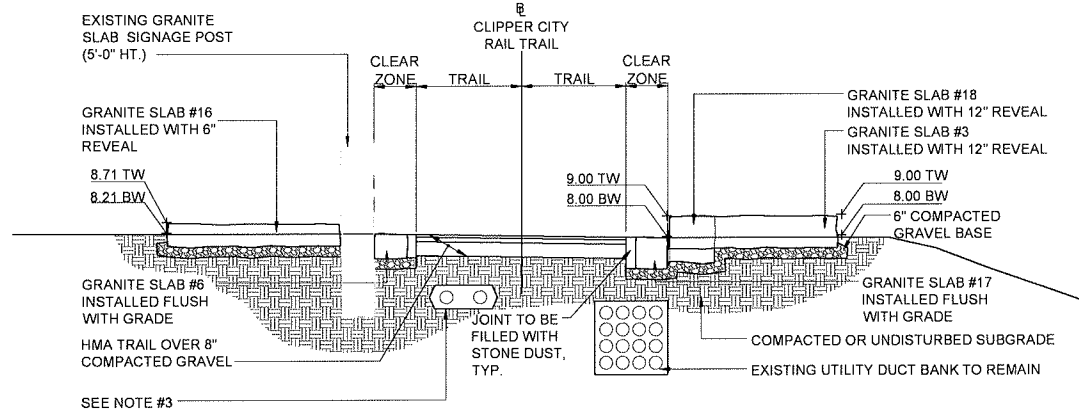


3 LANDSCAPE BOULDER RESET
NOT TO SCALE

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	16	22
STANTEC PROJECT NO. 210800843		



1 INTERPRETIVE GRANITE LAYOUT: STA 66+98
SCALE: 3/16" = 1'-0"



2 INTERPRETIVE GRANITE SECTION: SECTION A-A
SCALE: 1/4" = 1'-0"

INTERPRETIVE GRANITE LEGEND

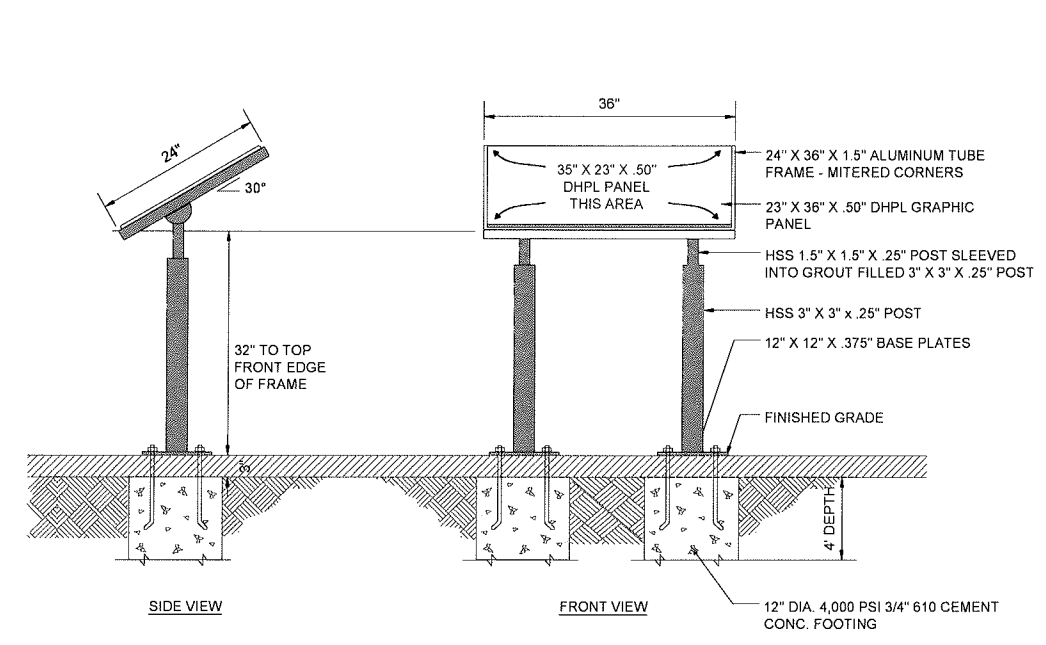
NUM.	DESCRIPTION	DIMENSIONS
#3	UPLAND ADDITIONAL STONE 3	12'-0"L. X2'-2"W. X 1'-4"H.
#6	FLUSH THRESHOLD STONE: 10' LONG	7'-7"L. X 1'-2"W. X 1'-6"H.
#16	ADDITIONAL WATERS EDGE STONE 2	8'-4"L. X 1'-0"W. X 1'-3"H.
#17	ADDITIONAL WATERS EDGE STONE 3	7'-4"L. X 1'-6"W. X 1'-3"H.
#18	RAISED SEAT HEIGHT STONE ON WATERSIDE OF THRESHOLD AS WHARF EDGE	8'-0"L. X 1'-6"W. X 1'-3"H.

