REVISED FINAL REPORT

New York State Office of General Services

Engineering Report for MO.07/MO.10 West Side of Genesee River Businesses

April 1, 2020

NEW YORK STATE OF OPPORTUNITY.
LAKE ONTARIO REDI
Resiliency & Economic Development Initiative

RAMBOLL

REVISED FINAL REPORT

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Engineering Report for MO.07 West Side of Genesee River Businesses

Prepared for:

New York State Office of General Services

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1. EXECUTIVE SUMMARY

In 2017 and 2019, the Lake Ontario and the St. Lawrence River System experienced high-water levels that resulted in severe flooding and erosion throughout the region. These conditions have caused adverse effects on property, infrastructure, business, and public safety. Given changes to the climatic baseline, New York State recognizes that moving forward requires planning for and responding to a potential new normal set of climate circumstances. For the Lake Ontario Region, learning how to adapt to and plan for a warmer, wetter, and more dynamic regional climate is emerging as a reality. By focusing on proactive resiliency planning that is informed by useful climate information and local input, the Lake Ontario Region has an opportunity to promote shoreline resiliency that allows communities and stakeholders to adapt to climate-related challenges.

This report covers a portion of the west bank of the Genesee River in the City of Rochester, New York near the river's mouth at Lake Ontario. The project area includes an approximately 3,200 foot stretch of Genesee River shoreline. The shoreline consists of the City of Rochester's River St. Marina and associated facilities along with a limited number of tax parcels owned by other businesses and parties. This portion of land has been subject to repeated flooding, river bank erosion, and property damage during the events described above and will remain threatened by future high-water events if resiliency initiatives are not implemented. Under the REDI program, the project area has been separated into two distinct but connected projects: MO-07 West Side Genesee River Businesses (generally from Train Station heading north) and MO-10 City of Rochester Marina extending south from the Train Station to the north boundary of Gibbs Marina.

As part of the REDI program, this report is prepared as an evaluation of alternatives and 10% conceptual design to help guide the next steps of the project execution process. The information provided in this document is primarily based on the online sources, site visits and discussions with City of Rochester personnel. Furthermore, this report includes recommendation for the next steps to investigate the site, perform the required field work and prepare a detailed assessment of the alternatives prior to making a final decision on the selected alternative. The cost estimates provided in Section 4 are for order of magnitude construction costs. Full order of magnitude project costs including non-construction costs of 25% engineering and 30% contingency are included for the recommended alternatives only in Appendix B, Table 9.

2. PROJECT BACKGROUND AND HISTORY

2.1 LOCATION

The project site is located along the western bank of the Genesee River in the City of Rochester, Monroe County, New York. The northern limit of the project area is approximately 2,300 feet south of the river's mouth at Lake Ontario, and the site extends approximately an additional 3,200 feet upstream. The entirety of the project area is in the City of Rochester's Charlotte neighborhood. The project area is bisected by Pattonwood Drive's Colonel Patrick O'Rorke Memorial Bridge. Figure 2-1 presents the project location.

Figure 2-1 *Site Location Map*

2.2 GEOLOGICAL CONDITIONS

A geotechnical evaluation including soil borings and accompanying report should be conducted prior to beginning the design phase, to evaluate subsurface conditions and provide detailed characteristic analysis of the soil and subsurface soils and groundwater and bedrock elevations. This information will enable the proper design and construction of potential mitigating strategies.

A cursory exploration of project area surface soil, bedrock and slope are discussed below:

Soil Type – Soil data was obtained from the Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) online. As shown in Figure 2-2, the project site area of interest (AOI) consists of the following soil types:

Table 2-1 *Project Area of Interest (AOI) Soil Map Legend*

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CIB	Collamer silt loam, 2 to 6 percent slopes	0.3	2.0%
Mb	Made land	2.5	32.4
Ub	Urban land	2.4	31.8
W	Water	2.7	35.7
Totals for Area of Interest		**7.6**	**100.0%**

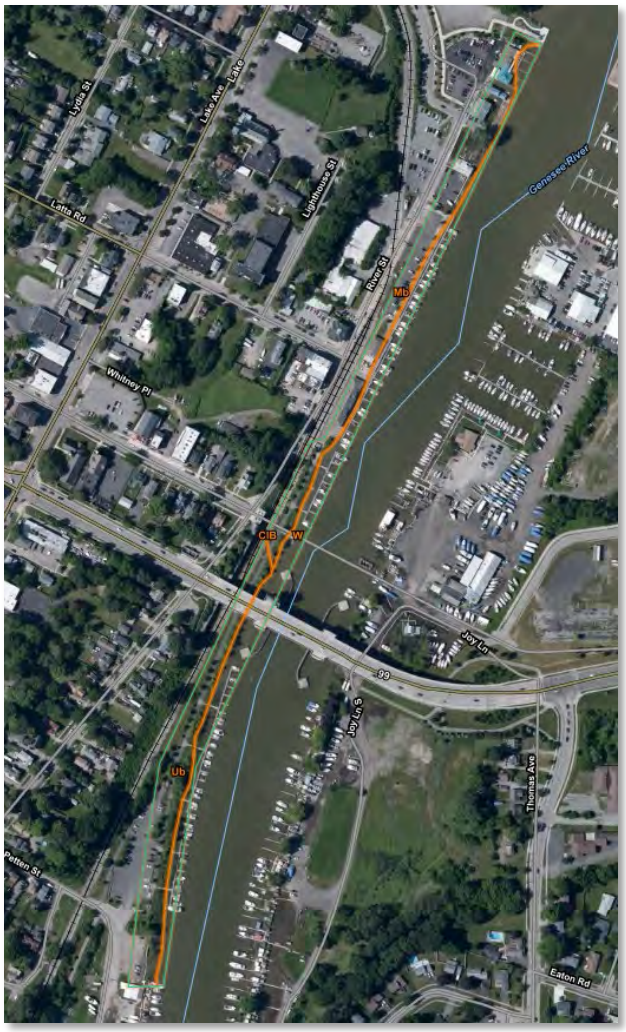


Figure 2-2 *NRCS Web Soil Survey Area of Interest (AOI)*

Bedrock – Soil borings and probing from past projects proximal to the project area may be available, however, at the time of this writing, such data have not been obtained. It is known that improvements in the area have included successfully driven sheet pile retaining walls, which have remained sound and intact. This suggests that bedrock was not encountered while driving these sheet piles, or that it was encountered at sufficient depth.

According to the New York State Museum of Bedrock Geology mapping, the project area is underlain by a shale and siltsone bedrock known as the Queenstone Formation. This mapping suggests that such bedrock could be encountered at depths of 0-900 feet below grade.

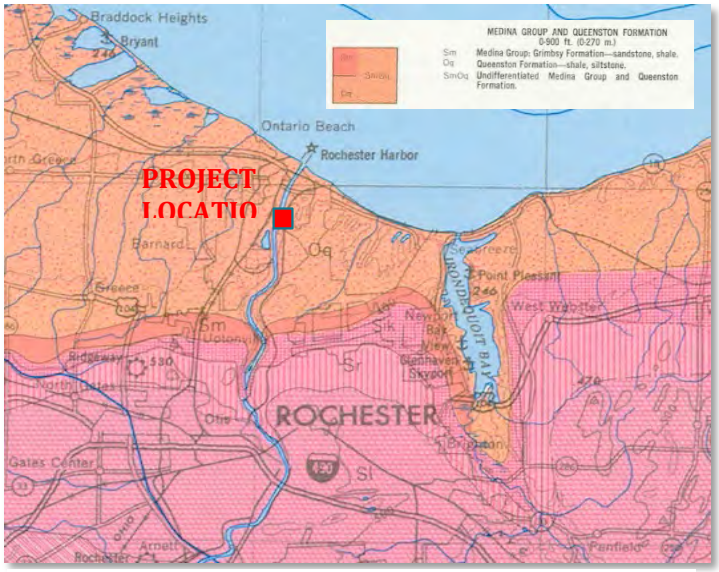


Figure 2-3 *Bedrock Mapping from Geologic Map of New York, Finger Lakes Sheet (New York State Museum, 1970)*

Slope – The immediate project area exhibits generally flat terrain except for that portion that includes the river bank itself, which slopes into the river. Much of the river bank in the project area is improved with manmade docks, boardwalks, or cribbing that result in a sudden change in elevation between land and water level. Slopes vary for portions of the river bank that remain naturalized and range from vertical to 3 on 1 slopes. A high-level topographic map of the project area and its surroundings is provided as Figure 2-4 below. The map shows that grade significantly increases in elevation just south of the project area.

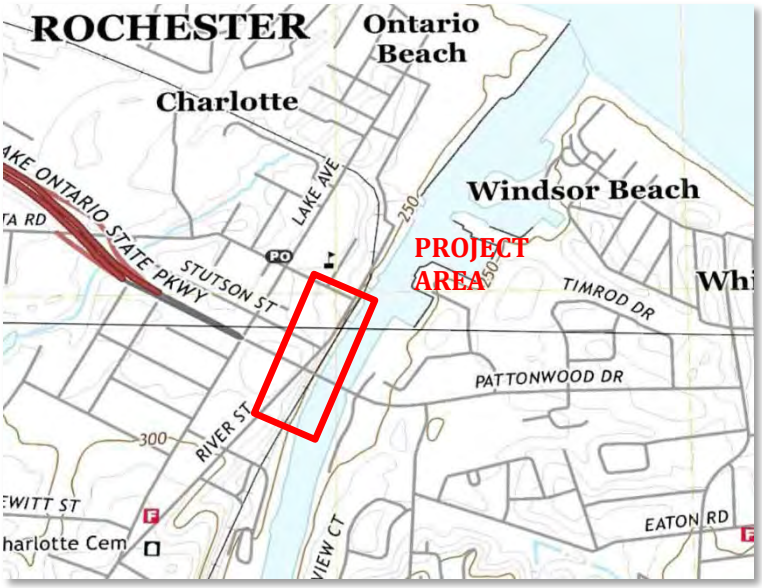


Figure 2-4 *Rochester East and East OE, NY Topographic Map (US Topo 2019)*

2.3 ENVIRONMENTAL CONDITIONS

Various online resources and data sets were reviewed to evaluate existing environmental conditions within the proposed project area. The following items were reviewed:

Wetlands – The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) of surface waters and wetlands was reviewed. The project area is located along a riverine NWI habitat. No wetlands are mapped in the project area as shown in Figure 2-5. Although these maps are helpful in the preliminary identification of wetlands, they do not represent regulated state or federal wetland boundaries. The project area is not located near a State Regulated Freshwater Wetland or within a mapped State Regulated Wetland Checkzone as shown in Figure 2-6. The nearest mapped State Regulated Freshwater Wetland is approximately 0.5-mile south of the project area.

