# **Interim Report**

### PRELIMINARY DESIGN OF A SUSTAINABLE SHORELINE AT THE HUDSON SHORES PARK IN THE CITY OF WATERVLIET, NY



### DECEMBER 22, 2017

Prepared for:





**Department of** Environmental Conservation

**Hudson River Estuary Program** 

Prepared by:



This document was prepared for the Hudson River Estuary Program, New York State Department of Environmental Conservation, with support from the New York State Environmental Protection Fund, in cooperation with the New England Interstate Water Pollution Control Commission. The viewpoints expressed here do not necessarily represent those of NEIWPCC or NYS DEC, nor does mention of trade names, commercial products, or causes constitute endorsement or recommendation for use.

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### LIST OF ABBREVIATIONS

GIS	Geographic Information Systems
GPS	Global Positioning System
Gomez and Sullivan	Gomez and Sullivan Engineers, D.P.C.
NEIWPCC	New England Interstate Water Pollution Control Commission
NOAA	National Oceanic and Atmospheric Administration
NYHOPS	New York Harbor Observing and Prediction System
NYSDEC	New York State Department of Environmental Conservation
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
USGS	Unites States Geological Survey

### 1 PROBLEM DEFINITION/BACKGROUND

The City of Watervliet, New York has long sought to develop recreational facilities and waterfront access for its citizens. In 2004, the City launched its Local Waterfront Revitalization Program, which focuses on protection and wise use of the City's estuaries. In 2009, the City took the Climate Smart Communities Pledge and created a Climate Action Plan to improve climate resilience. To help implement their pledge goals, the City has partnered with the New England Interstate Water Pollution Control Commission (NEIWPCC), and the New York State Department of Environmental Conservation's (NYSDEC) Hudson River Estuary Program and Hudson River National Estuarine Research Reserve and Sustainable Shorelines Project to fund engineering designs for a "sustainable shoreline" demonstration project at Hudson Shores Park. The ideal sustainable shoreline improvements will resist erosion, improve habitat value for native flora and fauna, and be resilient in the face of climate change, while also enhancing safe public access to the river.

The Hudson River Estuary Program's mission is to help people enjoy, protect, and revitalize the Hudson River estuary. To advance this mission, the Program released the 2015-2020 Hudson River Estuary Action Agenda, with a focus on benefits that people receive from healthy ecosystems and priority targets for each benefit. Implementation of this sustainable shoreline project will contribute to Benefit #2 (Resilient Communities), Target #2, which states that tributary streams and floodplains that are conserved, revegetated, and restored through natural solutions will absorb and slow floodwaters, mitigate erosions, and support the health of the Hudson River estuary. Managing for these ecosystem services reduces vulnerability to climate change and allows for sustainable human resource use. The proposed project will enhance the diversity of native vegetation, encourage natural filtration of floodwaters, and include shoreline features that will resist erosion by tides and extreme weather. This project will also contribute to Benefit 3 (Vital Estuary Ecosystem), Target #1, which seeks to increase the quantity and quality of nature-based shorelines. Additionally, Benefit #6 (Education, River Access, Recreation and Inspiration), Target #3 (Access) will be addressed by incorporating accessibility to the park for people of all abilities into the Sustainable Shoreline design. Features of the park will encourage citizens to connect with the river and may include educational components, recreation amenities, and fishing locations. This design project will also meet the NYSDEC's Sustainable Shorelines Project objectives to characterize estuary and shoreline conditions; determine ecological, engineering, and economic trade-offs of shoreline management options; and demonstrate innovative shorelines and best management practices.

### 1.1 Goals and Objectives

The project is located within Hudson Shores Park which is situated along the Hudson River and adjacent to Interstate 787 in the City of Watervliet. This park was constructed in 1975. The 9-acre park has a 1400-foot-long shoreline and houses a pavilion, picnic area, trail, boat house, kayak launch, and seasonal restaurant on a floating barge. The steep shoreline is lined with native and invasive vegetation. Some areas are protected by rip-rap. The only formal access to the shoreline is the kayak launch.

The goal of this project is to work with project partners to design an ecologically enhanced, engineered shoreline treatment for Hudson Shores Park that resists erosion, enhances accessibility for all citizens, and improves natural habitat value for native plants, fish, and wildlife. The objectives are to: 1) design resilient shoreline features that will resist erosion and adapt to rising sea levels; 2) design Americans with Disabilities Act (ADA)-accessible features for passive and active recreation, and 3) reduce invasive plant species while increasing the native plant species richness and native wildlife habitat.

### 2 EXISTING SITE CONDITIONS

### 2.1 Existing Information Review

Existing geographic information systems (GIS) data were collected from reliable sources and used to create a base map used for the ecological and general site assessment and to inform the project design. Supporting GIS data are gathered in a project-specific geodatabase. Table 2.1-1 lists the sources for these data. Figure 2.1-1 shows the base map used for the site assessment.

Source	Description	Data Year
City of Watervliet	2-foot LiDAR contour lines	1998
NYS GIS Clearinghouse – Albany County	2-foot LiDAR contour lines	2008
NYS GIS Clearinghouse – Albany County	1-foot resolution orthoimagery	2014
NYS GIS Clearinghouse	Streets	2017
USGS National Hydrography Dataset	Water bodies and channels	2017
New York Department of State	Coastal Zone Boundary	2017

Table 2.1-1. Existing GIS Data Used to Inform Design

National Wetlands Inventory data and NYSDEC wetlands data were reviewed; however neither dataset showed wetlands present within Hudson Shores Park.

Weston & Sampson is in the process of compiling a list of plant species successfully used for similar habitat enhancement plantings and the ecological requirements, such as spacing, sunlight tolerances, depth of planting, and appropriate planting depths and flooding regimes, for these species. These data, in the form of published reports for reference, planting lists, planting plans, and specification documents, will be stored in the project directory and will be available to all staff throughout the project.

Gomez and Sullivan requested New York State Heritage Program (NYSHP) for information regarding the presence of rare, threatened, or endangered (RTE) species at the project site in July 2017. NYSHP responded on July 21, 2017 and October 17, 2017 (C. Lutz, personal communication, July 21, 2017 and October 17, 2017) (Appendix A). The species documented in the vicinity of the project are shown on Table 2.1-2. The only botanical RTE species was green rock-cress (*Boechera missouriensis*). The record for this species was from 1960, prior to the construction of Interstate 787 along the Hudson River. Construction of the Interstate 787 significantly changes the riparian and shoreline habitat in Watervliet and Troy and the habitat for green rock-cress was likely lost.

Gomez and Sullivan contacted the National Marine Fisheries Service (NMFS) over the phone to ask for more information regarding the presence of shortnose sturgeon in the vicinity of the project and spoke with Edith Carson of the protected resources office (E. Carson, personal communication, November 3, 2017). Ms. Carson said that there are shortnose and Atlantic sturgeon in the river adjacent to Hudson

Shores Park. Therefore, any work done below the mean high water elevation would require consultation with NMFS.

Name	Species	Туре	NYS Listing	Federal Listing
Shortnose sturgeon	Acipenser brevirostrum	Animal	Endangered	Endangered
Cobra clubtail	Gomphus vastus	Animal	Unlisted	Critically Imperiled in NYS
Alewife floater	Anodonta implicata	Animal	Unlisted	Critically Imperiled in NYS
Green rock-cress	Boechera missouriensis	Plant	Threatened	Imperiled in NYS

 Table 2.1-2. State or Federally Listed Species in the Vicinity of the Project Area





Preliminary Design of a Sustainable Shoreline at the Hudson Shores Park Figure 2.1-1: Existing GIS Data

0 50 100 200 Feet













### 2.2 Topographic Survey

A 1-foot interval topographic survey of the shoreline and slope adjacent to the pavilion was conducted. This survey data has been supplemented with existing 2-foot interval LiDAR data for the remainder of the site.

The pavilion section of the site was chosen for the detailed survey since it was determined during the site visit with stakeholders that this area would be a good candidate to provide access to the shore. The topographic survey is presented on sheet V101 of the Preliminary Design drawings in Appendix B.

### 2.3 Ecological and General Site Conditions

The on-site project kick-off meeting was held on October 20, 2017. The meeting was attended by representatives from NEIWPCC, NYSDEC, NYSDOS, Gomez and Sullivan, and Weston and Sampson. A field evaluation was conducted by Gomez and Sullivan.