- NOTES:
- GRANITE SLABS HAVE BEEN PRE-SELECTED AND NUMBERED BASED ON LOCATION IN THE FIELD. NUMBERING BEGINS WITH THE EASTERN MOST STONE BEING LABELED #1 AND THE WESTERN MOST STONE BEING LABELED #18. DIMENSIONS SHOULD BE TAKEN TO ENSURE ACCURACY BEFORE THEY ARE PLACED.
 - THE LAYOUT AND POSITIONING OF ALL GRANITE ELEMENTS SHALL BE MARKED IN THE FIELD AND APPROVED BY THE LANDSCAPE ARCHITECT, PRIOR TO INSTALLATION.
 - (2) EXIST. 23KV BURIED ELECTRICAL LINES. CONTRACTOR SHALL LOCATE AND PROTECT THROUGHOUT INTERPRETIVE GRANITE EXCAVATION AND INSTALLATION.

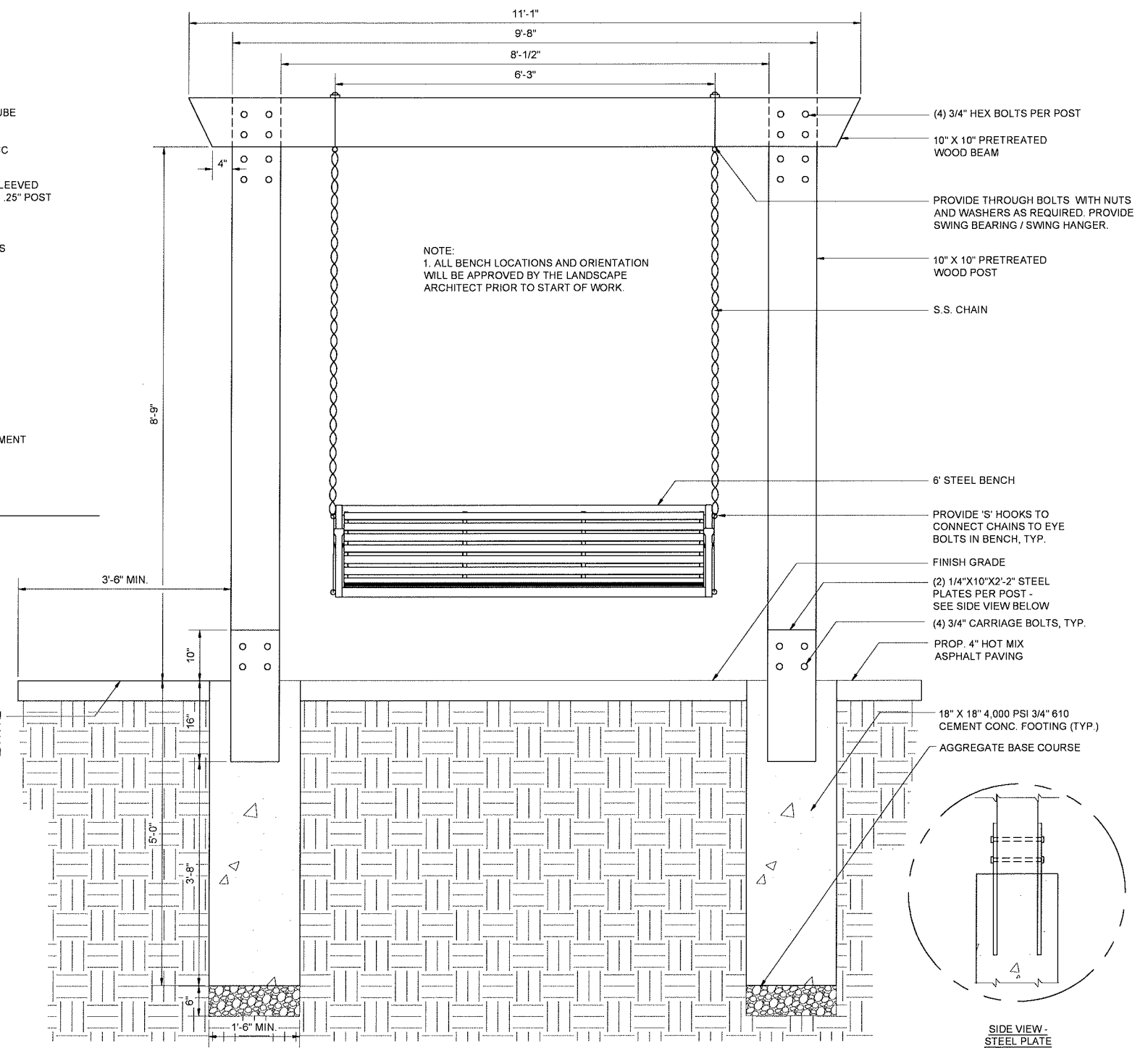
SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	17	22
STANTEC PROJECT NO. 210800843		