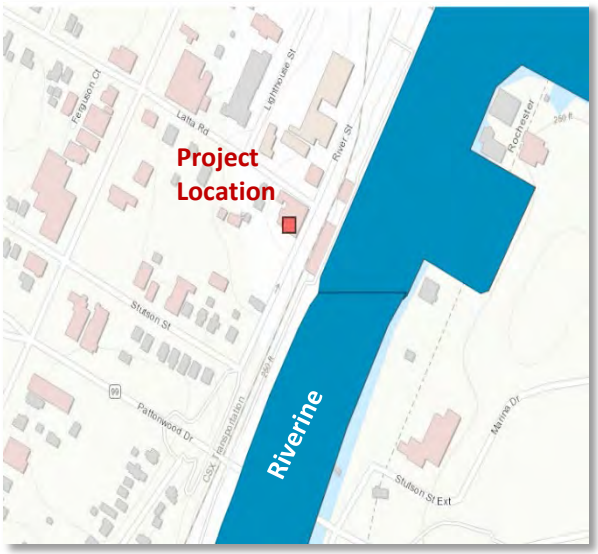


Figure 2-5 *USFWS NWI Wetlands*

Figure 2-6 *State Regulated Wetlands*

Sensitive Natural Resources – The New York State Department of Environmental Conservation's (NYSDEC) Environmental Resource Mapper (ERM) provides information about state wetlands, rare, threatened, and endangered plants and animals, and significant natural communities. According to the ERM, there are no

significant natural communities mapped in the vicinity of the project site. The ERM also indicates that the project area is not in the vicinity of animals or plants listed as endangered or threatened in New York State. However, according to the New York State Department of State's Geographical Information Gateway the Genesee River is designated as a significant coastal fish and wildlife habitat area. In addition, the areas within 100 feet of the Genesee River barge canal is designated as a Critical Environmental Area (CEA) by the City of Rochester.

The Genesee River is considered a state significant S1/S2 mussel waterbody. A mussel survey performed by a qualified malacologist is required if bed disturbance of the Genesee cannot be avoided. The mussel survey would encompass the area of direct impact and an adjacent buffer area. Mussel surveys should be coordinated through the NYSDEC Regional Office as soon as possible to avoid potential project delays as they can only be conducted during warm water periods that are defined by the NYSDEC.

The information for Planning and Consultation (IPaC) database provides information about endangered/threatened species and migratory birds regulated by the U.S. Fish and Wildlife Services. The IPaC results for the project area states that "there are no endangered species expected to occur at this location." The migratory bird species listed in Table 2-2 are transient species that may pass over but are not known to nest within the project area. A site-specific reconnaissance should be conducted to evaluate the potential presence of the species identified within the project limits.

Table 2-2 *Information for Planning and Consultation (IPaC) Resource List*

Species Name	Scientific Name	Level of Concern
Endangered Species		
There are no endangered species expected to occur at this location		
Migratory Birds		
American Golden-plover	*Pluvalis dominica*	BCC Rangewide (CON)[1]
Bald Eagle	*Haliaeetus leucocephalus*	Non-BCC Vulnerable[2]
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Non-BCC Vulnerable[2]
Bobolink	*Dolichonyx oryzivorus*	BCC Rangewide (CON)[1]
Buff-breasted Sandpiper	*Calidris subruficollis*	BCC Rangewide (CON)[1]
Canada Warbler	*Cardellina canadensis*	BCC Rangewide (CON)[1]
Cerulean Warbler	*Dendroica cerulea*	BCC Rangewide (CON)[1]
Dunlin	*Calidris aplina arcticola*	BCC-BCR[3]
Eastern Whip-poor-will	*Antrostomus vociferous*	BCC Rangewide (CON)[1]
Golden Eagle	*Aquila chrysaetos*	Non-BCC Vulnerable[2]
Golden-winged Warbler	*Vermivora chrysoptera*	BCC Rangewide (CON)[1]
Lesser Yellowlegs	*Tringa flavipes*	BCC Rangewide (CON)[1]
Long-eared Owl	*Asio otus*	BCC Rangewide (CON)[1]
Prairie Warbler	*Dendroica discolor*	BCC Rangewide (CON)[1]
Red-headed Woodpecker	*Melanerpes erythrocephalus*	BCC Rangewide (CON)[1]
Ruddy Turnstone	*Arenaria interpres morinella*	BCC-BCR[3]
Semipalmated Sandpiper	*Calidris pusilla*	BCC Rangewide (CON)[1]
Short-billed Dowitcher	*Limnodromus griseus*	BCC Rangewide (CON)[1]
Snowy Owl	*Bubo scandiacus*	BCC Rangewide (CON)[1]
Wood Thrush	*Hylocichla mustelina*	BCC Rangewide (CON)[1]

1. This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
2. This is not a Bird of Conservation Concern (BCC) in this area but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities Bald eagle is listed as a Threatened and golden eagle is listed as an Endangered species in New York State.
3. This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Cultural Resources – No facilities listed on the National Register of Historic Places were found within the project area. The Charlotte Railroad Station located at 414-420 River St, Rochester NY is listed as eligible to be placed on the State and National Registers of Historic Places. Prior to completing the design phase, the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) should be engaged to identify the potential presence of archeological resources and the potential need to perform a cultural resources investigation.

Floodplain Location – The Federal Emergency Management Agency (FEMA) flood map, referenced to the North American Vertical Datum of 1988 (NAVD 88), indicates that the project area is located within two floodplain zone categories, Zone X and AE. Zone X includes areas with future conditions of 1% annual chance flood hazard, subject to minimal flood hazard. Zone AE includes areas within a Special Flood Hazard Area. The portions of the project located in Zone AE areas include Monroe County Public Works (MCPW) Pump Station and U.S. Coast Guard (USCG) Auxiliary. Refer to Figure 2-7 for the FEMA flood map.

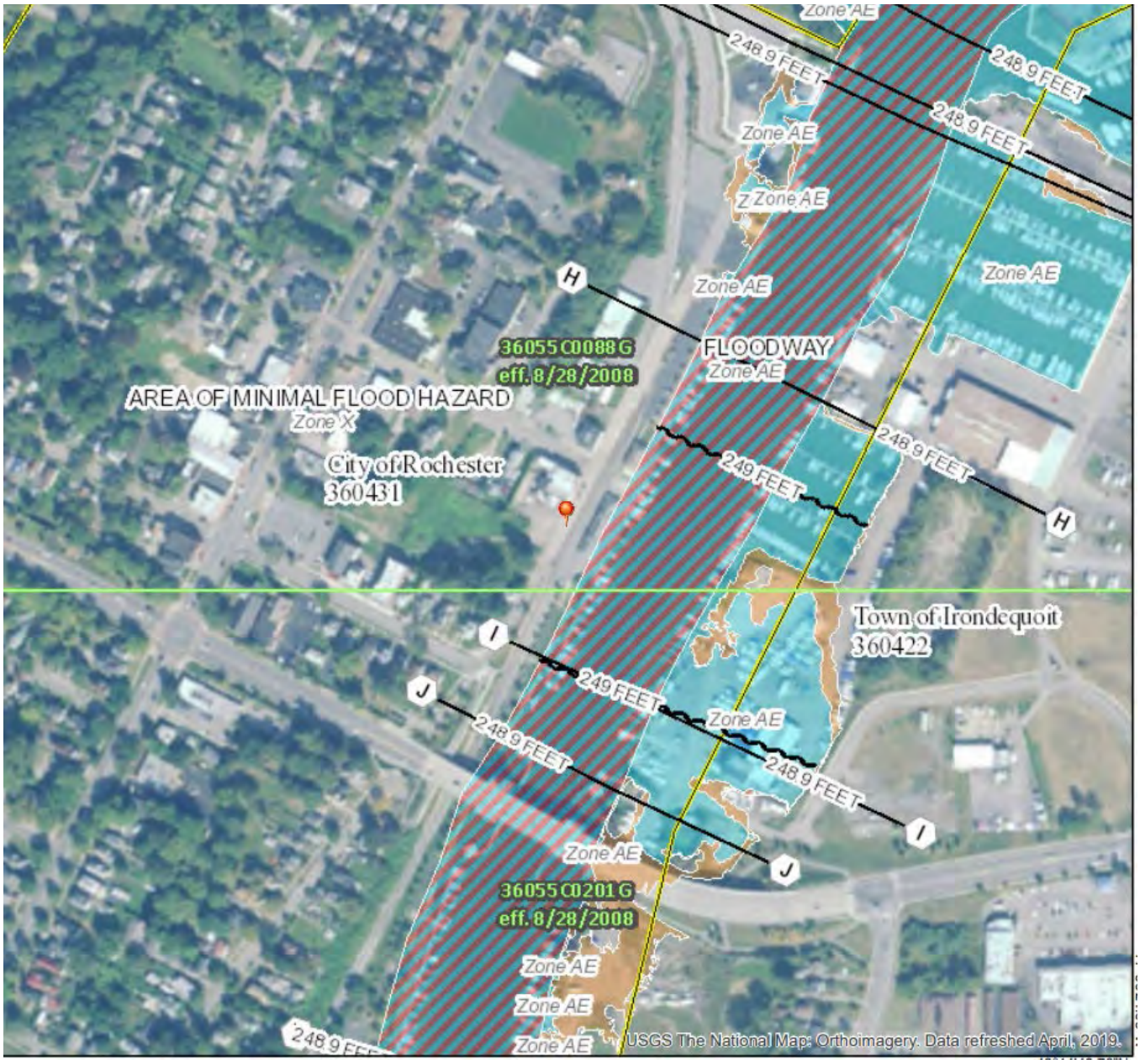


Figure 2-7 *FEMA Flood Map*

Water Levels – Water elevations of the Great Lakes have been regularly and systematically recorded since 1860 and show long-term fluctuation. Lake Ontario has experienced both extreme high and low-water elevations that appear to coincide with climatic variability, such as changes in precipitation, evaporation rates, and duration of ice cover (USACE 1999, Gronewold et al. n.d.).

Per the International Joint Commission (IJC), which regulates Lake Ontario and St. Lawrence River levels, the historic average water level experienced in Lake Ontario between 1918 and 2018 is approximately 246.26 feet. Per the Army Corps of Engineers, and IJC, the historic highs in 2017 and 2019 breached the old record high of 248.75 feet recorded in 1952, as shown in Figure 2-8. Lake Ontario reached a new daily water level high of over 249 feet in 2019. Water levels are typically reported using the International Great Lakes Datum 1985 (IGLD 1985) datum, FEMA uses the NAVD 88 datum. The NAVD 88 datum is within 0.1 ft of the IGLD 1985 datum at this location, and for the purposes of this report the reported elevations are considered interchangeable.

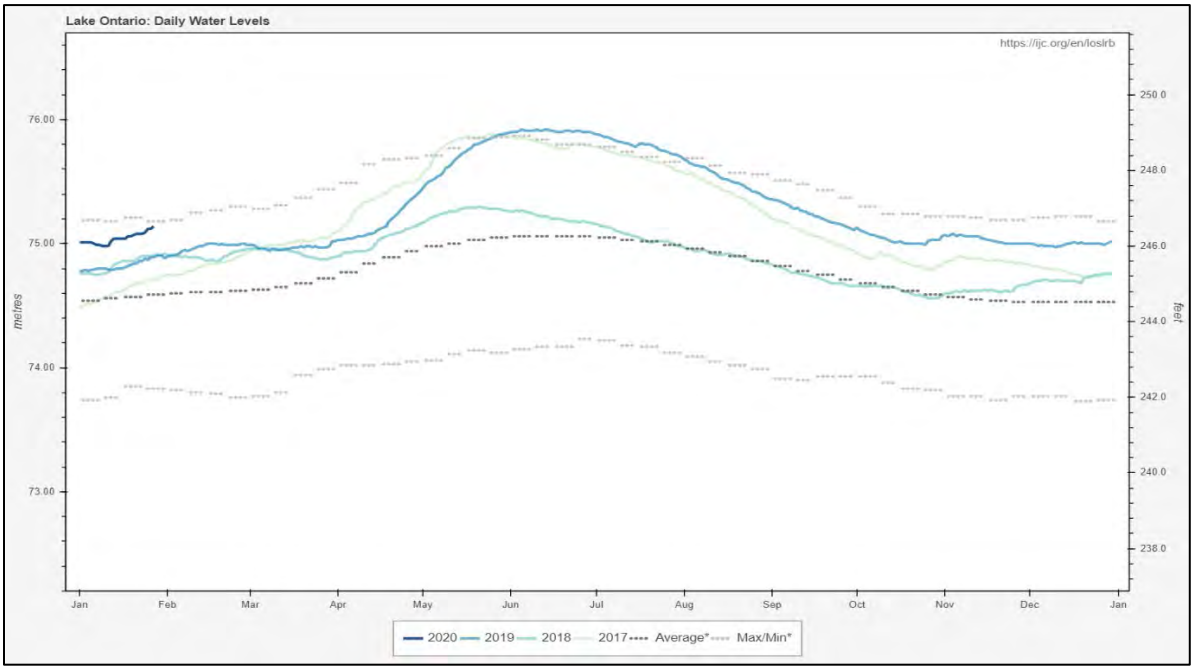


Figure 2-8 *Lake Ontario Daily Water Levels in 2017 through January 2020 (ft. IGLD 1985, International Joint Commission). Historic daily water levels (average and maximum/minimum) based on period from 1918-2018 for Lake Ontario.*

Conceptual Design Water levels – The conceptual alternatives developed and corresponding cost estimates in this engineering report are based on the water levels described in Table 2-3. These water levels are based on a review of the historical water levels described in Section 2.3, the New York's Great Lakes Coastal Resilience Index: A Community Self-Assessment manual completed by the New York Sea Grant and conceptual allowances for wave heights and freeboard based on prior project experience. A detailed site-specific analysis of the design water levels is recommended as part of the design process to account for project risks and a site-specific wave height analysis. Guidance is provided in the 1995 US Army Corps of Engineers Engineering and Design Manual – Design of Coastal Revetments, Seawall, and Bulkheads.