The ecological and general site assessment includes the following: general descriptions of the plant communities, GPS point collection for discrete invasive plant species stands, animal sightings, identification of potential wetlands, observations of adjacent aquatic habitats, an evaluation of bank stability and areas in need of shoreline stabilization, and investigation for the presence of rare species' habitat. GIS data are saved in the project-specific geodatabase. Photographs were taken to support field notes and GPS data.

### 2.3.1 Plant communities

The plant communities at Hudson Shores Park consists of Riprap/Artificial Shore (Edinger, 2014) as a buffer of trees, shrubs, woody vines, and herbs growing through a mix of rip-rap and soil along the Hudson River and Mowed Lawn (Edinger, 2014) with landscape trees and walking paths. The mowed lawn was largely outside of the project area. These communities are shown in Figure 2.3.1-1. No uncommon native plant communities that will require specific protection from construction and invasive species treatment were observed.





at the Hudson Shores Park Figure 2.3.1-1: Plant Communities

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### 2.3.2 Invasive Plant Species

For the purpose of this report, invasive species will refer to plant species listed on NYSDEC's 6 NYCRR Part 575 Prohibited and Regulated Invasive Species list (2014) or are listed as invasive by Capital-Mohawk Partnership for Invasive Species Management (Capital-Mohawk PRISM) (Capital-Mohawk PRISM, 2016a) or the New York Department of Transportation (NYSDOT, n.d.). The term "non-native" refers to species that are listed as non-native to New York State in the New York State Flora Atlas (Weldy *et al.*, 2017). Invasive species were wide spread throughout the Hudson Shores Park riparian and shoreline vegetation. Most of these species are not dominant and are not growing in discrete stands. Invasive species Asiatic bittersweet (*Celastrus orbiculatus*), common buckthorn (*Rhamnus cathartica*), and tree of heaven (*Ailanthus altissima*) were dominant plants along the entire shoreline, as shown in Figure 2.3.2-1. They were not growing in monoculture stands. One discrete, monoculture stand of giant knotweed (*Reynoutria sachalinensis*), one discrete, monoculture stand of Canada thistle (*Cirsium arvense*), and three discrete, monoculture stands of phragmites (*Phragmites australis*) were present within the park. Only one of the phragmites stands was within the project area. These stands are shown in Figure 2.3.2-1 and in the photos below. Invasive and non-native species that were observed throughout the shoreline are listed on Table 2.3.2-1.

This project will be focused on only part of the Hudson Shores Park riparian and shoreline area. The size and location of the focus areas allow for project goals to be met within budget and timeline limitations. Therefore efficient and effective treatment of invasive plants should only focus on the species that are growing in discrete stands, giant knotweed, Canada thistle, and phragmites. All three of these species are considered Tier 3 by Capital-Mohawk PRISM. This means that these species are, "likely too widespread for eradication, but low enough abundance to think about regional containment." The management strategy throughout the Capital-Mohawk PRISM region is to, "to slow the spread since many surrounding regions could be at risk if left unattended management goal for these species is to contain their spread." (Capital-Mohawk PRISM, 2016b)

Containment of the invasive species that are growing continuously throughout the site is not feasible for this project. These species would quickly reestablish in the project area following treatment as they are present throughout the vegetation adjacent to the project site.

Common name	Species	Status	Capital-Mohawk Rank
Asiatic bittersweet	Celatrus orbiulatus	non-native, invasive	Tier 3 (Containment)
bittersweet nightshade	Solanum dulcamara	non-native	not ranked
black alder	Alnus glutinosa	non-native	not ranked
broad-leaf dock	Rumex obtusifolius	non-native	not ranked
Canada thistle	Cirsium arvense	non-native, invasive	Tier 3 (Containment)
garlic mustard	Alliaria petiolata	non-native, invasive	Tier 3 (Containment)
honey locust	Gleditsia triacanthos	non-native	
giant knotweed	Reynoutria	non-native, invasive	Tier 3 (Containment)
	sachalinensis		
mugwort	Artemesia vulgaris	non-native, invasive	Tier 3 (Containment)
multiflora rose	Rosa multiflora	non-native, invasive	Tier 3 (Containment)
Norway maple	Acer platanoides	non-native, invasive	Tier 3 (Containment)
Phragmites	Phragmites australis	non-native, invasive	Tier 3 (Containment)
purple loosestrife	Lythrum salicaria	non-native, invasive	Tier 3 (Containment)
teasel	Dipsacus lacinatus	non-native, invasive	Tier 3 (Containment)

Table2.3.2-1. Invasive and Non-native Plant Species Growing in Hudson Shores Park Riparian Area

Preliminary Design of a Sustainable Shoreline at the Hudson Shores Park in the City of Watervliet, NY

Common name	Species	Status	Capital-Mohawk Rank
tree of heaven	Ailanthus altissima	non-native, invasive	Tier 3 (Containment)
yellow iris*	Iris pseudoacorus	non-native, invasive	

Target species are indicated in bold font.

\* Plants could not be identified to species due to phenology. Assumed to be yellow iris.





Preliminary Design of a Sustainable Shorelir at the Hudson Shores Park Figure 2.3.2-1: Invasive Plant Species Stands

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Preliminary Design of a Sustainable Shoreline at the Hudson Shores Park Figure 2.3.2-1: Invasive Plant Species Stands 0 12.5 25 50

 Feet

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Figure 2.3.2-2. Knotweed Stand Near Hudson Shores Park Kayak Launch



Figure 2.3.2-3. Thistle Stand Near Hudson Shores Park Boat House



Figure 2.3.2-4. Phragmites Stand Near Gangway to Floating Restaurant

### 2.3.3 Animal Sighting

No animals or animal signs were observed during the ecological and general site assessment.

### 2.3.4 Potential Wetlands

No potential wetlands other than the Hudson River were observed at Hudson Shores Park. Gomez and Sullivan staff confirmed this during the field assessment using the definitions and the guidelines in the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0) (USACE, 2012). Soil samples were not taken.

### 2.3.5 Observations of Adjacent Aquatic Habitats

No emergent aquatic vegetation was growing within the project area.

### 2.3.6 Evaluation of Bank stability and Areas in Need of Shoreline Stabilization

GPS points were collected along the shoreline in areas where the shoreline appeared moderately unstable or unstable. These points are shown in Figure 2.3.6-1 and Appendix C.

### 2.3.7 Investigation for the Presence of Rare Species' Habitat

The field crew assessed the entire shoreline for natural rock slopes that could provide habitat for green rockcress (*Boechera missouriensis*). No appropriate habitat was observed on the site. No investigations were done for RTE fish species.

### 3 PRELIMINARY PLANS

### 3.1 Land Use Areas

Based on a combination of stakeholder input and sound engineering judgement, four distinct usage areas have been identified for the site. The opportunities for improvements and enhancements for these areas are discussed below, from the north to the south end of the site.

<u>Environmental Resource Area</u> – This area begins at the north end of the park and extends to approximately the north end of the pavilion. The proposed work plan will leave this area untouched as the shoreline and embankment appear stable. Although invasive species, particularly Asiatic Bittersweet, Common Buckthorn, and Tree of Heaven, are present, the area is not utilized and therefore is not a priority for improvement.

Lawn and Viewshed Area – This highly used area includes the existing pavilion and extends to the northern gangway entrance to the seasonal barge and will be treated for invasive species. As much as possible, the existing slope will be cut back to provide a more gradual embankment, which will be finished with boulder gardens planted with native shrubs, vines and perennials. Additionally, a proposed stonedust pathway and stone staircase with a wooden railing will provide access to the shoreline in this area.

<u>Forest Area</u> - This area is between the north gangway and the bridge overpass and will also be left untouched. The shoreline and embankment appear stable. Although invasive species are present in this area, there are multiple stands of native vegetation which would likely be harmed by regrading. It is not utilized, aside from elevated gangways to access the existing seasonal barge, and therefore does not lend itself well to improvement.

<u>Boat and Fishing Recreation Area</u> – This area is between the bridge overpass and the south end of the park. The non-motorized boat launch and fishing pier is located in this section. In addition to other invasive species in this vicinity, there is a large stand of knotweed that is proposed to be removed. Staked native vegetation and vegetated rip-rap will replace the removed invasive species. Additionally, the existing paved walking path will be extended to the entrance of the pier to provide ADA access.