CONSTRUCTION DETAILS
PART 3 OF 5

CCRT_SHORELINE_HD(CONST DETAILS).DWG 6 Mar 2020



1 INTERPRETIVE SIGN
NOT TO SCALE



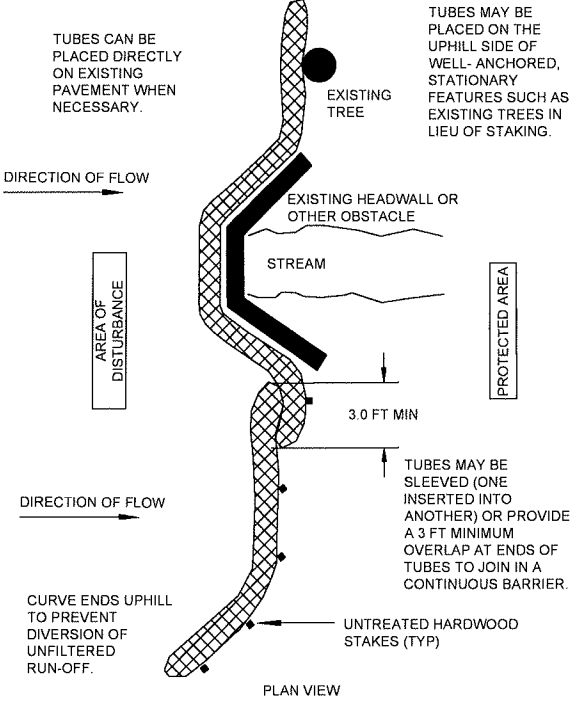
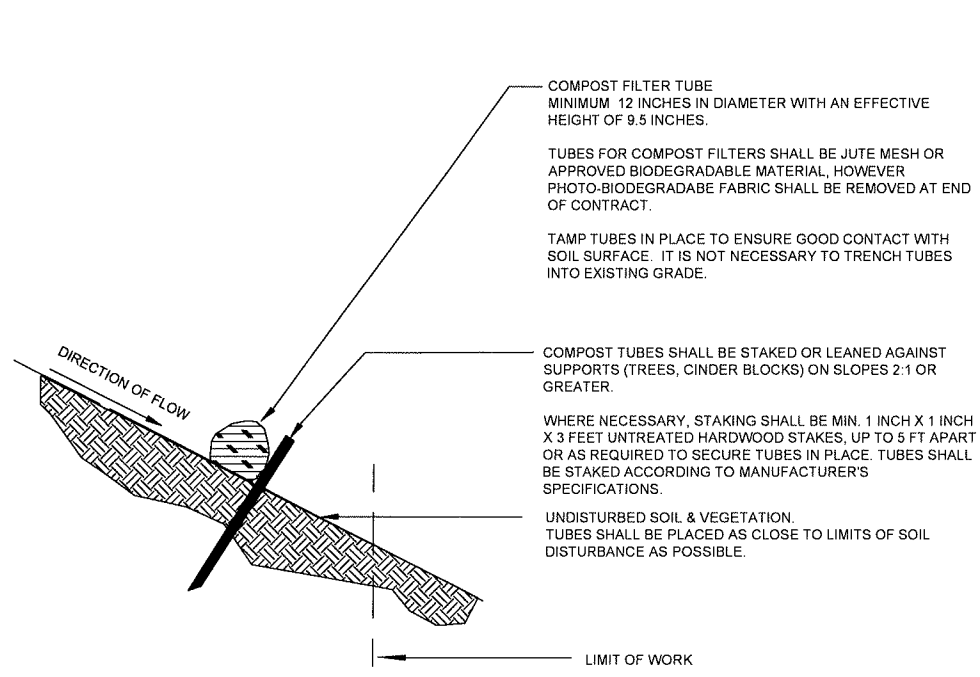
2 SWINGING BENCH
NOT TO SCALE

PROP. 3' X 4' COMPANION SPACE- ONE SIDE REQUIRED (TYP.) SEE PLAN FOR LOCATION

SIDE VIEW - STEEL PLATE

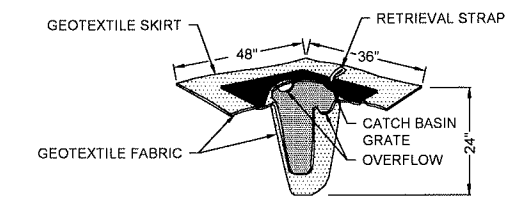
SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	18	22
STANTEC PROJECT NO. 210800843		