Note that this report distinguishes between flood protection measures and bank stabilization measures. It is assumed that freeboard allowance is not necessary for bank stabilization measures. Additionally, the wave height allowance is subject to judgement based on proximity of the engineered improvement to the mouth of the Genesee River. Therefore, in zones calling for bank stabilization the measures are proposed to extend to elevation 252.0' (2-ft wave allowance, no freeboard), and in zones calling for flood protection the flood protection measure is proposed be maximized and extend to elevation 255.0' (3-ft wave allowance, 2 ft freeboard). Wave height allowance is an assumed allowance.

To comply with the National Flood Insurance Program (NFIP) and local floodplain development requirements, detailed modeling and wave height calculations will be performed as part of the detailed design phase. This will include consideration of this and other projects along the Genesee River to ensure, when the projects are

considered as a whole, the proposed flood mitigation measures have no adverse impact on neighboring properties

Table 2-3 *Conceptual Design Water Levels*

Conceptual Design Water Level	Elevation (1985)
Low Water Level	242.0
Mean Water Level	245.3
High Water Level	250 Ft.
Assumed Wave Height Allowance	2.0-3.0 Ft.
Freeboard Allowance	2.0 Ft.

2.4 OWNERSHIP AND SERVICE AREA

- Publicly or Privately-owned

  According to the City of Rochester online GIS system, the project site is comprised of a combination of tax parcels both publicly and privately owned. The majority of the land is publicly owned by the City of Rochester and includes the River Street Marina as well as a City-owned, but County-operated, wastewater pumping station. Near the northern end of the project area there is a small parcel owned by the U.S. Government (USCG Auxiliary), and a parcel privately owned by TS Holding Corporation (504 River Street). See Appendix A, Figures 1A and 1B for plan view of tax parcel boundaries and associated owners.

- Facility/System Management

  The City of Rochester River Street Marina, while owned by the City, is generally operated and maintained by personnel from Gibbs Marina, which is a privately owned and operated marina located south of the City's property and proposed work limits. The Monroe County Pure Waters Wastewater Pumping Station is operated by Monroe County, but the tax parcel is owned by the City of Rochester.

- Outside users

  There are no anticipated intermunicipal agreements required as a result of this project, However, several easements may need to be negotiated on private parcels for maintenance of the proposed project features. It is assumed that maintenance and operations of the project features will be the responsibility of the City of Rochester. As such, an updated maintenance and operations agreement between the City and Gibbs Marina may be required.

- Population trends and growth

  According to available U.S. Census data and the American Community Survey 5-Year Estimates, the City of Rochester has approximately 207,778 residents as of 2018. The population of the City has generally seen a 5% decrease between years 2000 and 2018.

Table 2-4 *City of Rochester Population Data*

Year	Population
2018[1]	207,778
2017[1]	209,463
2016[1]	210,291
2015[1]	210,745
2014[1]	210,461
2013[1]	210,624
2012[1]	210,967
2011[1]	211,457
2010[1]	211,977
2000[2]	219,773

1. American Community Survey 5-Year Estimates
2. U.S. Census 2000 Demographic Profile

- Community involvement

  The River St. Marina and associated facilities are well used by local residents. While community engagement relative to the project has been limited to this point, protection of the marina resources has been generally well received by the public. It is assumed that the greatest community concerns are maintaining safety and accessibility for the marina features, limiting closure time of the facilities, and enhancing/maintaining the area's aesthetic appeal.

2.5 EXISTING FACILITIES AND PRESENT CONDITIONS

- Location and layout

  The project area is located along the western bank of the Genesee River in the City of Rochester approximately 2,300 feet south of the river's mouth at Lake Ontario. The site largely consists of the City of Rochester's River Street Marina, but also extends immediately north to tax parcels owned by the USCG and TS Holding Company (504 River Street). Figures 1A and 1B in Appendix A provide a plan view of the layout of the site.

  Important on-shore features within the project area include:

  - 8-ft wide asphalt pedestrian path
  - Historic train station building
  - Marina boater facilities building
  - Marina public parking lots
  - CSX railroad tracks
  - USCG Auxiliary building
  - Monroe County Wastewater Pumping Station

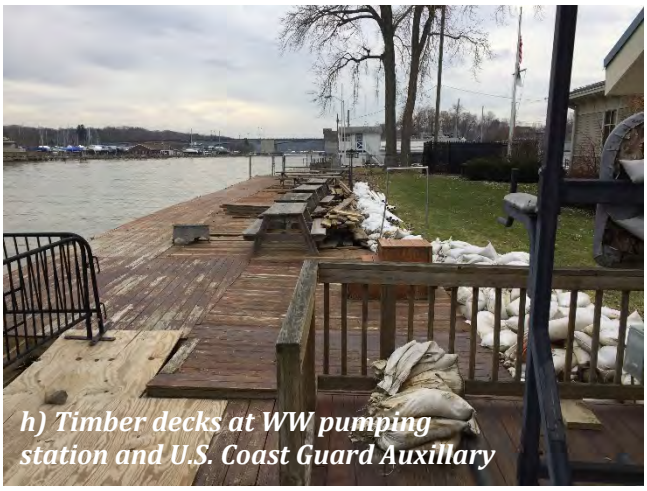
  The river bank within the project area is characterized by a variety of natural and engineered uses/covers. For the purposes of this report, the project area has been divided into project alternative zones. The project alternative zones generally exhibit contiguous existing shoreline treatments within each zone. Figures 1A and 1B in Appendix A provide a plan view of the project alternative zones as well as typical river bank sections where available. The following is a description of the river bank characteristics in the project area:

  - Zone ALT: This Zone includes 105 Petten Street owned by the City of Rochester and is part of the Genesee Marina Brownfield Cleanup Site which is scheduled to receive an engineered cover

consisting of a minimum of 1 foot of crushed stone or recycled concrete aggregate. The bank does not appear to have any engineered treatment but is vegetated. This parcel currently exhibits a drop-in grade on the order of 2 to 3 feet relative to Zone A, but grade will be changed once the cap is placed.

- Zones A, C & E: Floating docks with riverbank covered by engineered medium rip-rap stone with potential for existing emergent wetland fringe areas. (Figure 2.9c)
- Zone B: Floating docks with river bank covered by naturalized wetlands. See photo Figure 2.9b.
- Zone D: Precast concrete block river bank retaining wall. See photo Figure 2.9d
- Zone F-1: Floating docks with engineered timber boardwalk and railroad building with concrete retaining wall under railroad building. See photo Figure 2.9g.
- Zone F-2 Floating docks with engineered timber boardwalk and sheet pile retaining wall. See photo Figure 2.9f. A portion of Zone-F-2 is within the limits of the CSX Transportation, Inc. (CXST) Voluntary Cleanup Program. The Division of Environmental Remediation may require sediment sampling in accordance with the approved Site Management Plan prepared by AMEC E & E, PC. And dated June 2012,before any work is conducted .
- Zone G: This zone is combination of publicly and privately-owned parcels with varying bank treatments, but generally characterized by wooden docks. The USCG Auxiliary and Monroe County Pure Waters Wastewater Pumping Station, both exhibit wooden decks on their river sides (Figure 2.9i). A vacant private parcel owned by TS Holding Company contains an incomplete or dilapidated cribbing structure on its bank (Figure 2.9k). See Figure 2.9 below for photographs of existing site features and facilities. A portion of Zone-G is within the limits of the CXST Voluntary Cleanup Program. The Division of Environmental Remediation may require sediment sampling before any work is conducted.

Figure 2-9 *Photographs of Existing Facilities*



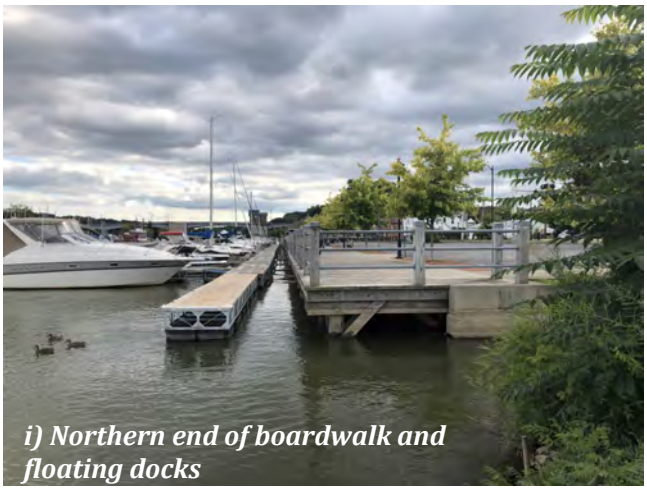


Figure 2-9 *Photographs of Existing Facilities*

- Project Area History

  The project area has undergone significant development over the past two decades. Figures 2-10a thru 2-10c below show the development of the project area between years 2002 and 2018.

  As late as the year 2005 the project area displayed limited development and opportunity for public use. During that time, the site had historically been dominated by the presence of the CSX Railroad and associate train depot (historic railroad building). The area did serve as a location for various private and public docks; however, access and parking in the project area were limited and the site appeared industrial in nature. The Monroe County Wastewater Pumping Station existed in original form in the project area and subsequently modernized in later years.

  In 2005 the City of Rochester made a significant investment in the development and beautification of the project area. The 2005 project resulted in the construction of most of the existing public facilities described above including the rip-rap bank stabilization, landscaping, a 800-foot-long timber boardwalk, a 8-foot wide asphalt pedestrian path, a boater facilities building, public parking areas, and floating docks with associated vessel slips. In Figure 2-10b it is possible to see the construction of the now existing timber boardwalk in progress. Also improved since 2002 was the Pattonwood Dr. bridge (Colonel Patrick O'Rorke Memorial Bridge), which was completely reconstructed with new piers and navigation fender system visible in the images below.