In all areas where invasive species are to be removed, the construction contract will require two additional years of follow-up treatment and plantings maintenance to help to ensure control of the vegetation.

### 3.2 Preliminary Plans, Cost Estimate, and Renderings

Preliminary design plans and selected site renderings are located in Appendix B. The preliminary cost estimate for the work described above is currently \$486,000. This includes a 25% contingency allowance and an additional 10% for construction management.

As described in Section 3.1, in order to provide a project meeting the requirements of the City, only specific areas of the site were selected for improvements. The lawn and viewshed area containing the pavilion is a popular area within the park. The vegetation on the embankment including invasive species is cut back on a yearly basis by City personnel. Trimmings are disposed of on site, in a remote area at the southern tip of the park. There are currently several steep, uneven social paths from the top of the embankment to the shoreline. By regrading the slope to a less steep, more stable embankment and providing a designated access path to the shore, several main goals will be accomplished. First, in the process of regrading, the invasive species present in this area will be removed, disposed of properly and replaced with new native low-growing plantings that will enhance and preserve the viewshed. Overall, the proposed project will reduce the vegetation maintenance required by the City and the additional potential spread of invasive species will be lessened since stockpiling of the clippings will be unnecessary.

Providing a single designated access point to the shore will allow for a safer solution for people to reach the shore and serve to reduce erosion potential elsewhere on the embankment caused by multiple bare footpaths.

The boat and fishing recreation area was selected as a second focus point since it is also a highly used area within the park. The addition of a smooth surface path connecting the existing walkway to the dock will provide greater access to a range of patrons. Removal of invasive species and replacement with native plants in the southern portion of the shoreline will provide a showcase area within the park. It will offer an opportunity for the City to determine whether removal of invasive species throughout the remainder of the park offers an achievable and economically beneficial solution for reducing maintenance and increasing the environmental character of the park.

### 4 FINDINGS AND RESPONSES TO REGULATORY ISSUES

A pre-application meeting was held on December 21st at the Watervliet City Hall. Attendees included representatives from the City, US Army Corps of Engineers (USACE), the NYS Department of Environmental Conservation (NYSDEC) and the NYS Department of State (NYSDOS).

A review of plans was conducted and questions and concerns from the Stakeholders were discussed. The major issues that were raised are addressed below.

- 1. Will native trees remain on site? *The project aims to retain the large trees uphill of the work areas and as many native trees on the slopes as feasible. Existing willows along the shoreline will also be preserved.*
- 2. Will submerged aquatic vegetation (SAV) be introduced as part of the project? *Given the combination of rocky and generally inorganic soils within and below the tidal zone elevations and the presence of ice scour along the shoreline, it is not recommended that SAVs be installed.*
- 3. What is the mean high water elevation? Using data from the NOAA Tides & Currents Datums and preliminary conversations with the USACE, it was determined that 3.4ft is considered the mean high water elevation. We will follow up with USACE to confirm that this is accurate.
- 4. In the cobble and rip-rap areas near the kayak boat launch there is limited void space. How will plantings be incorporated? It is anticipated that hand work will be required to open the voids where plantings and soils will be installed to provide adequate space for establishment.
- 5. The sea-level rise projections should be shown in the plans and any measures required to protect the project elements should be incorporated. *The expected seal level elevations will be included in the revised plans.*
- 6. Provide more detail regarding the steps of the stairs and the steepness of the regraded slope. *Cross sections of the proposed steps and slope will be provided in the revised plans.*
- 7. Will additional stone be brought in to construct the boulder gardens near the stairs? It is anticipated that the existing rip-rap and stone currently onsite will be adequate to be relocated and utilized for the construction of the proposed boulder gardens. These structures will help to reduce water runoff down the slope and provide additional stability to the embankment.
- 8. Consider using a more porous material for the path connecting the walkway to the dock. *Options other than typical asphalt will be investigated.*

- 9. How will construction affect the accessibility of the park to the public? During the actual construction, such as paving and regrading, the adjacent sites may require closure to the public. However, it is expected that these will be small timeframes, only a few days at a time. Ideally it will be possible to schedule construction prior to or after times of increased usage, such as early spring or late fall. Parking is not expected to be impacted given the size of the exiting lots. The construction period will depend on the contractor's schedule.
- 10. How will the contractor treat invasive species? *Prior to construction, the contractor will submit means and methods for approval by the City. The contract will include the requirement of two additional years of invasive species treatment and plant maintenance by the contractor.*
- 11. Will construction require machinery to be operated in the water? *The work will be completed in the dry.*
- 12. How should permitting proceed? Forms and required documentation should be completed as much as feasible. It is understood that modification may be required in the case that the plans change. Permits may need to be renewed if the construction does not occur within the timeframes indicated by the specific permits, however this is not expected to be a laborious or time-consuming process.
- 13. The NYSDEC stated that the stream classification will impact the permits required. If the river is a class C, then their jurisdiction is mean high water. If it is a class B then the NYSDEC has jurisdiction of the streambanks.
- 14. The USACE stated that if all work, including installation of erosion control measures, will be completed above mean high water they do not have jurisdiction. If requested, they are willing to document this finding with a letter.
- 15. The NYSDOS stated that if no Federal permits are required, then they will only need to conduct a State level coastal consistency review.
- 16. The USACE and the NYSDEC indicated that they would like to visit the project site to further understand the project and confirm permitting requirements. *Gomez and Sullivan will arrange a meeting at the site with the agencies in January.*

It is currently presumed that the proposed shoreline stabilization measures along the western shore of the Hudson River will have minimal environmental permitting implications as they are located above the mean high water. Permitting or authorization may be limited to the NYSDEC and the NYSDOS.

### 5 **REFERENCES**

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   New York Flora Association, Albany, New York.

APPENDIX A: NEW YORK NATURAL HERITAGE PROGRAM AND IPAC DOCUMENTS

### **Erin Redding**

Lutz, Colleen M (DEC) <colleen.lutz@dec.ny.gov></colleen.lutz@dec.ny.gov>
Tuesday, October 17, 2017 8:58 AM
Erin Redding
Michele Stottler; Jennifer Wesolowski
RE: Rare Plant Data Request

Dear Erin,

Thank you for contacting us. Many of our historical records, such as the record for Green rock-cress (*Boechera missouriensis*), have limited information about the site location and/or distribution of the species observation. These records pre-date 1979 and their continued presence at the site is unknown. They tend to be mapped with low accuracy and over broader areas, simply because exact locational data was not provided when the observation was documented.

When I reviewed the map and EO (element occurrence), the directions to this record are listed as "Watervliet; west side" and encompasses the entire project site and more. I wish I had more details about the observation; but they don't seem to exist in the database.

If you are looking for more specific information about the site it might be worth contacting the Region 4 office, the phone number is included on our report. Additionally, you might be interested in our conservation guide on Green rock-cress: <u>http://www.acris.nynhp.org/guide.php?id=8886</u> which includes conservation and management practices for this species.

If you have any additional questions, please feel free to contact me.

Sincerely,

Colleen Lutz

Assistant Biologist NY Natural Heritage Program 625 Broadway, 5th Floor Albany, NY 12233-4757 www.nynhp.org 518-402-8913

The New York Natural Heritage Program is a partnership between the New York State Department of Environmental Conservation and the State University of New York College of Environmental Science and Forestry.

From: Erin Redding [mailto:eredding@gomezandsullivan.com]
Sent: Monday, October 16, 2017 5:01 PM
To: Lutz, Colleen M (DEC) <Colleen.Lutz@dec.ny.gov>
Cc: Michele Stottler <mstottler@gomezandsullivan.com>; Jennifer Wesolowski <jwesolowski@gomezandsullivan.com>
Subject: Rare Plant Data Request

### ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello Colleen,

We are working as environmental and engineering consultants for a "Sustainable Shorelines" demonstration project at the Hudson Shores Park in the City of Watervliet. The purpose of the project is to create a shoreline treatment that resists erosion, enhances accessibility and recreational use, and improves habitat value.