CCRT_SHORELINE_HQ(CONST DETAILS) DWG 6-Mar-2020

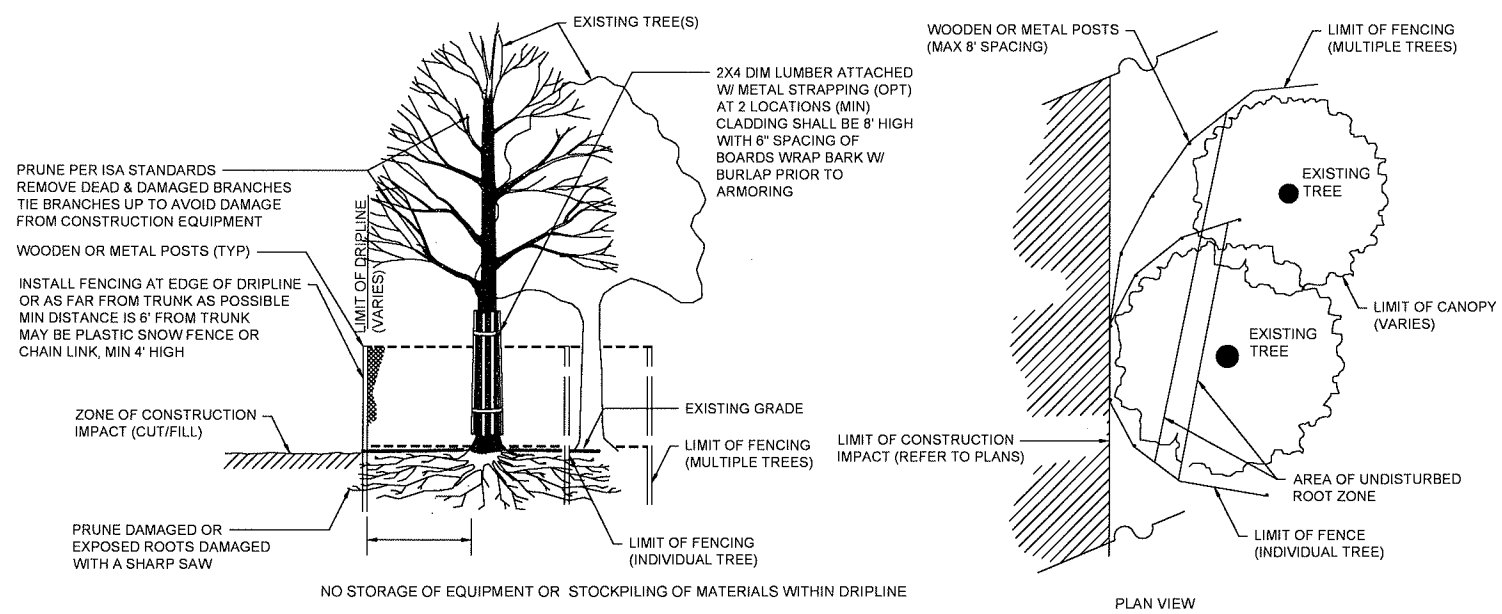


- NOTES:
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
 2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
 3. TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
 4. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
 5. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
 6. ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

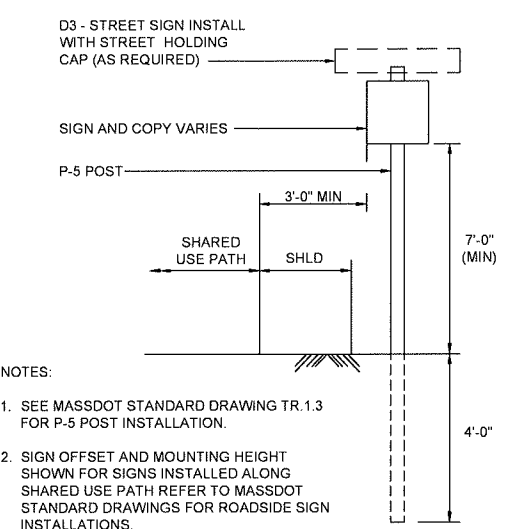
12" COMPOST FILTER TUBE DETAILS
NOT TO SCALE



SILT SACK FOR SEDIMENT CONTROL
NOT TO SCALE

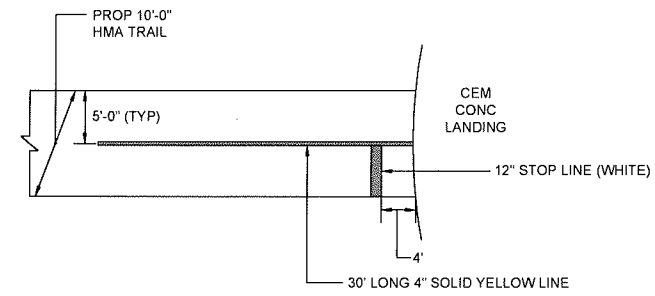


TREE PROTECTION - EXISTING TREE(S)
NOT TO SCALE

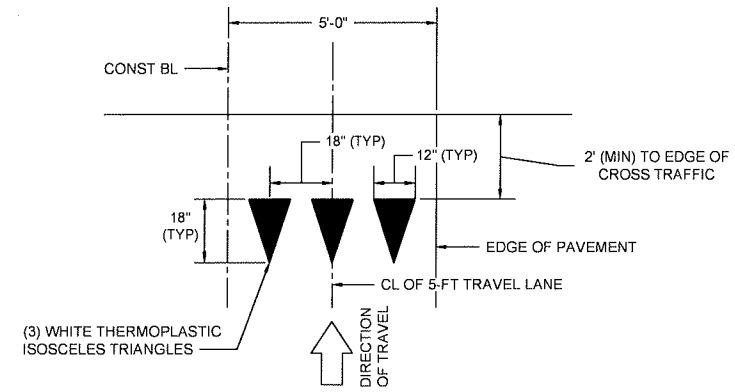


TYPICAL SIGN LOCATION
NOT TO SCALE

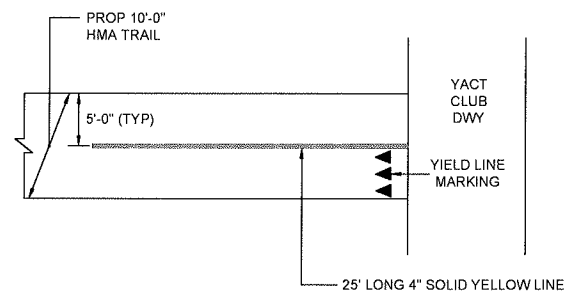
SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	19	22
STANTEC PROJECT NO. 210800843		