Figure 2-10a *Google Earth Image of Project Area, Year 2002*

Figure 2-10b *Google Earth Image of Project Area, Year 2005*

Figure 2-10c *Google Earth Image of Project Area, Year 2018*

This portion of the Genesee River is designated as a federal channel and is monitored and maintained by the United States Army Corps of Engineers (USACE). The USACE conducts bathymetric surveys within the limits of the navigation channel annually and dredges as required to maintain minimum required depths. They last dredged within the navigation channel in 2019 and appear to perform dredging every two to five years in the channel.

The City of Rochester obtained a permit from the Department of the Army on May 13, 2019 to dredge a total of 15,650 cubic yards of sediment annually from the west side of the Genesee River to maintain the existing docking facilities. To date, no dredging has been completed along the bank.

2.6 DEFINITION OF THE PROBLEM

As described above, significant investment has been made in the project area to enhance public use of the Genesee River and Lake Ontario. Recent high-water events in 2017 and 2019, however, have threatened these investments. Maximum water levels during these events have risen above the elevation of existing bank stabilization measures endangering the stability of the banks and in some cases causing damage to the banks and infrastructure. While the water has not historically risen above the elevation of the newly constructed public boardwalk (el. 253.2'), recent trends in water levels and climatic conditions suggest that such water elevations could exist in the future. A rise of water levels above the elevation of the top of the boardwalk would subject adjacent properties to flooding, damage and possible closure. Other properties such as the Pelican's Nest Restaurant and the USCG Auxiliary have already experienced flooding. Additionally, the relatively new floating docks function improperly during extreme low and high-water events and have experienced repeated damage. The purpose of this project is to increase the resiliency of the project area's facilities and resources including more robust bank stabilization measures, flood mitigation techniques, and floating dock modifications to protect existing facilities against future extreme water events.

Figure 2-11 *U.S. Coast Guard Auxiliary Shown with Sand Bag Dike to Protect Against Flooding*

2.7 FINANCIAL STATUS

The project will be financed by the City of Rochester and 95% of the cost will be reimbursed by the REDI Program. The proposed financing plan is shown in the Table 2-5. Note that updated estimated project costs will be discussed later in this report.

Table 2-5 *Project Financing Plan*

Description	Cost
MO-07 Westside Genesee River Businesses	
Total Preliminary Estimated Project Cost	$2,225,000
REDI Grant Amount	$2,113,750
Minimum Required Local Share	$111, 250
MO-10 City of Rochester Marina	
Total Preliminary Estimated Project Cost	$1,064,000
REDI Grant Amount	$1,010,800
Minimum Required Local Share	$53,200

3. PERMIT AND REGULATORY COMPLIANCE

Projects where design has progressed sufficiently (generally 50% design) to complete and submit a permit application prior to April 30, 2020 may be completed under the NYSDEC's General Permit (GP-0-19-003) for Storm Recovery (General Permit expires 09/30/2020). This General Permit was issued by the NYSDEC after the high-water events on Lake Ontario in 2017 and 2019 to hasten the permitting process for owners to repair and stabilize their properties damaged by high water levels and simplify shoreline recovery efforts. A pre-application conference with the agencies is recommended to discuss the potential applicability of the General Permit to this project.

Table 3-1 provides a preliminary list of permits and approvals that may be required for to complete the project if it cannot be completed under the General Permit. Permits and authorizations will ultimately depend on the final proposed design and should be discussed during the pre-application conference with the agencies. For many permits or authorizations from the NYSDEC, the New York State Department of State (DOS), New York State Office of General Services (OGS) and the USACE, a Joint Application Form will be used.

Table 3-1 *Permit and Regulatory Requirements*

Agency	Permit	Regulated Activity
US Army Corps of Engineers	Section 404 of the Clean Water Act/Section 10 of the Rivers and Harbors Act (Joint Application)	Section 404 – Regulates fill and/or discharge of dredged material in Waters of the United States. Section 10 – Regulates activities in federally designated navigable waterbodies.
US Fish and Wildlife Services	Consultation	Threatened and Endangered Species Act compliance. Required for work near regulated species.
NOAA / National Marine Fisheries Service	Consultation	Essential fish habitat review. Recommended for work near regulated fish habitat.
NYSDEC	State Environmental Quality Review Act (SEQRA)	Environmental impact assessment. Preparation of Short or Full Environmental Assessment Form. May also involve "Environmental Justice"-related public participation activities. Federal funding/permits may require National Environmental Policy Act review.
	Article 15: Protection of Waters (Joint Application)	Disturbance to bed/banks of the Genesee River (Class B) and Excavation or Fill in a Navigable Water
	Article 34: Coastal Erosion Hazard Permit Area (Joint Application)	Disturbance within a designated Coastal Erosion Hazard Area
	6 NYCRR Part 182: Incidental Take Permit	Needed if the mussel survey results in the presence of any New York State listed Threatened or Endangered mussel species.
	Section 401 Water Quality Certification (Joint Application)	Discharge to waters of the United States
	State pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharge from construction activities	Storm water discharges from construction phase activities disturbing one-acre or greater. Includes preparation and implementation of SWPPP.
Local Municipality Level	Article 36 – – Floodplain Development and Floodway Guidance	Disturbance within a designated 100-year flood zone. May require H&H analysis as part of floodplain review by DEC.
	Site Plan Approval	Approval of site modifications. (May not be necessary if no major site modifications [i.e.,

		Building Permit only] – coordinate with municipal Code Enforcement Officer to identify process).
NYS Natural Heritage Program	Consultation	Recommended for work near regulated habitat of State listed threatened and endangered Species and Significant Natural Communities.
NYS Department of State	Federal Consistency Review	Consistency with NYS and/or Local Waterfront Revitalization Program Policies
NYS Office of General Services	Authorization	State lands underwater
NYS Office of Parks, Recreation and Historical Preservation	Consultation	Review under Section 106 of Historical Preservation Act State Historic Preservation Law 14.09 (satisfied if Section 106 is satisfied)
City of Rochester	Waterfront Consistency Review Ordinance	Consistency review of work conducted in the Local Waterfront Area (LWA) with the Local Waterfront Revitalization Program policies.
	Consultation, Federal Coastal Zone Management Act & NYS Coastal Management Program (6 NYCRR Part 600)	Review in accordance with applicable Local Waterfront Revitalization Program Policies.https://docs.dos.ny.gov/opd-lwrp/LWRP/Rochester_C/RochesterLWRP.pdf

4. ALTERNATIVES ANALYSIS

4.1 DESCRIPTION

The project alternatives are categorized generally as action and no-action. Within the action alternative there are several proposed options for each project zone and for floating dock modifications. Options include nature-based features whenever feasible. A schematic representation of the action alternatives is presented in Appendix A - Figures 2A and 2B.

- No-Action Alternative

  The "no-action" alternative leaves the project site as-is, with no improvements. Under the no-action alternative the west bank of the Genesee River in the project area could be subject to the following during foreseeable highwater events and wave run-up:

  - Damage to existing floating docks to the extent the docks could be rendered unusable. This could also correspond to damage to private and public vessels.
  - Increased river bank erosion. This erosion could cause undermining of existing site features including the 8 foot-wide asphalt pedestrian path and may require regular repair/reshaping of eroded river bank.
  - Potential flooding above the elevation of the existing timber boardwalk. Such flooding could encroach on the CSX Railroad property and across River St. rendering the tracks and street unusable and damaging existing structures. The existing historic railroad building and recently constructed boater facilities building would also be subject to damage.
  - Damage and temporary or permanent closing to properties adjacent the river including the USCG Auxiliary and the Pelican's Nest Restaurant.
  - Potential flooding of the Monroe County Wastewater Pumping Station

- Action Alternatives

  - Zone ALT:

    This zone is associated with 105 Petten Street tax parcel owned by the City of Rochester and is part of the Genesee Marina Brownfield Cleanup Site. It is scheduled to receive an engineered cap under permit of the New York State Department of Environmental Conservation. This zone was considered for bank stabilization measures only and proposed options are similar to those discussed in Zones A and C below;

Option 1: rip-rap bank stabilization or Option 2: vegetative erosion control. Work in this zone is currently being considered as a bid alternate for the project. Each option should avoid any intrusive work to avoid impacting the placed engineered cap. All material brought onto this parcel will meet the specifications set forth in DER-10 and Part 375.

- Zones A& C
  - *Option 1 – Rip-rap extension*

    This option includes the extension of medium rip-rap up the river bank from elevation 250' to elevation 252'. The rip-rap would be a continuous extension of already existing rip-rap, and the newly placed stone would match the existing stone characteristics to the extent possible. The rip-rap extension would serve to stabilize the portion of stream bank that is not currently protected from foreseeable high-water events and wave run-up. No new property easements would be necessary for this option.

  - *Option 2 – Vegetative erosion control (nature-based)*

    This option includes the placement of engineered erosion control matting with integrated vegetation from elevation 250' to elevation 252'. The lower limits of the matting and vegetation would match the upper limits of existing rip-rap stone. The matting would serve to stabilize the portion of stream bank that is not currently protected from foreseeable high-water events and wave run-up. This option would provide a softer, natural look to the river bank and potentially provide additional wildlife habitat. Figure 4-1 below presents a conceptual schematic of the vegetative erosion control.

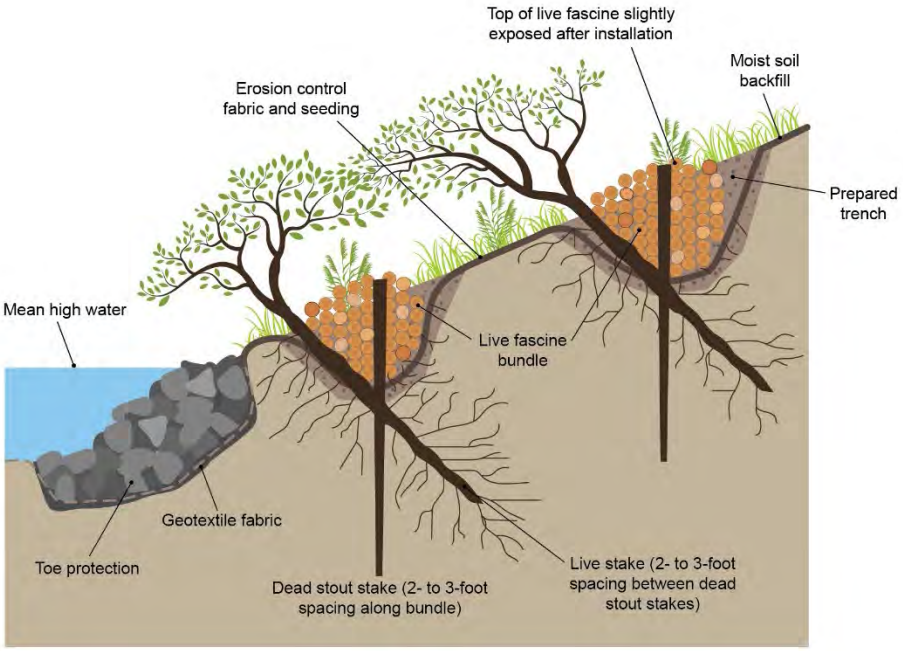


Figure 4-1 *Vegetative Erosion Control/ Bank Stabilization*

  - *Option 3 – Berm Construction*

    For additional protection against flooding, a berm constructed of low permeability soils could be installed along the bank. The berm should be constructed with maximum slopes of 1.5H:1V to an elevation of 255.0'. The berm could be vegetated as shown in Option 2 to stabilize the slope and offer erosion protection during flood events. This option would require modification of the dock access ramps to be raised to a similar elevation, or the installation of stop gaps with concrete ring walls could be constructed and tied into the berm. This would limit access to the docks during flood events above existing grade.