I am contacting you in regard to the Natural Heritage data request we submitted in June and your response dated July 21, 2017. When we last reached out to you, we were pursuing this work. We now have a contract in place with New England Interstate Water Pollution Control Commission and NYSDEC. We understand that there is a rare plant, green water-cress (*Boechera missouriensis*) in the vicinity of the project site. Are there more specific location data available for this species within Watervliet? If so, can Natural Heritage share these data with Gomez and Sullivan or with our client, New England Interstate Water Pollution Control Commission and NYSDEC?

Sincerely,

Erin Redding Certified Ecologist (Ecological Society of America) Gomez and Sullivan Engineers, D.P.C. 1961 Wehrle Dr. Suite 12 Williamsville, NY 14221 716-250-4960 eredding@gomezandsullivan.com GOMEZ AND SULLIVAN

GSE CONFIDENTIALITY NOTICE: This email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you are not the intended recipient, please do not read or review the content and/or metadata and do not disseminate, distribute or copy this communication. Anyone who receives this message in error should notify the sender (eredding@gomezandsullivan.com) immediately by return e-mail and delete it from his or her computer. APPENDIX B: PRELIMINARY DESIGN DRAWINGS

# PRELIMINARY DESIGN OF A SUSTAINABLE SHORELINE AT THE HUDSON SHORES PARK IN CITY OF WATERVLIET, NY

PREPARED FOR:

NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION 650 SUFFOLK STREET **SUITE 410** LOWELL, MA 01854

# **DRAWINGS - PRELIMINARY 30% DESIGN**

# NOT TO BE USED FOR CONSTRUCTION

DF	RAWING NO.	TITLE
GC	001	COVER SHEET
G1	01	GENERAL NOTES
V1	01	EXISTING CONDITIONS
CO	01	DEMOLITION PLAN
C1	01	INVASIVE SPECIES REMOVAL
C2	.01	PROPOSED SLOPE REGRADING
L1	00	LANDSCAPE PLAN 1
L1	01	LANDSCAPE PLAN 2
L1	02	LANDSCAPE PLAN 3
L1	03	LANDSCAPE PLAN 4
L1	04	LANDSCAPE PLAN 5
L1	05	LANDSCAPE PLAN 6
C5	600	<b>EROSION &amp; SEDIMENT CONTROL DETAILS</b>
C5	01	PLANTING DETAILS
C5	02	PLANTING & SITE DETAILS

## **DIG-SAFE**

CONTRACTOR SHALL CALL DIG-SAFE CALL CENTER AT 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO STARTING ANY EXCAVATION. SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS ARE NOT TO BE INCLUDED IN THE REQUIRED 72 HOUR NOTICE.

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PROJECT LOCATION:





NARY SIGN

OR **JCTION** 



1 Winners Circle, Suite 130, Albany, New York 12205 Tel: (518) 463-4400 (800) SAMPSON

www.westonandsampson.com



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**Department of** Environmental Conservation



# HUDSON SHORES PARK SUSTAINABLE SHORELINE DESIGN

# COVER

PREPARED BY: CHJ/JSW

DWG.NO:

G001

SCALE: AS NOTED

**GENERAL NOTES** 

- 1. THE CITY OF WATERVLIET (THE CITY) WILL DESIGNATE AN AUTHORIZED REPRESENTATIVE TO REPRESENT THE CITY DURING THE CONSTRUCTION PHASE. THIS AUTHORIZED REPRESENTATIVE MAY BE CITY STAFF OR A CONSULTANT. THE CITY'S STAFF AND/OR AUTHORIZED REPRESENTATIVES ARE COLLECTIVELY REFERRED TO HEREIN AS THE CITY.
- 2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FULFILL ALL REQUIREMENTS OF THE CONTRACT AND ALL AMENDMENTS THERETO, INCLUDING
- BUT NOT LIMITED TO, GENERAL CONDITIONS, SPECIAL CONDITIONS, SPECIFICATIONS AND THESE DRAWINGS IN ORDER TO COMPLETE THIS PROJECT.
   THE CONTRACTOR SHALL ASSUME THERE WILL BE A KICKOFF MEETING IN THE WATERVLIET AREA AT THE START OF THE PROJECT (THE PRIME CONTRACTOR AND SUBCONTRACTORS SHALL ATTEND) AND WEEKLY UPDATE CONFERENCE CALLS DURING THE TREATMENT PROCESS (SUBCONTRACTORS SHALL ATTEND AS NEEDED). DAILY FIELD REPORTS SHALL BE DELIVERED TO THE CITY FOR REVIEW AND ACCEPTANCE.
- 4. PRIOR TO THE COMMENCEMENT OF THE WORK, THE CONTRACTOR SHALL SUBMIT A HEALTH AND SAFETY PLAN DETAILING THE HEALTH AND SAFETY SYSTEMS AND PROCEDURES WHICH WILL APPLY DURING THE TERM OF THE CONTRACT. THE HEALTH AND SAFETY PLAN WILL BE REVIEWED BY AND WILL BE SUBJECT TO APPROVAL BY THE CITY.
- 5. THE CONTRACTOR SHALL HOLD DAILY SAFETY MEETINGS BEFORE THE START OF WORK.
- 6. ALL WORK SHALL BE COORDINATED AND PERFORMED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
- 7. THE CITY IS AUTHORIZED TO ISSUE STOP WORK ORDERS DIRECTING THAT CONSTRUCTION ACTIVITIES CEASE IMMEDIATELY. THE CONTRACTOR SHALL, EFFECTIVE IMMEDIATELY UPON STOP WORK ORDER ISSUANCE, CEASE TO ISSUE ANY FURTHER ORDERS AND/OR SUBCONTRACTS FOR MATERIALS OR SERVICES IN SUPPORT OF THIS CONTRACT. THE CONTRACTOR SHALL IMMEDIATELY COMPLY WITH THE ORDER AND TAKE ALL REASONABLE STEPS TO MINIMIZE THE INCURRENCE OF COSTS ALLOCABLE TO THE WORK COVERED BY THIS ORDER DURING THE PERIOD OF WORK STOPPAGE.
- 8. ALL MATERIALS SHALL BE PROVIDED AND WORK SHALL BE PERFORMED IN CONFORMANCE WITH THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION OFFICE OF ENGINEERING STANDARD SPECIFICATIONS DATED MAY 1, 2008, AS AMENDED, AND ALL ADDENDA THERETO, UNLESS NOTED OTHERWISE.
- 9. THE CITY SHALL OBTAIN AND PAY FOR ALL RELEVANT LOCAL, STATE AND/OR FEDERAL PERMITS PRIOR TO THE START OF CONSTRUCTION, INCLUDING HERBICIDE TREATMENT PERMITS.
- 10. THE CONTRACTOR SHALL COMPLY WITH ALL CONDITIONS CONTAINED IN RELEVANT PERMITS ISSUED FOR THIS PROJECT.
- 11. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR ANY TEMPORARY FACILITIES.
- 12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PERFORMANCE AND COMPLETION OF THE WORK AND SHALL RETAIN COMPETENT STAFF AT THE SITE AT ALL TIMES WHEN WORK IS IN PROGRESS.
- 13. NO WETLANDS SHALL BE DISTURBED UNLESS INDICATED ON THE PLANS AND ALL APPROPRIATE PERMITS ARE IN PLACE.
- 14. SHOULD HAZARDOUS/UNSUITABLE MATERIAL BE ENCOUNTERED, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY THE CITY. THE CONTRACTOR WILL BE RESPONSIBLE TO NOTIFY THE APPROPRIATE REGULATORS AND ADDRESS REGULATORY REQUIREMENTS AND/OR GUIDANCE INCLUDING CALLING THE NYS SPILL HOTLINE AT 1-800-457-7362 IF NEEDED.
- 15. PRECAUTIONS SHALL BE TAKEN BY THE CONTRACTOR TO PREVENT ANY IMPACTS TO AREAS OUTSIDE OF THE LIMITS OF PROPOSED WORK. THE CONTRACTOR SHALL SUBMIT TO THE CITY FOR APPROVAL ANY IMPACTS TO AREAS OUTSIDE THE LIMITS OF PROPOSED WORK AT LEAST TWO WEEKS IN ADVANCE OF THE PROPOSED IMPACT. IF THE CONTRACTOR'S ACTIVITY ADVERSELY AFFECTS ANY AREA OUTSIDE THE LIMIT OF PROPOSED WORK, THE CONTRACTOR SHALL IMMEDIATELY RESTORE THE AREA TO ITS PRE-CONSTRUCTION CONDITION.
- 16. SURVEY DATA ARE BASED ON 1998 LIDAR DATA AND NOVEMBER 2017 TOPOGRAPHIC SURVEY BY WESTON AND SAMPSON. COORDINATES SHOWN ARE EXPRESSED IN U.S. SURVEY FEET AND REFERENCED TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), NEW YORK STATE PLANE COORDINATE SYSTEM.
- 17. ELEVATIONS ARE SHOWN IN NORTH AMERICAN VERTICAL DATUM 88.
- 18. THE HUDSON RIVER PARK PORTION OF THE SURVEY IS IN ZONE AE, AN AREA SUBJECT TO INUNDATION BY THE 100-YEAR FLOOD WITH THE BASE FLOOD ELEVATION DETERMINED. REFER TO FLOOD INSURANCE RATE MAP NO. 36001C0202D, PANEL NO. 202 OF 434 WHICH BEARS AN EFFECTIVE DATE OF MARCH 16, 2015.
- 19. THE CONTRACTOR SHALL BE ADVISED THAT THE PROJECT IS LOCATED IN AN AREA PRONE TO FLOODING AND SEVERE WEATHER IS KNOWN TO OCCUR AT THIS LOCATION. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT THE PROJECT WHILE UNDER CONSTRUCTION, WHICH MAY INCLUDE SEQUENCING THE PROJECT TO PROTECT TEMPORARY AND PERMANENT STRUCTURES. THIS INCLUDES, BUT IS NOT LIMITED TO, PROTECTION FROM STORMS, FLOODS, BOAT WAKES, CURRENT, WIND, AND RECREATIONAL USERS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PROTECTION OF THE PROJECT SITE, TEMPORARY FACILITIES, FALSEWORK, EQUIPMENT, PERSONNEL, WORK, MATERIALS, AND OTHER PROPERTIES, BOATS, THE PUBLIC, OR INDUSTRY. FALSEWORK SHALL BE REMOVED IF WEATHER IS ANTICIPATED TO THREATEN THE PROJECT, THE HUDSON RIVER, OR OTHER PROPERTY.
- 20. NO ADDITIONAL PAYMENT WILL BE MADE FOR WORK ACTIVITIES IMPACTED DUE TO FLUCTUATIONS IN THE WATER SURFACE ELEVATIONS. NO ADDITIONAL PAYMENT WILL BE MADE FOR INCREASED POLLUTION PREVENTION, FALSEWORK, OR TEMPORARY FACILITIES REQUIRED DUE TO VARYING WATER SURFACE ELEVATIONS.
- 21. THE CONTRACTOR SHALL PREVENT THE TRANSPORT OF INVASIVE PLANT MATERIAL TO AND FROM THE SITE. EQUIPMENT, VEHICLES, PERSONAL GEAR, AND IMPORTED MATERIALS SHALL BE CLEAN AND FREE OF PLANT MATERIAL. ALL EQUIPMENT SHALL BE CLEANED USING PRESSURE WASH PRIOR TO SITE MOBILIZATION. THE EQUIPMENT WILL BE EXAMINED AND PHOTOGRAPHED BY THE CITY UPON ARRIVAL AT THE SITE. IF EQUIPMENT IS NOT ACCEPTABLE, THE CONTRACTOR WILL BE REQUIRED TO CONDUCT ADDITIONAL CLEANING PRIOR TO INITIATING SITE ACTIVITIES.
- 22. THE CONTRACTOR IS RESPONSIBLE TO DESIGN AND INSTALL ALL TEMPORARY FACILITIES SO THAT THEY REMAIN IN PLACE AND FUNCTIONING. ALL TEMPORARY FACILITIES SHALL BE LOCATED TO AVOID IMPACTS TO SUBMERGED AQUATIC VEGETATION (SAV), WETLANDS, AND OTHER SENSITIVE RESOURCES.
- 23. ACCESS TO THE SITE WILL BE COORDINATED WITH THE CITY. THE USE OF VEHICLES ON THE SITE WILL FOLLOW GUIDELINES PROVIDED BY THE CITY.
- 24. ONLY MATERIALS ACCEPTABLE TO THE CITY SHALL BE USED IN THE FILL MIXTURE OR THE SOIL CHOKING OF THE RIP RAP.
- 25. IF EXCAVATED MATERIALS ARE TO BE HAULED, THE MATERIAL MUST BE COMPLETELY STABILIZED AND TIED DOWN TO PREVENT DISCHARGE INTO THE HUDSON RIVER. THE CONTRACTOR SHALL NOT DISCHARGE EXCAVATED MATERIAL WITHIN THE HUDSON RIVER.
- 26. TEMPORARY STOCKPILING OF EXCAVATED MATERIALS ON APPROVED DESIGNATED AREA IS ACCEPTABLE. STOCKPILES SHALL BE PLACED, GRADED, AND SHAPED FOR PROPER DRAINAGE. COVER TO PREVENT WIND-BLOWN DUST. PROVIDE APPROVED SILT SOCKS OR OTHER CONTAINMENT APPROVED BY THE CITY IN ADVANCE OF PROJECT ACTIVITIES TO PREVENT WATERBORNE SEDIMENTS. TEMPORARY STOCKPILING SITES MUST HAVE AN APPROVED EROSION AND SEDIMENT CONTROL PLAN, IF REQUIRED BY FEDERAL, STATE, OR LOCAL REGULATION.

### SOIL AND EROSION CONTROL NOTES

- 1. ALL MATERIALS SHALL BE PROVIDED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NEW YORK STATE STANDARDS FOR EROSION AND SEDIMENT CONTROL.
- 2. THE CONTRACTOR SHALL INSTALL ALL REQUIRED POLLUTION CONTROL DEVICES PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR THEIR MAINTENANCE, REPOSITIONING AND REMOVAL UPON COMPLETION OF WORK.
- 3. FILTER SOCK SHALL BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS. INSTALLATION LOCATIONS SHALL BE APPROVED BY THE CITY. AT TIME OF REMOVAL, THE STAKES AND ANY OTHER ANCILLARY MATERIALS ASSOCIATED WITH THE FILTER SOCK SHALL BE REMOVED FROM THE SITE.
- 4. ALL EXPOSED AREAS, INCLUDING STOCKPILES, THAT WILL BE LEFT EXPOSED MORE THAN FOURTEEN (14) DAYS, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, WILL IMMEDIATELY RECEIVE TEMPORARY SEEDING. MULCH, WATER AND ANCHOR AS NECESSARY TO ESTABLISH GRASS AND PREVENT LOSS TO WIND. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH SMALL GRAIN STRAW AT A RATE OF TWO (2) TONS PER ACRE, IN ACCORDANCE WITH STATE STANDARDS.
- 5. PERMANENT VEGETATION TO BE SEEDED ON ALL EXPOSED AREAS IMMEDIATELY AFTER FINAL GRADING. STRAW MULCH TO BE USED FOR PROTECTION UNTIL SEEDING IS ESTABLISHED.
- 6. SHOULD CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE WILL BE SPRINKLED UNTIL THE SURFACE IS WET, TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED, OR MULCH SHALL BE APPLIED IN ACCORDANCE WITH STATE STANDARDS FOR EROSION CONTROL.
- 7. ALL SOIL WASHED, DROPPED, SPILLED, OR TRACKED OUTSIDE THE LIMITS OF DISTURBANCE OR ONTO PUBLIC RIGHTS-OF-WAY SHALL BE REMOVED IMMEDIATELY.
- 8. STOCKPILE AND STAGING LOCATIONS SHALL BE APPROVED BY THE CITY.

9. THE CONTRACTOR SHALL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE, AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION THAT HAVE NOT BEEN FINALLY STABILIZED, STRUCTURAL PRACTICES, OTHER CONTROLS, AND AREAS WHERE VEHICLES EXIT THE SITE AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF ANY STORM THAT PRODUCES 0.5 INCHES OR MORE OF RAINFALL AT THE SITE. WHERE SITES HAVE BEEN FINALLY STABILIZED, SUCH INSPECTION SHALL BE CONDUCTED AT LEAST ONCE A MONTH.