WATER STREET INTERSECTION DETAIL
 NOT TO SCALE



YIELD LINE MARKING
 NOT TO SCALE



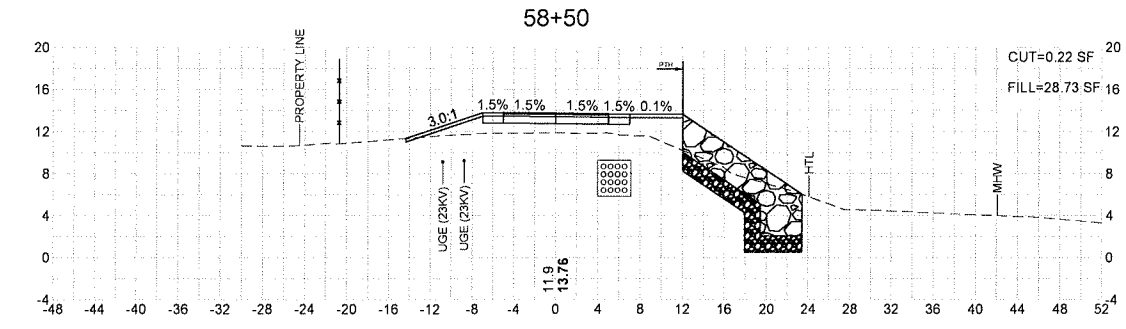
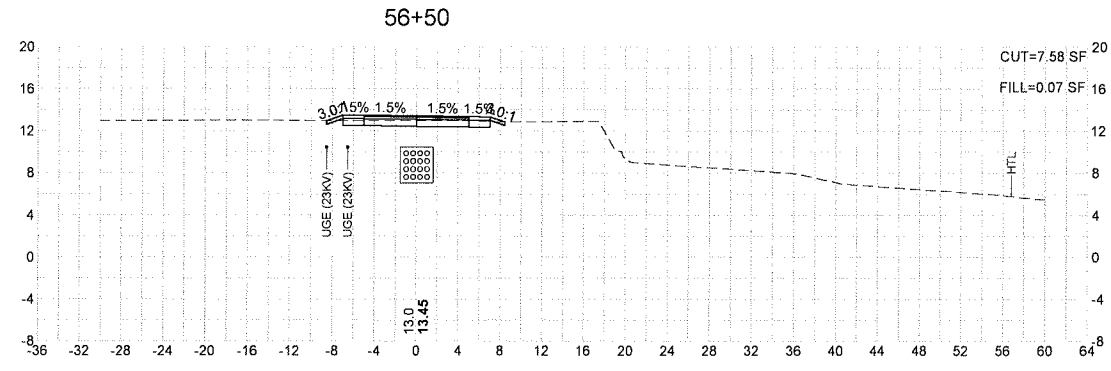
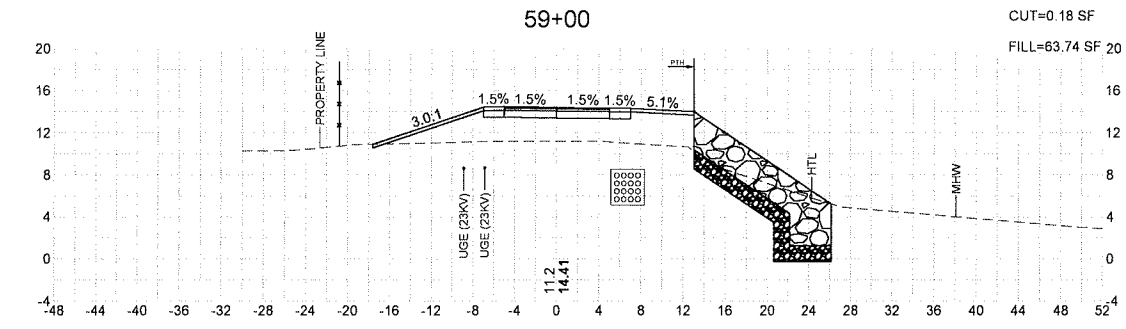
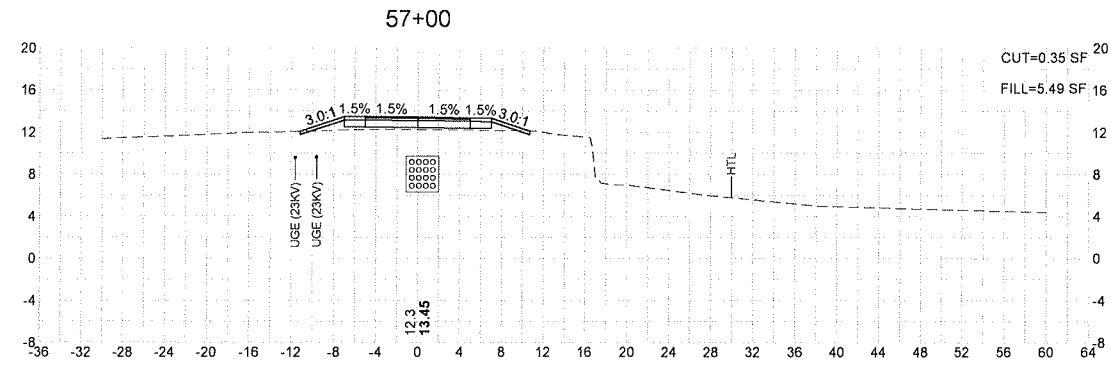