- Option 4 – Wetland Enhancement

  It is still to be determined whether Zones A and C support an emergent wetland fringe, but the existence of such fringe is likely. If a wetland fringe does exist, it is proposed that the wetland area be enhanced with additional plant species to provide plant diversity and stream bank stabilization as described in Zone B below. This option would be implemented in conjunction with one of options 1 thru 3 above.

  Both Options 1 and 2 would have limited to no impact on site usage as the proposed improvements would take place on sloped land adjacent to areas where rip-rap already exists. No new property easement would be necessary for these options. Option 3 could impact site usage as the proposed berm would require modifications or limit access to the docks during flood conditions. As shown in Appendix A, Figure 2A, a public boat launch is scheduled to be constructed within Zone A in the near future. If the flood control berm option is chosen design coordination would need to occur.

- Zone B
  - *Option 1 - Wetlands to remain as-is*

    Existing wetlands provide wildlife habitat and natural water filtration capabilities. With this option, the existing wetlands remain as-is with no modifications. The benefit of this option is that there would be no disturbance to the wetland environment.

  - *Option 2 - Wetland enhancement*

    The existing wetlands exhibit limited plant diversity and may be subject to damage during foreseeable high-water events. This option includes the introduction of alternative plant species to the existing wetlands which will provide enhanced wildlife habitat, river bank beautification, and additional stabilization capabilities. Plant species to be introduced may include flood-tolerant herbaceous species such as:

    - *Equisetum fluviatile* (river horsetail)
    - *Justica americana* (water willow)
    - *Scirpus americanus* (chairmaker's bulrush)
    - *Schoenoplectus tabernaemontani* (softstem bulrush)
    - *Zizania aquatica* (wild rice)

  - *Option 3 - Wetland removal and stabilization*

    The existing wetlands may act to slow the water velocity near the banks of the river, causing excessive sediment build-up and conflict with the adjacent floating docks. Work under this option includes the removal of wetlands, reshaping the river bank in this zone and stabilizing the zone with engineered erosion control matting and integrated vegetation along the river bank. The proposed vegetation would not extend into the river as far as the existing wetlands. This option would cause the most environmental impact and would require wetland mitigation measures.

    No new property easements would be necessary for Zone B options. With each option, a vegetated earthen berm could be constructed on the existing bank to provide additional flood protection as detailed above in Option 3 for Zones A, C, and E.

- Zone E
  - *Option 1 – Rip-rap extension*

    This option includes the extension of medium rip-rap up the river bank from elevation 250' to elevation 252'. The rip-rap would be a continuous extension of already existing rip-rap, and the newly placed stone would match the existing stone characteristics to the extent possible. The rip-rap extension would serve to stabilize the portion of stream bank that is not currently protected from foreseeable high-water events and wave run-up. No new property easements would be necessary for this option.

- *Option 2 – Vegetative erosion control (nature-based)*

  This option includes the placement of engineered erosion control matting with integrated vegetation from elevation 250' to elevation 252'. The lower limits of the matting and vegetation would match the upper limits of existing rip-rap stone. The matting would serve to stabilize the portion of stream bank that is not currently protected from foreseeable high-water events and wave run-up. This option would provide a softer, natural look to the river bank and potentially provide additional wildlife habitat. Figure 4-1 above presents a conceptual schematic of the vegetative erosion control.

  Option 3 – Flood Curbing

  This option would include the installation of continuous cast-in-place concrete in front of the existing boardwalk. The curbing would be installed to elevation 255.0' and tie into the south to existing grade to the south based on the River Street Waterfront As Built Drawings. To the north, the curbing could tie into the proposed flood mitigation measure in Zone F-1.

- Zone D
  - *Option 1 – Pre-cast concrete retaining wall extension*
  - Under this option the existing pre-cast concrete block retaining wall in Zone D would be raised by two courses of block to an elevation of 252.0'. Additional required work would include backfilling of the wall with matching drainage stone and topsoil and seeding the remaining slope to protect against erosion control and provide vegetation enhancement. The resulting raised wall would provide additional stream bank protection against undermining of the adjacent earthen bank and pedestrian walkway. Note that due to required regrading, existing young trees adjacent the retaining wall may need to be relocated.
  - *Option 2 – Envirolok bank stabilization (or similar)*

    Under this option the river bank above the top elevation of existing concrete block retaining wall would be stabilized with an Envirolok stabilization system (or similar). Envirolok features a system of sand and topsoil filled bags that are stepped along a slope and tied together via spikes. Additionally, the bags may be tied to the bank with a geogrid mesh. The bags are designed to allow for growth of engineered plant species whose roots further anchor the bags in place and stabilize the bank. The Envirolok system is a nature-based solution to bank stabilization.

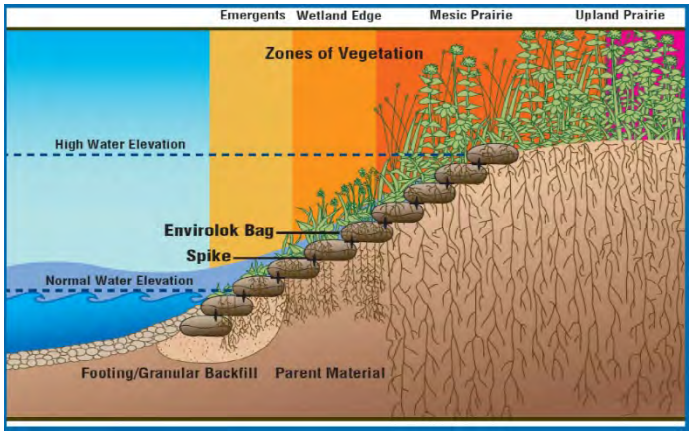


Figure 4-2 *Envirolok Bank Stabilization Schematic (Source: Envirolok.com)*

    For additional flood protection, each option could be modified to include the addition of a vegetated berm installed to a proposed top elevation of 255.0'.

- Zone F-1
  - *Option 1 – Concrete retaining wall modifications*
  - Past improvements in this zone include the construction of a cast-in-place concrete retaining wall and footer beneath the historic railroad building. Work under this option includes the modification of the existing retaining wall on the river side of the train station to create a concrete flood wall that reaches top elevation 255.0'. Openings with removable stop logs would be provided in the wall as required to facilitate pedestrian access to the building. This option would require removal and replacement of a portion of the timber boardwalk.
  - *Option 2 – Railroad building floodproofing*
  - This option includes modification of the railroad building structure such that it is flood proofed. This would avoid the need for a concrete floodwall in front of the building. Due to the age of the structure

and potential historic permitting requirements design and implementation of this option may be difficult and very costly. A thorough structural inspection of the building would be required to further evaluate the feasibility of this option.

- *Option 3 – Installation of Sheet Pile Seawall*
- Under this option a sheet pile retaining wall with a concrete cast in place cap would be constructed on the riverside of the existing boardwalk. Work under this option would include removing the existing decking of the boardwalk and installing sheet piling to the outside edge of the boardwalk. The sheet piles would be capped with a cast in place concrete wall that would be installed to an elevation of 255.0'. The space between the sheet pile alignment and shoreline would be dewatered and backfilled with suitable material to reduce the uplift potential during flood conditions. Once backfilled, the boardwalk decking could be reinstalled or replaced with a concrete sidewalk option. Under this option additional hydraulic analysis would be required to satisfy extensive permitting requirements to determine potential flooding impacts to adjacent properties.

» Zone F-2

- *Option 1 – Cast-in-place concrete floodwall*
- This option includes construction of a cast-in-place concrete floodwall to a top elevation of 255' along the existing timber boardwalk. The floodwall would be built upon, and integrated into, the existing concrete sheet pile cap that runs along the western edge of the boardwalk. The wall would serve to protect the CSX Railroad, River Street, and those properties across River Street from potential flooding during foreseeable high-water events and wave run-up. The wall would be equipped with aluminum stop gate systems that could be closed during flooding conditions.
- *Option 2 – Earthen berm and concrete flood wall (nature-based)*

  This option consists of substituting the concrete floodwall identified in Option 1 with an engineered earthen berm. The earthen berm would be placed between the timber boardwalk and the public parking area. This would require a significant portion of the parking area to be sacrificed due to the berm's footprint. While the earthen berm may provide a visually pleasing nature-based solution, the berm's large footprint makes this option less than ideal.
- *Option 3 – Installation of Sheet Pile Seawall*
- Under this option a sheet pile retaining wall with a concrete cast in place cap would be constructed on the riverside of the existing boardwalk. Work under this option would include removing the existing decking of the boardwalk and installing sheet piling along the alignment shown on Figure 2B. The sheet piles would be capped with a cast in place concrete wall that would be installed to an elevation of 255.0'. The space between the sheet pile alignment and shoreline would be dewatered and backfilled with suitable material to reduce the uplift potential during flood conditions. Once backfilled, the boardwalk decking could be reinstalled or replaced with a concrete sidewalk option. Under this option additional hydraulic analysis would be required to satisfy extensive permitting requirements to determine potential flooding impacts to adjacent properties.

  Under the Zone F options described above, additional improvements common to each would be necessary. These improvements include the following

  - Installation of openings in the floodwall/berm with integrated stop gate systems to allow for pedestrian and/or vehicle traffic
  - Installation of an outlet check valve on the parking area stormwater outlet piping to the river
  - Installation of a manually operated stormwater pumping system for pumping out interior storm drainage during high water events.
  - Modification of the dock ramps to allow access during flooding conditions.

No new property easements would be necessary for these Zone F options. The flood control measure constructed in Zone F-2 would tie into the flood control measure constructed in Zone G described below,

near an existing boat ramp (see Figure 2B, Appendix A). It is understood that this boat ramp is no longer needed and will be regraded to match adjacent properties.

- Zone G
  - *Option 1 – Sheet pile sea wall*

    Under this option the flood barrier constructed in Zone F would be continued into Zone G for protection of the properties north of the timber boardwalk. This option consists of driven steel sheet pile with a concrete cap as the flood barrier. The sheet pile wall would terminate into the shoreline at the property line of parcel 530 (Monroe County Pump Station) at its northern end and tie into the flood protection measure constructed to the south in Zone F-2 (see Figure 2B, Appendix A). The sheet pile alignment will follow the existing shoreline to the extent possible to minimize impacts to the floodplain. Detailed hydraulic and hydrologic modeling will be completed as part of final design.

  - *Option 2 – Concrete sea wall*

    As an alternative to a sheet pile floodwall, a cast-in place or precast concrete floodwall may be constructed in Zone G. The floodwall would tie into the flood barrier constructed in Zone F and terminate at the into the shoreline at the property line of parcel 530 (Monroe County Pump Station) at its northern end. This option would require significant excavation or further encroachment into the river to determine feasibility.

    Common construction components for Options 1 and 2 include storm drain modifications to convey drainage to the river as needed. These modifications will consist of replacing components of the storm drains at the discharge, adding check valves and temporary pumping station connections as needed.

    Zone G improvements would require both temporary construction phase easements and permanent easements to be established. These easements would need to be negotiated with TS Holdings (504 River Street) and the U.S. Coastguard Auxiliary. The permanent easements would be required for periodic floodwall maintenance and inspection.

- Floating Dock Modifications
  - *Option 1: Installation of vertical post and ring anchoring system*

    Under this option the anchoring system for all floating docks in the project area would be replaced with an alternate system that would keep the docks functional and free of damage during extreme high and low water events. The approach included with Option 1 is to drive steel posts at periodic intervals along the floating docks and connect the docks to the steel posts via a steel ring (or similar) which would allow the docks change elevations according to the water level. A conceptual sketch of the post and ring system is included in Appendix A, Figure 3. While other materials for the posts are available, steel posts filled with concrete were selected for this evaluation as they will provide a long-term solution. Materials selection will be made during Final Design based on other contributing factors including cost.