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### CLEARING AND GRUBBING

- I. THE CONTRACTOR AT ALL TIMES SHALL KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY ITS OPERATION. GOOD HOUSEKEEPING PRACTICES SHALL BE MAINTAINED ON A CONTINUOUS BASIS FROM WORK SITE TO WORK SITE. DISPOSAL OF ANY WASTE MATERIALS ON THE CONSTRUCTION SITE IS PROHIBITED.
- 2. THE CONTRACTOR SHALL NOT DISTURB SOIL (CLEAR, GRUB, GRADE, EXCAVATE, OR DEWATER) IN AREAS OUTSIDE OF THOSE SPECIFIED ON THE PLAN UNLESS APPROVED BY THE CITY.
- 3. THE CONTRACTOR WILL PROVIDE EMPLOYEE FACILITIES AND WASTE DISPOSAL.
- 4. ALL COMBUSTIBLE WASTE MATERIALS SHALL BE PLACED IN COVERED METAL CONTAINERS AND PROMPTLY DISPOSED OF IN AN APPROVED MANNER AT AN APPROVED WASTE DISPOSAL FACILITY.
- 5. STORAGE AND/OR USE OF CHEMICALS, FUELS, OILS, GREASES, BITUMINOUS MATERIALS, SOLIDS, WASTE WASHINGS, AND CEMENT SHALL BE HANDLED AS TO PREVENT LEACHING OR SURFACE RUN-OFF INTO PUBLIC WATERS OR DRAINS. ALL APPROVED STORAGE AREAS FOR THESE MATERIALS MUST BE DIKED.
- 6. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND PROPER DISPOSAL OF ALL WASTE MATERIAL AND/OR DEBRIS (INCLUDING BUT NOT LIMITED TO INVASIVE-SPECIES PLANT DETRITUS). WASTE MATERIAL AND DEBRIS SHALL NOT BE RELEASED INTO THE RIVER OR BURNED. ALL WASTE MATERIAL AND DEBRIS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL LAWS AND OTHER APPLICABLE CODES, AT A LOCATION APPROVED BY THE CITY.
- 7. THE CONTRACTOR'S EQUIPMENT MUST BE FREE OF HYDRAULIC LEAKS. THE EQUIPMENT WILL BE MAINTAINED IN AN OPERATIONAL CONDITION AT ALL TIMES AND MAY BE INSPECTED BY THE CITY AT ANY TIME FOR HYDRAULIC LEAKS AND GENERAL CONDITION.

### WATER POLLUTION CONTROL NOTES

- 1. CARE SHALL BE TAKEN TO PROTECT THE WATER.
- 2. ALL WATER RESOURCES (I.E. GROUND AND SURFACE WATERS), INCLUDING ALL DRAINS, SHALL BE PROTECTED FROM LEACHING AND/OR RUN-OFF OF CHEMICAL POLLUTANTS, SOLID WASTES, AND CONSTRUCTION SITE DEBRIS.
- 3. EQUIPMENT, TOOLS AND TRUCKS USED IN THIS PROJECT SHALL BE CLEANED IN SUCH A MANNER AS TO PREVENT WASH WATER FROM ENTERING ANY WATER BODY.
- 4. SPILLAGE OF HAZARDOUS SUBSTANCES INTO THE WATERWAY IS PROHIBITED BY THE CLEAN WATER ACT OF 1977. MEASURES INCLUDING PROPER MAINTENANCE OF CONSTRUCTION EQUIPMENT, DESIGNATING FUEL/HAZARDOUS SUBSTANCES HANDLING AREAS TO ALLOW SPILLS TO BE CONTAINED BEFORE REACHING THE WATERWAY, INSTRUCTING PERSONNEL NOT TO DISPOSE OF OIL AND OTHER SUCH MATERIALS INTO DRAINS OR INTO THE WATERWAY DIRECTLY, AND OTHER NECESSARY PROCEDURES SHALL BE IMPLEMENTED PRIOR TO ANY CONSTRUCTION ACTIVITIES.
- 5. ABSORBENT MATERIALS SHALL BE RETAINED ONSITE IN THE EVENT THAT A SPILL OCCURS.



# HUDSON SHORES PARK SUSTAINABLE SHORELINE DESIGN

## **GENERAL NOTES**

PREPARED BY: CHJ/JSW

DWG.NO:

G002

SCALE: AS NOTED







INVASIVE AND NON-NATIVE SPECIES THAT ARE KNOWN TO BE ON THE SITE SHOWN IN THE TABLE BELOW. (PER 6 NYCRR PART 575 - PROHIBITED AND REGULATED INVASIVE

COMMON NAME	SPECIES
ASIATIC BITTERSWEET	Celatrus orbiulatus
BITTERSWEET NIGHTSHADE	Solanum dulcamara
BLACK ALDER	Alnus glutinosa
BROAD-LEAF DOCK	Rumex obtusifolius
CANADA THISTLE	Cirsium arvense
GARLIC MUSTARD	Alliaria petiolata
HONEY LOCUST	Gleditsia triacanthos
GIANT KNOTWEED	Reynoutria sachalinensi
MUGWORT	Artemesia vulgaris
MULTIFLORA ROSE	Rosa multiflora
NORWAY MAPLE	Acer platanoides
PURPLE LOOSESTRIFE	Lythrum salicaria
TEASEL	Dipsacus lacinatus
TREE OF HEAVEN	Ailanthus altissima
YELLOW IRIS*	Iris pseudoacorus

STEM INJECTION - HERBICIDE IS INJECTED DIRECTLY INTO THE STEM OF AN HERBACEOUS PLANT. THIS METHOD MAY BE APPROPRIATE FOR TREATING THE KNOTWEED ON

PRIOR TO TREATMENT/ INVASIVE REMOVALS, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE OWNER'S REPRESENTATIVE AN INVASIVE SPECIES TREATMENT PLAN. AT A

TREATMENT APPLICATIONS, CONDUCTED BY THE CONTRACTOR, SHALL BE CONDUCTED BY A MINIMUM OF TWO PERSON TREATMENT CREW. ALL APPLICATORS SHALL BE NEW YORK STATE CERTIFIED COMMERCIAL PESTICIDE APPLICATORS (CATEGORY 5A AQUATIC VEGETATION CONTROL) AND/OR A CERTIFIED COMMERCIAL PESTICIDE TECHNICIAN.

CONTRACTORS SHALL UTILIZE SPECIFIC TREATMENT METHODS FOR EACH TARGET SPECIES. VARIOUS METHODS MAY NEED TO BE EMPLOYED FOR EACH SPECIES AS WELL (E.G. LOW VOLUME FOLIAR HERBICIDE APPLICATION FOR LARGER STANDS AND THE CUT AND TREAT METHOD FOR SMALLER STANDS). THE SEASONAL TIMING OF INVASIVE TREATMENT MAY VARY BY SPECIES AND THE DENSITY OF TREATMENT AREAS AS WELL. TREATMENTS TO BE APPLIED INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

LOW VOLUME FOLIAR TREATMENT - AN APPROPRIATE LOW VOLUME HERBICIDE MIXTURE APPLIED TO TARGETED PLANTS DURING FOLIAR SEASON. IT IS ASSUMED THAT LOW-VOLUME FOLIAR TREATMENTS WILL BE PRIMARILY APPLIED TO HERBACEOUS SPECIES AND TO TREE AND SHRUB SPECIES LESS THAN 10 FEET TALL. LOW VOLUME

CUT AND TREAT - CUTTING THE STEM OF THE PLANT, REMOVING THE CUTTINGS AND TREATING THE CUT STEM WITH AN HERBICIDE. THIS METHOD MAY BE APPROPRIATE FOR SMALL POPULATIONS THAT ARE VERY CLOSE TO DESIRABLE, NON-TARGET SPECIES. CUT AND TREAT SHALL PRIMARILY BE USED TO KILL WOODY SHRUBS AND TREES. THIS TREATMENT SHALL BE USED TO SELECTIVELY REMOVE BLACK ALDER AND TREE OF HEAVEN WHERE DIRECTED, AND MAY ALSO BE USED ON HONEYSUCKLE AND

**OTHER METHODS** - CONTRACTORS ARE ENCOURAGED TO PROVIDE RECOMMENDATIONS FOR OTHER TREATMENT METHODS E.G., HAND PULLING, HAND WICKING.