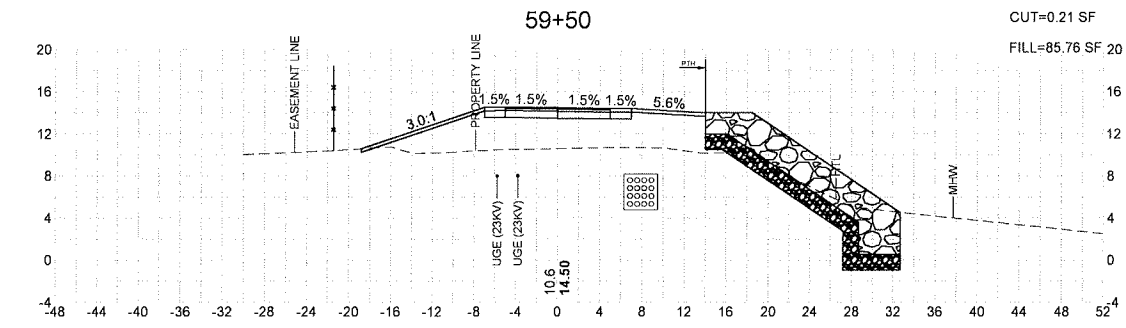
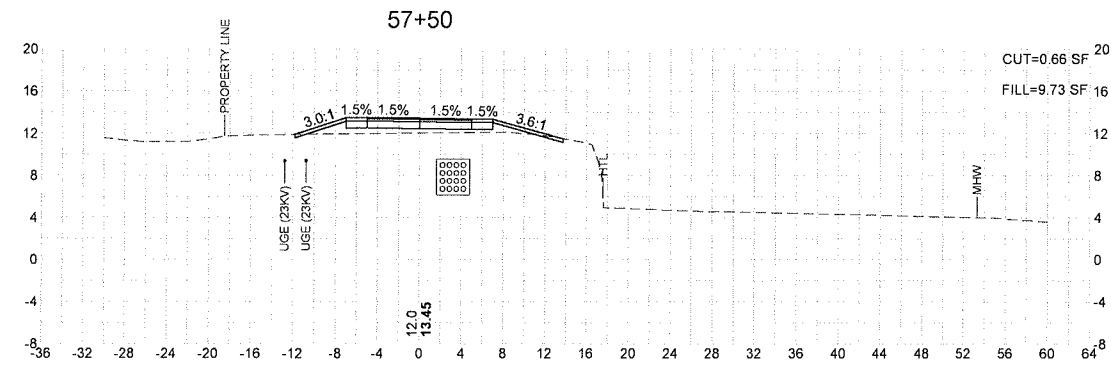
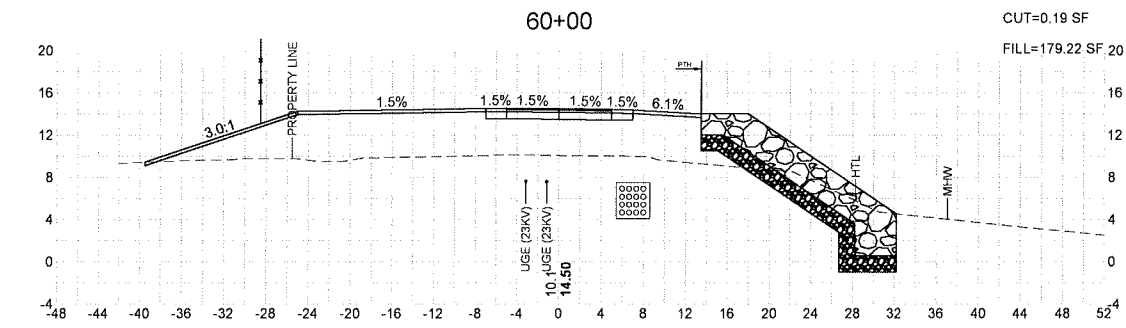
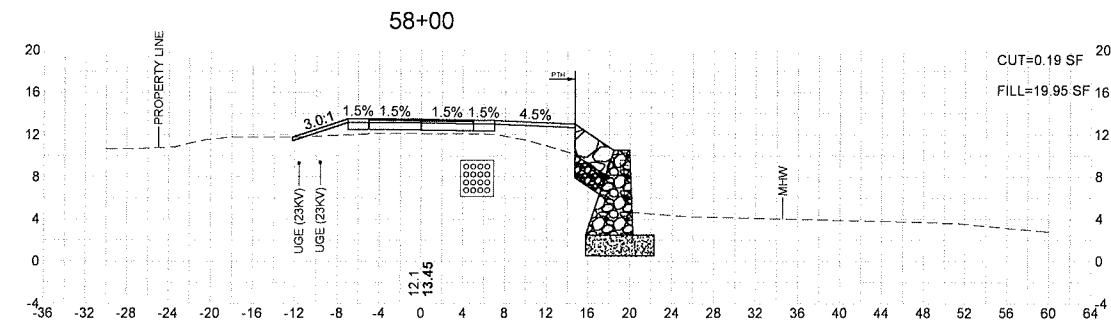
YACT CLUB DRIVEWAY INTERSECTION DETAIL
 NOT TO SCALE

NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	20	22
STANTEC PROJECT NO. 210800843		

RAIL TRAIL CROSS SECTIONS
PART 1 OF 3

NOTE: FOR SHORELINE STABILIZATION CROSS SECTIONS SEE SHEETS 9 - 14.

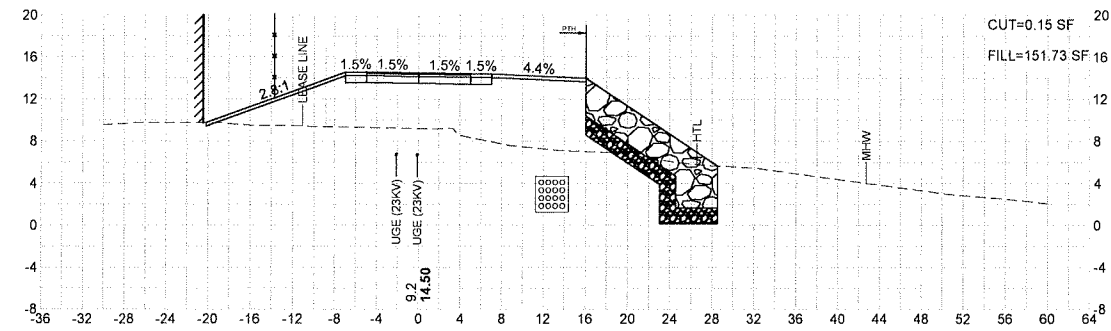
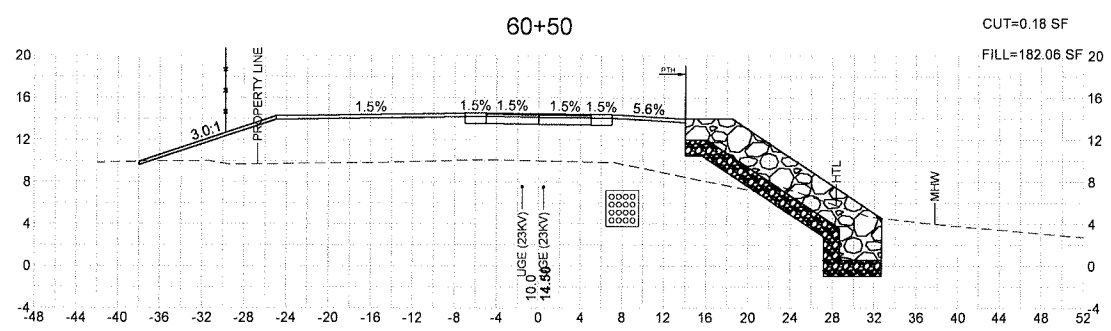
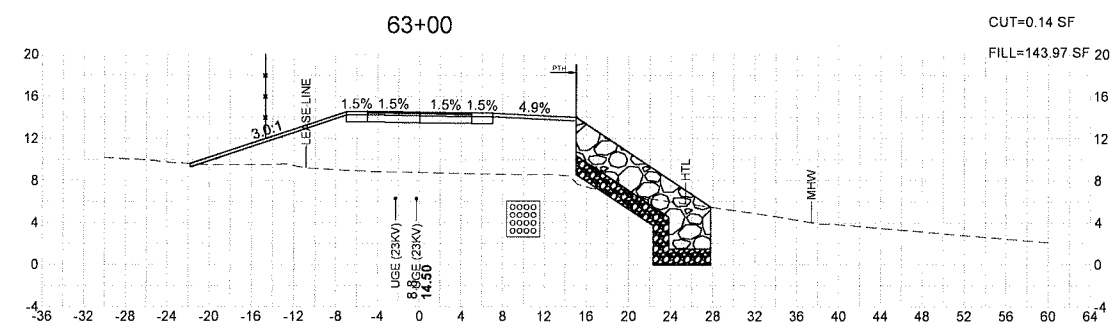
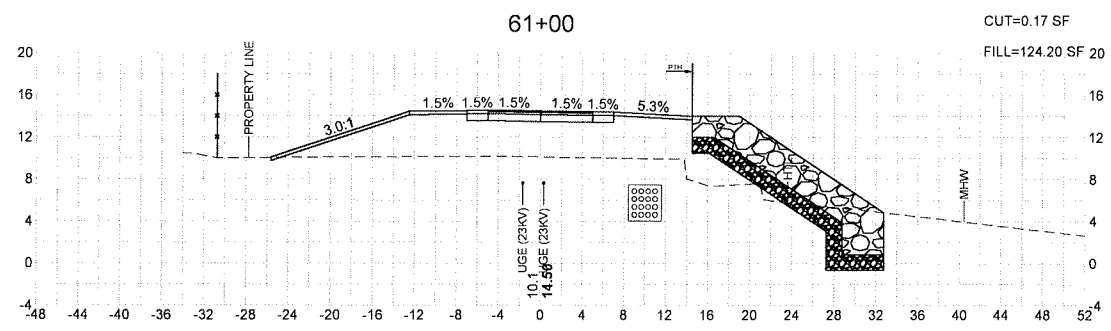
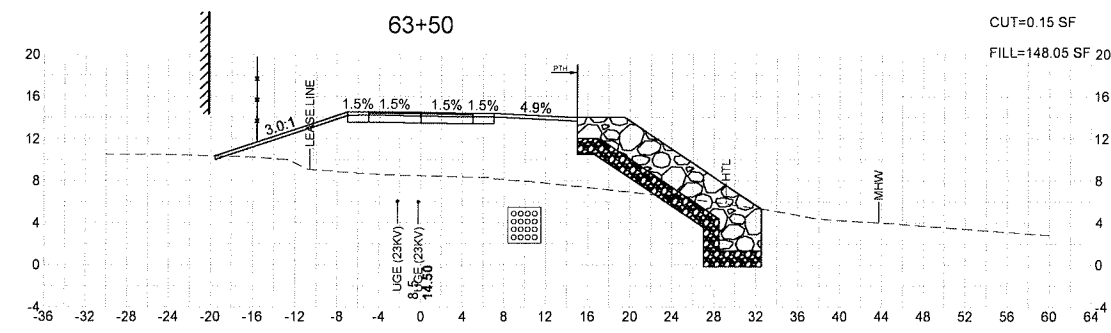
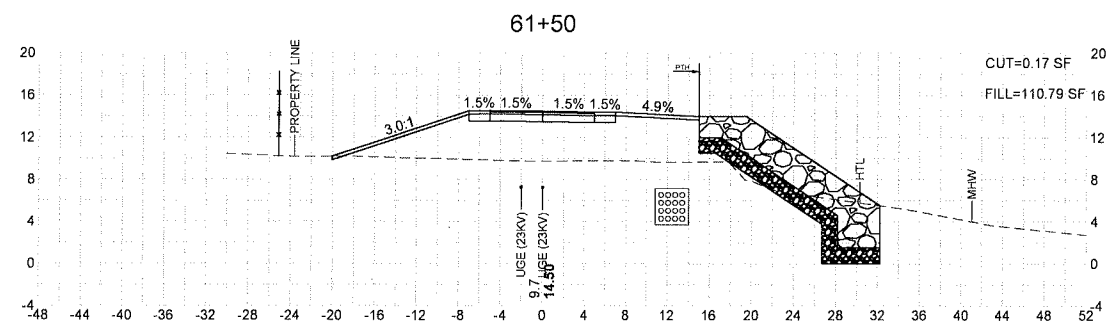
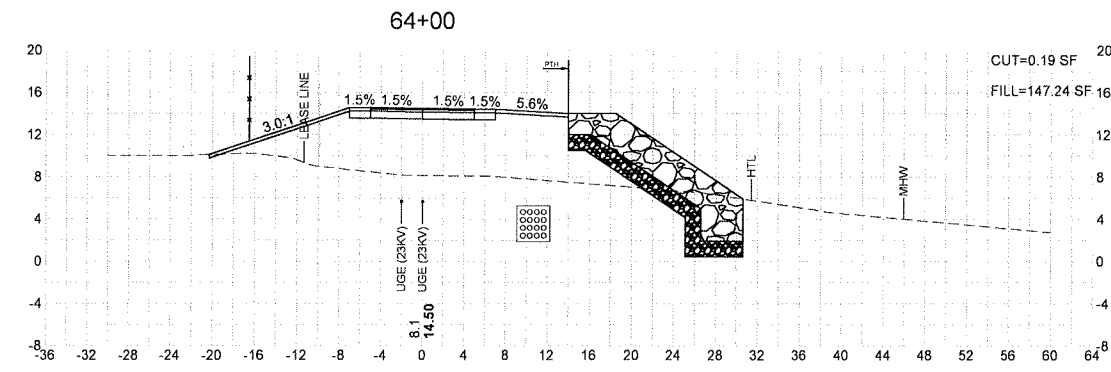
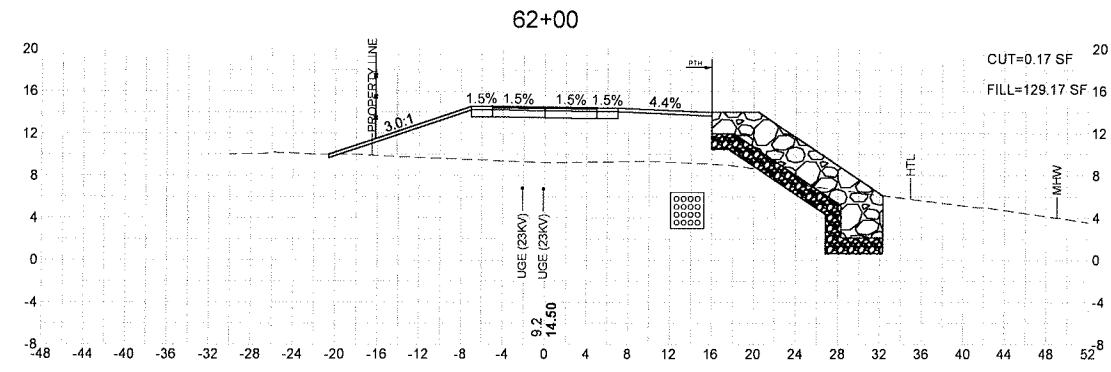


NEWBURYPORT
SHORELINE RESILIENCY: CRITICAL INFRASTRUCTURE
PROTECTION AND CLIPPER CITY RAIL TRAIL PROJECT

SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	21	22
STANTEC PROJECT NO. 210800843		

RAIL TRAIL CROSS SECTIONS
PART 2 OF 3

NOTE: FOR SHORELINE STABILIZATION CROSS SECTIONS SEE SHEETS 9 - 14.



SUBMISSION	SHEET NO.	TOTAL SHEETS
PRELIMINARY DESIGN	22	22
STANTEC PROJECT NO. 210800843		

RAIL TRAIL CROSS SECTIONS
PART 3 OF 3

NOTE: FOR SHORELINE STABILIZATION CROSS SECTIONS SEE SHEETS 9 - 14.