    Option 2: Modification of existing bank ties

    Under this option the existing floating dock anchoring system would be modified to accommodate extreme high and low water events. This would include modification of the bank tie joints at both the bank side and dock side to allow the arms to pivot in the horizontal plane. The new joints may be comprised of a ball joint or a horizontal pin augmented by reinforced dockage components.

Figure 4-4 *Existing Utilities on Fixed Boardwalk to be Relocated*

Figure 4-3 *Existing Floating Dock Bank Tie System*

Floating dock modifications under both Options 1 and 2 would also include relocation of electric utilities from the stationary boardwalk onto the floating docks to facilitate a wider vertical range of movement. Additionally, a detailed inspection of the docks is recommended to identify any damage due to varying water levels. Damaged boards and dock framing should be repaired as defined in the final design. In addition, general structural repairs of timber boards that have incurred damaged due to high water will also be addressed.

» Additional Project Components

The following additional project components have been identified by the City for inclusion in this project. These items were not part of the original project profile for Projects MO-07 and MO-10 but are critical to public infrastructure impacted by high water elevations. These items and are included herein as placeholders for future discussion:

- Zone G Extension: The proposed flood protection described above for Zone G could be extend further north to provide protection to the private properties north of the project area.. The proposed floodwall installed in Zone G could be extended north along the shoreline and perimeter of the restaurant property and tie into the existing concrete pier on the riverside of parcel 4590. Preliminary conceptual solutions include:
  - Extending sheet pile wall with concrete cap north
  - Planning level cost estimate: $800,000
- Ontario Beach Parking Lot Drainage: During flood conditions, the bioretention basins in the parking area do not operate properly and the cause is unknown. Solutions to create a free-flowing permanent solution will be reviewed. Preliminary conceptual solutions include:
  - Duck-bill check valve or similar on bioretention outlet pipes
  - Interior drainage stormwater sump and pumping system
  - Planning level cost estimate: $400,000

- City Fire Boat Slip: The City Fire Department is purchasing a new fire boat with a preference to locate on the west side of the Genesee River. The overall improvements will consist of a slip, dockage and utilities and security to support the new equipment. Preliminary conceptual solutions include:
  - Placement of the slip and dockage between Zones F-2 and G as described in this report
  - Design coordination with flood protection measures outlined in this report
  - New electric and water utilities as required
  - Planning level cost estimate: $400,000
- River Street Extension: The City will be realigning River Street in the area of the CG Auxiliary and Monroe County Pure Water Pumping Station within the next 2-3 years. Pending available funding and scheduling, this important project may be able to be integrated into flood mitigation measures for the River Street area. Preliminary conceptual solutions include:
  - Modification of existing stormwater drainage basins and conveyance along River Street
  - Planning level cost estimate (flood related work only): $100,000
- Port of Rochester Boat Launch: High water levels have inundated the fixed concrete docks rendering them unusable for the flood portion of the season. An alternative system is needed to ensure operability throughout the boating season. Preliminary conceptual solutions include:
  - Floating dock system with ramp
  - Planning level cost estimate: $150,000

4.2 COST ESTIMATE

Conceptual cost estimates for each alternative zone and associated options are provided in tabular form in Appendix B. Additionally, a summary of construction costs is included in Table 5-1 below.

4.3 COMMUNITY BENEFITS AND OTHER IMPACTS

The following non-monetary factors relate to implementing improvements in each of the project alternative zones:

- Aesthetics: Stabilization of project area banks with vegetative erosion control can provide enhanced aesthetics and a softer look to the bank. Proposed concrete flood walls can be constructed with a decorative finish to add to visual appeal of the area.
- Recreational Opportunities: Implementation of floating dock improvements and bank stabilization improvements has the potential to keep boat slips and walking paths open to the public for greater periods of time with limited down time due to damage during extreme water level events.
- Ecological Benefit: Implementation of the enhanced wetland alternative and vegetative erosion control has the potential to promote improved wildlife ecology.
- Climate Resiliency: Constructing a new sea wall and new flood wall will provide additional protection against flood risk, even in the event if flooding is exasperated due to ongoing climate change issues.

5. SUMMARY AND COMPARISON OF RESILIENCY, NATURAL AND NATURE-BASED ALTERNATIVES

This section provides a comparison of alternatives by providing a summary table of technically feasible alternatives identifying pros, cons, and estimated total cost for each. The cost estimates are provided as rough order of magnitude of raw construction cost, without any additional markups for comparison purposes only. Project construction costs were estimated for the alternatives based on conceptualized designs. Rough order of magnitude quantities has been developed and unit costs have been derived from similar NYSDOT item costs, recommended manufacturer costs and other similar project known costs. The costs are assumed to represent scale differences between the alternatives but are by no means considered accurate for detailed construction estimates.

Table 5-1 *Comparison of Alternatives*

Alternative Zone(s)	Option	Pros	Cons	Cost
A & C	1-Rip-rap Extension	• Contiguous with existing bank stabilization measures • Inexpensive • Limited maintenance	• Limited environmental enhancement	$6,338
	2-Vegetative erosion control	• Nature-based solution • Enhanced wildlife habitat	• Potential for vegetation overgrowth, sight obstructions and maintenance requirements	$5,155
	3-Vegetated Earthen Berm	• Nature-based solution • Enhanced wildlife habitat and flood protection	• Requires modifications to dock ramps to maintain access during flooding • Additional cost	$31,070
	4-Wetland Enhancement	• Enhanced wildlife habitat • Enhanced river bank beautification • Enhanced bank stabilization • Inexpensive	• Moderate temporary environmental disturbance • Potential for excessive localized sedimentation	$3,500
B	1-Wetland to remain as is	• No environmental disturbance	• No environmental enhancement • Potential for excessive localized sedimentation	$0
	2-Wetland enhancement	• Enhanced wildlife habitat • Enhanced river bank beautification • Enhanced bank stabilization • Inexpensive	• Moderate temporary environmental disturbance • Potential for excessive localized sedimentation	$13,223
	3-Wetland removal	• Robust river bank stabilization • Reduction in localized sedimentation	• Maximum environmental disturbance • Wetland mitigation required • Extensive permitting requirements	$14,609

Alternative Zone(s)	Option	Pros	Cons	Cost
	Vegetated Earthen Berm	• Nature based solution • Enhanced wildlife habitat and flood protection	• Requires modifications to dock ramps to maintain access during flooding • Additional Cost	$25,940
D	1-Retaining wall extension	• Contiguous with existing bank stabilization measures • Ease of construction	• Limited aesthetic benefit	$40,496
	2-Envirolok erosion control or similar	• Nature-based • Proven effectiveness • Potential aesthetic benefits	• Potential for more intensive maintenance	$28,400
	Vegetated Earthen Berm	• Nature based solution • Enhanced wildlife habitat and flood protection	• Requires modifications to dock ramps to maintain access during flooding • Additional Cost	$15,796
E	1-Rip-rap Extension	• Contiguous with existing bank stabilization measures • Inexpensive • Limited maintenance	• Limited environmental enhancement	$2,377
	2-Vegetative erosion control	• Nature-based solution • Enhanced wildlife habitat	• Potential for vegetation overgrowth, sight obstructions and maintenance requirements	$2,366
	3-Flood Curbing	• Effective	• Requires modifications to dock ramps to maintain access during flooding • Additional cost	$7,454
F-1	1-Concrete retaining wall modifications	• Contiguous with floodwall proposed in zone F-2	• Relatively difficult construction • Less natural looking and less visually pleasing • Boardwalk and docks inaccessible as flood waters approach elevation 253 +/- • Does not protect riverside infrastructure	$265,050
	2-Railroad building floodproofing	• May retain historic look of building	• Extensive permitting (SHPO) • Structural and architectural condition of building unknown	(1)

Alternative Zone(s)	Option	Pros	Cons	Cost
			• Boardwalk and docks inaccessible as flood waters approach elevation 253 +/- • Does not protect riverside infrastructure	
	3-Sheet pile seawall	• Highly effective • Maintain use of boardwalk and docks during flood conditions	• Lack of aesthetics • Cost • Extensive permitting	$528,627
F-2	1-Cast-in-place concrete floodwall	• Ease of construction • Proven solution	• May be less visually pleasing	$246,875
	2-Earthern berm	• Nature-based solution • More visually pleasing	• Large footprint results in loss of parking area • Requires regular maintenance (mowing)	$241,665
	3-Sheet pile sea wall	• Highly effective • Maintain use of boardwalk and docks during flood conditions	• Lack of aesthetic • Cost • Extensive permitting	$1,397,405
G	1-Sheet pile sea wall	• Highly effective	• Lack of aesthetic enhancement	$786,626
	2-Concrete sea wall	• Could be made to be more visually pleasing	• Expensive • High degree of construction difficulty	(1)
Floating Docks	1-Post and ring anchoring system	• Proven solution		$231,792
	2-Bank tie modification	• Potential reuse of existing materials	• Difficult to implement with reuse of materials • High cost to benefit ratio • Limited water level change	$100,000
Notes:	(1) Further Evaluation required to determine feasibility and resulting cost of option.			

6. RECOMMENDATIONS

The project alternatives zones are organized such that work in some zones may be omitted from the project if they are deemed not cost effective or other factors arise. However, it is recommended that all zones undergo improvements with one of the proposed options to ensure continuous bank stabilization and flood protection for the project area. Further, the cost for most proposed stabilization measures are relatively minimal compared to the potential for repeated damage due to high water.

- The following summarizes the recommended option for each zone with accompanying justification:
  - Zones A & C Recommendation: **Options 2 & 4 – Vegetative Bank Stabilization & Wetland Enhancement**

    The option for vegetative bank stabilization is a relatively inexpensive, but easy to construct and highly effective approach. This option provides a naturalized look to the stream bank and may provide ecological benefits. This option is preferred over rip-rap extension for its nature-based characteristics. In addition, if an emergent wetland fringe exists in these zones wetland enhancement is recommended. Option 3, the earthen berm, is not recommended due to costs and complications associated with providing access to floating docks, and the flood protection benefits of such a measure are minimal.

  - Zone B Recommendation: **Option 2- Wetland Enhancement**

    Enhancement of the existing wetlands in this zone will be inexpensive and easy to implement while providing a variety of potential benefits. While leaving the wetlands as-is (Option 1) would bear no cost, the cost of enhancement is minimal relative to the gain in ecological habitat, flood resistant species, and improved riverbank stabilization. Option 3, to remove the wetlands entirely, is the least cost effective and comes with a host of permitting challenges while providing very little benefit. Option 4, the earthen berm, is not recommended due to costs and complications associated with providing access to floating docks, and the flood protection benefits of such a measure are minimal.

  - Zone D Recommendation: **Option 1- Retaining Wall Extension**

    The retaining wall extension option is a straight forward and inexpensive approach to an already hardened streambank. Raising of the retaining wall will result in little to no loss of adjacent green space and compared to the cost of implementing an Envirolok system (Option 2) the retaining wall extension is preferred. While the Envirolok system may provide a "greener" solution, in this case the monetary costs outweigh the benefits of such a solution. Option 3, the earthen berm, is not recommended as the flood protection benefits of such a measure are minimal.

  - Zone E Recommendation: **Options 2 & 3 – Vegetative Bank Stabilization & Flood Curbing**

    The option for vegetative bank stabilization is a relatively inexpensive, but easy to construct and highly effective approach. This option provides a naturalized look to the stream bank and may provide ecological benefits. This option is preferred over rip-rap extension for its nature-based characteristics. In addition, it is recommended that flood curbing be installed to tie into the flood protection measure constructed in Zone F-2.