5. ALL CUT HERBACEOUS OR SUCKERING INVASIVE PLANT MATERIALS, SEEDS, BERRIES, AND RHIZOMES SHALL BE DISPOSED OF PROPERLY AT AN APPROVED FACILITY OFF-SITE. PLANT MATERIAL SHALL NOT BE BURNED. CARE SHALL BE TAKEN THAT NO MATERIAL IS RELEASED DURING TRANSPORTATION. CONTRACTOR SHALL PROVIDE HAULING/DISPOSAL

THE CONTRACTOR MUST INFORM CITY'S AUTHORIZED REPRESENTATIVE OF ITS INTENDED SCHEDULE AT ALL TIMES. WHILE IT IS RECOGNIZED THAT RAIN, WIND, AND OTHER VARIABLES MAY CAUSE SCHEDULES TO BE ADJUSTED, THE CONTRACTOR MUST INFORM CITY'S AUTHORIZED REPRESENTATIVE OF ITS INTENDED SCHEDULE ONE WEEK IN

7. THE CONTACTOR SHALL SECURE THE TREATMENT AREA AND POST PROPER NOTIFICATIONS INDICATING TREATMENTS BEING CONDUCTED, AS DIRECTED BY THE CITY.

THE CERTIFIED PESTICIDE APPLICATOR SHALL COMPLETE A DAILY PESTICIDE APPLICATION RECORD TO TRACK HERBICIDE APPLICATIONS UNDER THIS SCOPE. TREATMENT RECORDS SHALL CONTAIN, AT A MINIMUM, DATE, APPLICATOR, PRODUCT USED, DOSAGE RATE, AREA TREATED, METHOD OF APPLICATION, TARGET ORGANISM, AND PLACE OF APPLICATION. IN ADDITION TO THE DAILY TREATMENT RECORDS, THE CONTRACTOR MUST DOCUMENT ALL EQUIPMENT MAINTENANCE EVENTS THAT OCCUR DURING TREATMENT ACTIVITIES. A COPY OF THESE TREATMENT AND MAINTENANCE RECORDS SHALL BE SUBMITTED TO CITY IN BOTH HARDCOPY AND ELECTRONIC FORMAT (PDF

MATERIAL SAFETY DATA SHEETS FOR ALL CHEMICALS ON SITE SHALL BE POSTED ON-SITE AND REMAIN ACCESSIBLE AT ALL TIMES DURING TREATMENT.

THE CONTRACTOR IS RESPONSIBLE FOR ADHERING TO ALL FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO THE PURCHASE, TRANSPORT, APPLICATION, AND DISPOSAL OF HERBICIDES. CONTRACTOR IS RESPONSIBLE FOR SECURING ANY PERMITS REQUIRED FOR THE PURCHASE, TRANSPORT, APPLICATION AND DISPOSAL OF HERBICIDES

11. THE PROJECT INVOLVES APPLICATION OF HERBICIDES IN AND ADJACENT TO A STATE-REGULATED WATERWAY AND AS SUCH, THE CONTRACTOR SHALL PROVIDE AND UTILIZE A GLYPHOSATE-BASED HERBICIDE THAT IS AUTHORIZED FOR USE IN AQUATIC APPLICATIONS AND IN NEW YORK STATE. THE CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S SPECIFICATIONS FOR MIXING, DILUTION, AND USE, INCLUDING SPECIFIC INSTRUCTIONS FOR TARGET VEGETATION. PERSONAL PROTECTIVE SAFETY EQUIPMENT AS REQUIRED PER

12. THE CONTRACTOR SHALL PROTECT THE ENVIRONMENT. THE CONTRACTOR IS RESPONSIBLE TO ASSURE THAT TREATMENT CREWS ABIDE BY ALL APPLICABLE ENVIRONMENTAL REGULATIONS, INCLUDING BUT NOT LIMITED TO FEDERAL, STATE AND LOCAL RULES GOVERNING POLLUTION AND THE PROTECTION OF PLANTS AND ANIMALS.

### SURVEY LEGEND

<u> </u>			
£	EDGE OF WOODS	oo	CHAIN LINKED FENCE
Str 2		ОНU	OVERHEAD UTILITY WIRES
	DECIDUOUS TREE	——— w ———	WATER LINE & WATER VALVE
NALU A	CONIFEROUS TREE		CURBING
â	SHRUB/BUSH	——— Е ———	UNDERGROUND ELECTRIC
Д	SIGN	SD	STORM MANHOLE (MHST)
	UTILITY POLE		CATCHBASIN (CB)
¤	LIGHT POLE	0	METAL POST/BOLLARD (BOL)
	HYDRANT	TF	TOP OF FRAME
<b>*</b> o	WATER SHUTOFF	Ē	ELECTRIC MANHOLE (MHE)
69	SANITARY MANHOLE (MHSA)	) M	MISC. MANHOLE (MH)
$\rightarrow$	GUY WIRE	С П	TELEPHONE MANHOLE (MHT)
· · <u> </u>	EDGE OF WATER	10	MAJOR CONTOUR LINE
o	METAL FENCE		MINOR CONTOUR LINE

# HUDSON SHORES PARK SUSTAINABLE SHORELINE DESIGN

# **INVASIVE SPECIES REMOVAL**

PREPARED BY: CHJ/JSW DWG.NO:

C101

SCALE: AS NOTED















6" CRUSHED STONE NYSDOT 703-4, TYPE 3 -		
CROWNED AND COMPACTED SUBGRADE -///		
STABILIZATION FABRIC AMOCO #2006 $/$ $10^{\circ}$ OR APPROVED EQUIVALENT. $/$ $10^{\circ}$		
2% CROSS PITCH MIN. 12' MIN, OR PER		
OWNER'S REQUIREMENTS		
NOTES: 1. STABILIZATION FABRIC SHALL BE PLACED OVER THE ENTIRE ENTRANCE AREA PRIOR TO PI OVER AR FARRIC PER MANUFACTURER'S SPECIFICATIONS	I LACING OF STONE.	
2. ALL SURFACE WATER FLOWING OR DIVERTED TOWARDS THE CONSTRUCTION ENTRANCE SHA BENEATH THE ENTRANCE ROAD.	ALL BE PIPED	
3. WHEN EQUIPMENT WASHING IS REQUIRED IT SHALL BE DONE ON A SEPARATE AREA ADJA ENTRANCE ROAD AND STABILIZED WITH STONE. EQUIPMENT WASHING WILL BE REQUIRED I	CENT TO THE F ROAD RECEIVES	
SIGNIFICANT SOILS OR DEBRIS ACCORDING TO JUDGMENT BY OWNER OR OWNER'S REPRES 4. KEEP ROADS CLEAR OF STONES, MUD, AND OTHER CONSTRUCTION DEBRIS. CLEAN PAVEN	SENTATIVE. IENT AS	
ACCUMULATIONS WARRANT AND AS ORDERED BY ENGINEER. 5. REMOVE SILT ACCUMULATIONS ROUTINELY AND DISPOSE OF PROPERLY SUCH THAT WATER	QUALITY IS NOT	
IMPAIRED. DO NOT INTRODUCE SILT INTO DRAINAGE SYSTEM OR TOPSOIL/RESTORATION AR	REAS.	
SCALE: N.T.S.		
	-	
	5	
f		
1. EROSION MATTING PER VTRANS SCCT 755.11. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.		
NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.		
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP'S IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP'S WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM	1	
OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED		
APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECP'S. 3. ROLL THE RECP'S (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP'S WILL UNROLL		
WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM . STAPLES/STAKES SHOULD BE PLACED		
THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN. 4. THE EDGES OF PARALLEL RECP'S MUST BE STAPLED WITH APPROXIMATELY 2" - 5" OVERLAP		
DEPENDING ON RECP'S TYPE. 5. CONSECUTIVE RECP'S SPLICED DOWN THE SLOPE MUST BE PLACED FND OVER FND (SHINGLE		
STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE ON RECP'S TYPE. NOTE: #IN LOOSE SOIL CONDITIONS THE LISE OF STAPLE OF STAKE LENGTHS OPEATED THAN 6"		
MAY BE NECESSARY TO PROPERLY SECURE THE RECP'S.		
<b>SLOPE STABILIZATION MATTING</b>	_	
SCALE: N.T.S.	-	
		DDEL
		30% L