  - Zone F-1 Recommendation: **Option 1- Retaining Wall Modification**

    Retaining wall modification in front of the historic railroad building, while technically challenging, is highly feasible and would blend well with the proposed concrete floodwall in Zone F-2. At the time of this writing little is known about the structural and architectural details of the historic railroad building. This makes floodproofing such a building (Option 2) potentially costly. Additionally, floodproofing modifications to the building may be limited if the structure is deemed a historical resource by the State of New York. The visible portion of the retaining wall above the boardwalk could also be constructed with textured forms and/or dyes for aesthetic appeal. The City's preferred alternative is Option 3, a sheet pile seawall on the river side of the boardwalk, to protect the boardwalk itself from flooding. If this alternative was ultimately selected extensive hydraulic and hydrologic modeling would need to be completed and

additional costs may arise from flood mitigation efforts on adjacent properties, Option 3 also presents the greatest permitting challenge.

» Zone F-2 Recommendation: **Option 1- Cast-in-place Concrete Floodwall**

A cast-in-place concrete floodwall (concrete cap extension) is cost effective and easily designed and constructed. An earthen berm is not preferred due to its relatively large footprint which will result in reduced usability (parking space) of the recently improved parking area. Further, an earthen berm provides little ecological and environmental benefit. The City's preferred alternative is Option 3, a sheet pile seawall on the river side of the boardwalk, to protect the boardwalk itself from flooding. If this alternative was ultimately selected extensive hydraulic and hydrologic modeling would need to be completed and additional costs may arise from flood mitigation efforts on nearby properties, Option 3 also presents the greatest permitting challenge.

» Zone G Recommendation: **Option 1- Sheet Pile Sea Wall**

The sheet pile sea wall option is preferred over the concrete floodwall option (Option 2) for its simple design and ease of construction which make the sheet pile far more cost effective, while having been proven to be highly effective.

» Floating Docks Recommendation: **Option 1 – Post & Ring System**

The post and ring dock system is recommended for its proven effectiveness and inexpensive installation. Compared to modifying the existing bank tie system (Option 2), the post and ring system has a higher likelihood of success with minimal additional cost.

- Cost estimate

The total estimated project cost for the recommended alternative (all zones, options as described above) is $3,289,000. This project cost includes construction costs as well as 25% permitting, engineering, legal and administrative costs plus 30% contingency on construction and soft costs. A summary of the project costs by zone and REDI project is included in Appendix B.

- Project schedule

Strategic project scheduling and adequate lead times are important to implementing projects on time and on budget. When projects are being planned, multiple aspects need to be scheduled, starting with a review of the grantee's municipal procurement practices and a preapplication meeting with the local NYSDEC RPA. A conceptual project schedule based on typical task durations is presented in Table 6-1. The pre-application meeting will help set the stage for the rest of the project, including discussions surrounding required permits and design recommendations. Following the pre-application meeting, preliminary design and permitting can begin. Because permitting is dependent on project complexity, disturbance type, and locations within navigable waters of the United States, adequate lead time is recommended. While the permitting process is being worked through, the design will be finalized.

Table 6-1 ***Conceptual Project Schedule***

Description	Estimated Duration
Selection of professional consultants	60 days
Scheduling and completion of the Permit Pre-Application Conference	30 days
SEQRA Process	60 days (concurrent with design)
Design	210 days
Permits and Approvals	60-90 days
Advertisement and Award of Construction Contracts	90-120 days
Construction	300 days

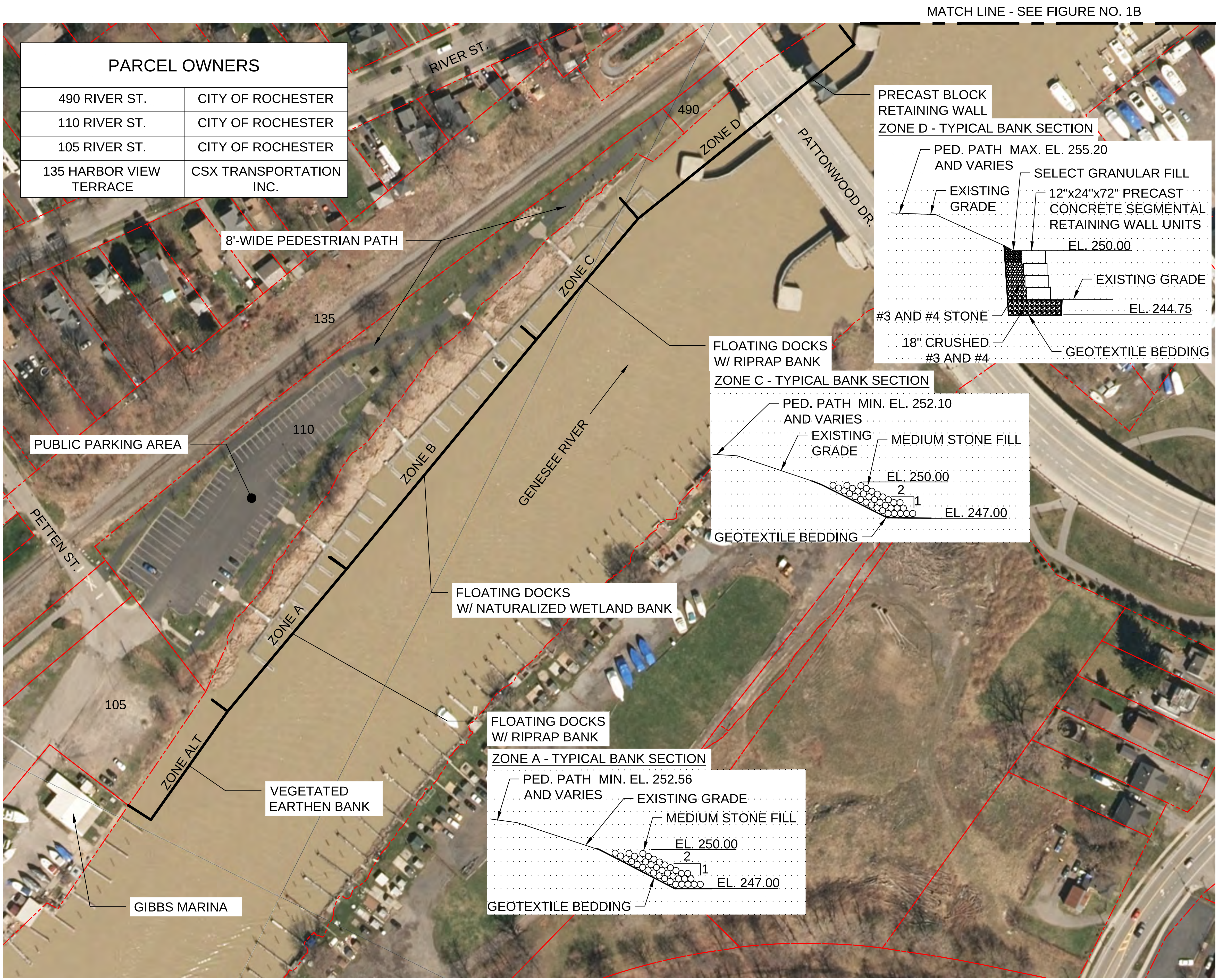
As part of the planning process, community and stakeholder public outreach and informational meetings should be held to get the community engaged and supporting the project. These meetings should be held to define any key issues and resident concerns with the recommended alternatives. Additional steps to proceed include:

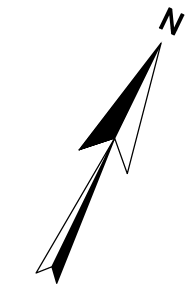
- Authorize design phase engineering services;
- Conduct site survey to confirm existing grades and verify utility locations and sizes, specifically existing stormwater infrastructure;
- Retrieval and review of additional background information including:
    - Structural and architectural details of historic railroad building
    - Details for existing floating docks
    - Refinement of high-water level and top of wall elevations
  - Topographic and bathymetric surveys
  - Geotechnical investigation and borings
- Complete comprehensive floodplain modeling for the proposed alternatives in conjunction with all additional REDI improvement project to ensure the proposed flood mitigation measures do not negatively impact neighboring properties;
- Prepare design plans and specifications;
- Secure regulatory (and funding agency as appropriate) approvals; and
- Advertise and receive bids and award construction contract(s);
- Construct proposed infrastructure.

Appendix A

Additional Figures

FIGURE NO. 1A





LEGEND

SITE FEATURE

TAX PARCEL

490 PARCEL ADDRESS

ZONE A PROJECT ZONE

NEW YORK STATE
OFFICE OF GENERAL SERVICES

WEST SIDE OF GENESEE RIVER
IMPROVEMENTS

ROCHESTER, NY

EXISTING SITE
FEATURES AND CONDITIONS

125' 0 125'

FILE NO. 2069.73070-FIG1B

FEBRUARY 2020

O'BRIEN & GERE ENGINEERS, INC

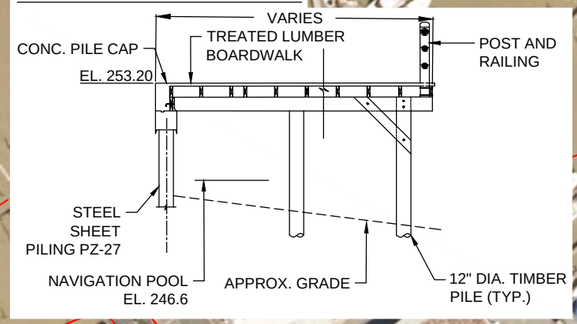
A RAMBOLL COMPANY

RAMBOLL

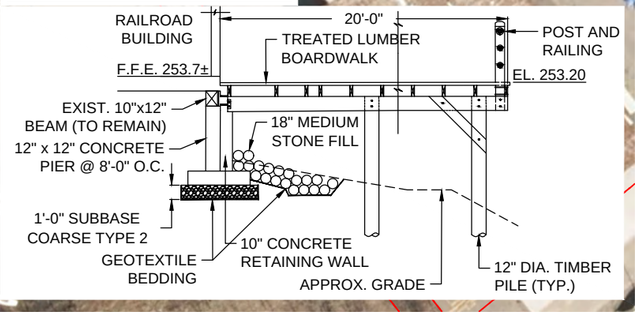
PARCEL OWNERS	
490 RIVER ST.	CITY OF ROCHESTER
504 RIVER ST.	PELICANS NEST
520 RIVER ST.	US COAST GUARD
530 RIVER ST.	CITY OF ROCHESTER
560-566 RIVER ST.	PELICANS NEST
4590 LAKE AVE.	CITY OF ROCHESTER

PELICANS NEST RESTAURANT
560-566
4590
MONROE COUNTY WW PUMPING STATION
530
US COAST GUARD AUXILIARY
520
504
ZONE G
INCOMPLETE CRIBBING/ TIMBER DECKS/ FINGER DOCKS
PUBLIC PARKING AREA
RIVER ST.
LATTA RD.
490
ZONE F-2
TIMBER BOARDWALK W/ SHEET PILE WALL
BOATER SERVICES BUILDING
HISTORIC RAILROAD BUILDING
GENESEE RIVER
490
ZONE F-1
ZONE E
490
FLOATING DOCKS W/ RIPRAP BANK
MATCH LINE - SEE FIGURE NO. 1A