CT EXISTING TREES WHICH ARE TO REMAIN AND WHICH MAY BE INJURED, BRUISED, ED, OR OTHERWISE DAMAGED BY CONSTRUCTION OPERATIONS, UTILIZING STANDARD ROTECTION CRITERIA INCLUDING:

- INSTALLATION OF SAFETY ORANGE PLASTIC FENCING (MINIMUM 4' IN HEIGHT) AROUND INDIVIDUAL TREES IDENTIFIED FOR PROTECTION. FENCING SHALL BE INSTALLED AT THE OUTWARD LIMIT OF THE TREE'S DRIPLINE OR EXTENT OF CANOPY COVER.
- INSTALLATION OF SAFETY ORANGE PLASTIC FENCING (MINIMUM 4' IN HEIGHT) AROUND GROUPS OF TREES DESIGNATED FOR PROTECTION.
- REE AND/OR SHRUB BRANCHES IN THE WAY OF EQUIPMENT SHALL BE TRIMMED ACCORDING TO PROFESSIONAL HORTICULTURAL STANDARDS. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR AND SUB-CONTRACTORS USE EQUIPMENT TO DEMOLISH BRANCHES AS WORK PROCEEDS.
- WITHOUT ARCHITECT'S APPROVAL.

ED FENCING SHALL BE INSTALLED PRIOR TO THE INITIATION OF LAND DISTURBING IES AND SHALL BE REMOVED AT THE CONCLUSION OF CONSTRUCTION. TREES IATED FOR REMOVAL SHALL BE REMOVED IN A MANNER THAT WILL NOT IMPACT ENT TREES.

IONS, AND REPLACE WITH EQUIVALENT, UNDAMAGED TREES AND LANDSCAPE ES. OBTAIN OWNER/ARCHITECT'S APPROVAL BEFORE REPLACEMENT. REPLACEMENT ES SHALL OCCUR ON A ONE-TO-ONE BASIS.







		DOT URB	AN AREA MIX		
	LBS/AC	LBS/AC			
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
42.0%	128	256	RED FESCUE	85%	98%
16.0%	49	98	KENTUCKY BLUE GRASS	85%	85%
42.0%	128	256	PERENNIAL RYEGRASS	90%	95%
100%	305	610			

SOIL AMENDMENT GUIDANCE				
FERTILIZER	FERTILIZER	LIME	LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED	
10-20-10	FOLLOW	PELLETIZED	FOLLOW	
500 LBS/AC	MANUFACTURER	2 TONS/AC	MANUFACTURER	

![](_page_50_Figure_2.jpeg)

				PRELIMINARY
				30% DESIGN
REV NO	DATE	DESCRIPTION	DWN PROJ CHK APP.	
	1	REVISIONS	V	CONSTRUCTION

		PLANTING S	CHEDULE		
KEY	BOTANIC NAME	COMMON NAME	QUANTITY	SIZE	REMARKS
SMALL TREES/SH	IRUBS			I	
AS	AMELANCHIER STOLONIFERA	RUNNING SERVICEBERRY	xx	24"-30"	MULTI-STEM, FULL TO BASE
CS	CORNUS SERICEA	REDOSIER DOGWOOD	xx	24"-30"	MULTI-STEM, FULL TO BASE
SP	SALIX PENTANDRA	LAKE WILLOW	xx	36″-48″	CONTAINER, FULL TO BASE
VC	VIBURNUM CASSINDIDES	WITHROD VIBURNUM	xx	24"-30"	CONTAINER, FULL TO BASE
PERENNIALS					
AI	ASCLEPIAS INCARNATA	SWAMP MILKWEED	xx	#1 CONT.	CONTAINER
AS	ASTER SIMPLEX	PANICLED ASTER	xx	#1 CONT.	CONTAINER
CC	CALAMAGRESTIS CANADENSIS	CANADA BLUEJDINT GRASS	xx	#1 CDNT.	CONTAINER
EH	ELYMUS HYSTRIX	BOTTLEBRUSH GRASS	xx	#1 CDNT.	CONTAINER
PV	PANICUM VIRGATUM	SWITCHGRASS	xx	#1 CDNT.	CONTAINER
PP	PHLOX PILOSA	DOWNY PHLOX	xx	#1 CONT.	CONTAINER

![](_page_50_Picture_5.jpeg)

![](_page_50_Picture_6.jpeg)

FINISHED GRADE

![](_page_50_Picture_9.jpeg)

![](_page_50_Figure_10.jpeg)

![](_page_50_Picture_12.jpeg)

1 Winners Circle, Suite 130, Albany, New York 12205 Tel: (518) 463-4400 (800) SAMPSON

www.westonandsampson.com

![](_page_50_Picture_16.jpeg)

SCALE: 1"=10'

![](_page_51_Figure_0.jpeg)

Prepared by: JSW/RM Checked: CHJ

### Gomez and Sullivan Engineers, DPC Prepared for:

Project No:

NEIWPCC

### CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST

12/15/2017

1952

### Project: Hudson Shores Park Shoreline Stabilization

Estimate for: Preliminary (30%) Design

tem Number	Description	Quantity	Unit	Unit Price	Cost
	Contractor Gen. Requirements <sup>1</sup>				
1	(mob/demob, on-site facilities, etc.)	1	LS	\$32,200	\$32,200
2	Erosion and Sediment Control	800	FT	\$15	\$12,000
3	Clearing and Grubbing	0.5	AC	\$5,000	\$2,500
4	Invasive Species Control	2	DAY	\$2,000	\$4,000
5	Large Tree Removal	5	EA	\$1,000	\$5,000
6	Landscaping/Plantings	1	LS	\$23,000	\$23,000
7	Slope Stabilization	11000	SF	\$20	\$220,000
8	Seed/Lawn Restoration	1	LS	\$6,000	\$6,000
9	Stonedust Pathway & Boulder Gardens	1	LS	\$31,000	\$31,000
10					\$0
11					\$0
12					\$0
13					\$0
14	Invasive Species Control Maintenance	2	YR	\$1,500	\$3,000
15	Plant Maintenance	1	LS	\$15,000	\$15,000

Subtotal Direct Cost	\$353,700
Contingency Allowance (25%) <sup>2</sup>	\$88,425
Total Direct Cost <sup>3</sup>	\$442,000
Construction Management (10%) <sup>3</sup>	\$44,000
Total OPCC	\$486,000

### Notes:

1. Contractor General Requirements taken as 10% of the remaining itemized costs totaled and rounded to the nearest \$100.

2. Contingency Allowance taken as 25%.

3. Rounded to the nearest \$1,000.

4. The unit prices are estimated based on a compliation of manufacturer's pricing and similar completed project costs.

### APPENDIX C: SHORELINE STABILITY ASSESSMENT

GPS ID	Field Comment	Photo	Shoreline Stability
4	Steeper slope with garlic mustard. Trees in this area have been cut.		Moderately unstable
11	Steep slope	No photo	
27	The slope here is near vertical with cottonwood trees		Moderately unstable

GPS ID	Field Comment	Photo	Shoreline Stability
29	Steep slope with dumping of concrete, waste from management, and large concrete blocks.		Moderately unstable
35	Fallen tree at shoreline. Mulberry tree on the bank is undercut.	<image/>	Unstable

Interim Report
Preliminary Design of a Sustainable Shoreline at the Hudson Shores Park in the City of Watervliet, NY

GPS ID	Field Comment	Photo	Shoreline Stability
36	Eroding slope. Potential for stabilization here.		Moderately unstable
37	Bank at or above high water is undercut from point 36 to here.		Moderately unstable

GPS ID	Field Comment	Photo	Shoreline Stability
42	Undercut cottonwood roots		Moderately unstable
44	Undercutting and steep slope south of employee gangway		Moderately unstable
45	Eroding slope		Moderately unstable

### Interim Report Preliminary Design of a Sustainable Shoreline at the Hudson Shores Park in the City of Watervliet, NY

GPS			Shoreline
ID	Field Comment	Photo	Stability
46	Eroding slope		Moderately unstable