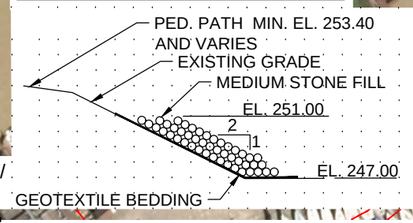
ZONE F-2 - TYPICAL SECTION



ZONE F-1 - TYPICAL SECTION



ZONE E - TYPICAL BANK SECTION



N

LEGEND

SITE FEATURE
TAX PARCEL
490 PARCEL ADDRESS
ZONE A PROJECT ZONE

NEW YORK STATE
OFFICE OF GENERAL SERVICES

WEST SIDE OF GENESEE RIVER
IMPROVEMENTS

ROCHESTER, NY

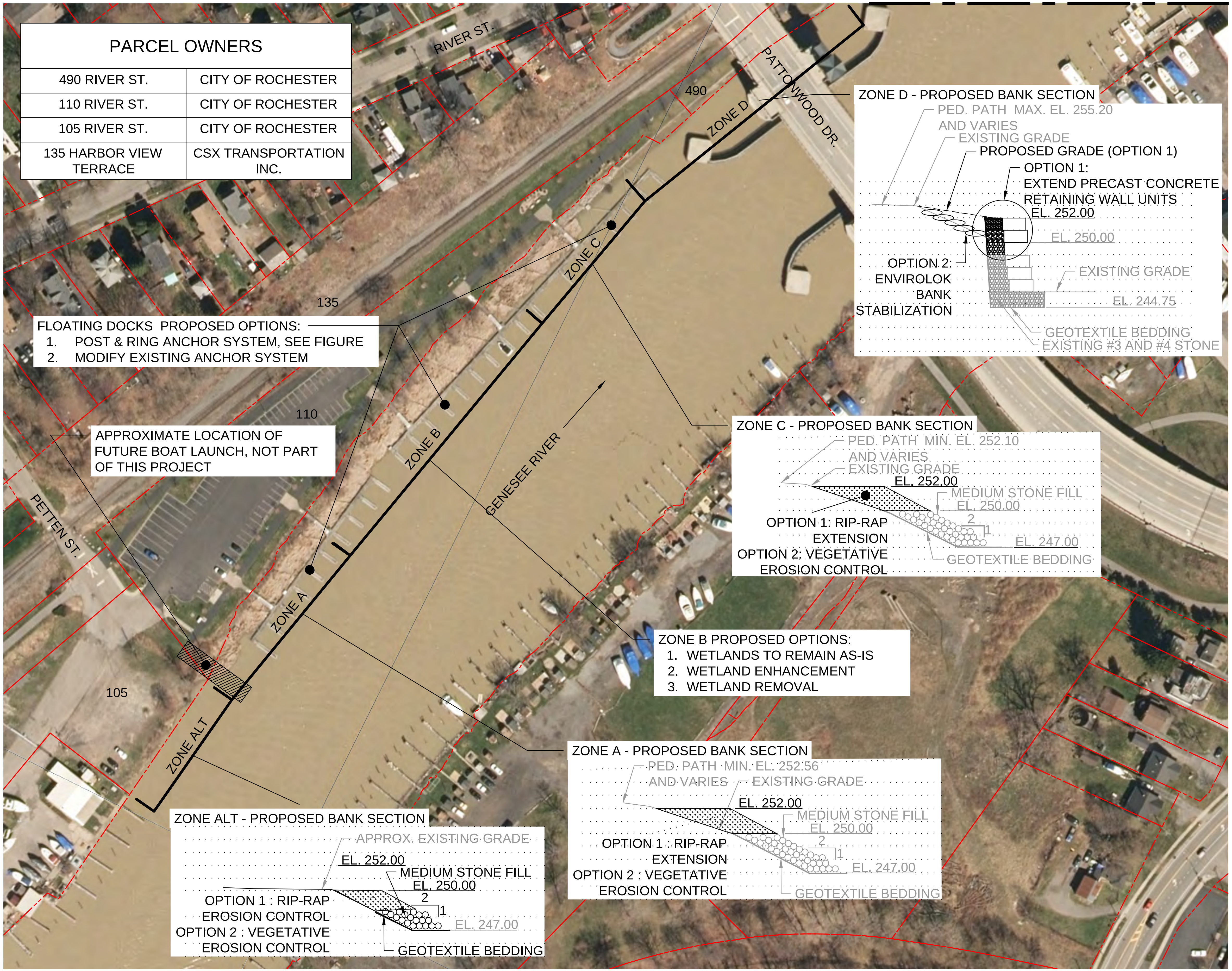
EXISTING SITE FEATURES AND CONDITIONS

125' 0 125'

FILE NO. 2069.73070-FIG1B
FEBRUARY 2020

O'BRIEN & GERE ENGINEERS, INC
A RAMBOLL COMPANY

RAMBOLL



PARCEL OWNERS

490 RIVER ST.	CITY OF ROCHESTER
110 RIVER ST.	CITY OF ROCHESTER
105 RIVER ST.	CITY OF ROCHESTER
135 HARBOR VIEW TERRACE	CSX TRANSPORTATION INC.

N

LEGEND

(symbol)	SITE FEATURE
(red dashed line)	TAX PARCEL
490	PARCEL ADDRESS
ZONE A	PROJECT ZONE

NEW YORK STATE
OFFICE OF GENERAL SERVICES

WEST SIDE OF GENESEE RIVER IMPROVEMENTS

ROCHESTER, NY

PROPOSED IMPROVEMENT ALTERNATIVES

125' 0 125'

FILE NO. 2039.73070-FIG2A
FEBRUARY 2020

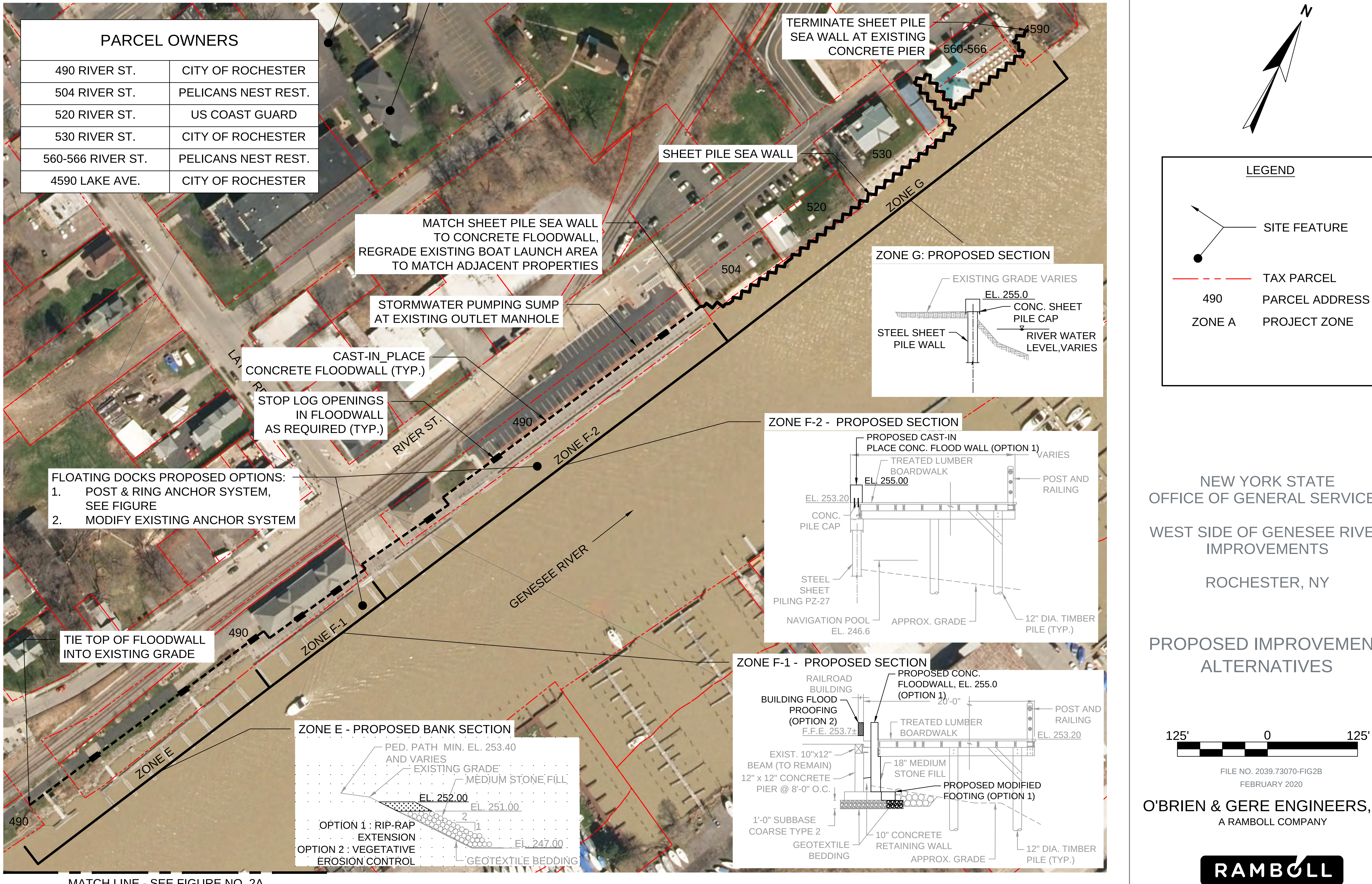
O'BRIEN & GERE ENGINEERS, INC
A RAMBOLL COMPANY

RAMBOLL

I:\Nys-Ogs.2069\73070.Wo-1-Redi-Plann\Docs\Reports\Engineering Reports\MO.07 West Side of Genesee River Businesses\07 Figures\Figure Resources\

FIGURE NO. 2B

PARCEL OWNERS	
490 RIVER ST.	CITY OF ROCHESTER
504 RIVER ST.	PELICANS NEST REST.
520 RIVER ST.	US COAST GUARD
530 RIVER ST.	CITY OF ROCHESTER
560-566 RIVER ST.	PELICANS NEST REST.
4590 LAKE AVE.	CITY OF ROCHESTER



TERMINATE SHEET PILE SEA WALL AT EXISTING CONCRETE PIER
4590
560-566
530
520
504
490
SHEET PILE SEA WALL
ZONE G
MATCH SHEET PILE SEA WALL TO CONCRETE FLOODWALL, REGRADE EXISTING BOAT LAUNCH AREA TO MATCH ADJACENT PROPERTIES
STORMWATER PUMPING SUMP AT EXISTING OUTLET MANHOLE
CAST-IN_PLACE CONCRETE FLOODWALL (TYP.)
STOP LOG OPENINGS IN FLOODWALL AS REQUIRED (TYP.)
RIVER ST.
ZONE F-2
FLOATING DOCKS PROPOSED OPTIONS:
1. POST & RING ANCHOR SYSTEM, SEE FIGURE
2. MODIFY EXISTING ANCHOR SYSTEM
GENESEE RIVER
ZONE F-1
TIE TOP OF FLOODWALL INTO EXISTING GRADE
ZONE E
ZONE G: PROPOSED SECTION
EXISTING GRADE VARIES
EL. 255.0
CONC. SHEET PILE CAP
STEEL SHEET PILE WALL
RIVER WATER LEVEL,VARIES
ZONE F-2 - PROPOSED SECTION
PROPOSED CAST-IN PLACE CONC. FLOOD WALL (OPTION 1)
VARIES
TREATED LUMBER BOARDWALK
EL. 255.00
POST AND RAILING
EL. 253.20
CONC. PILE CAP
STEEL SHEET PILING PZ-27
NAVIGATION POOL EL. 246.6
APPROX. GRADE
12" DIA. TIMBER PILE (TYP.)
ZONE F-1 - PROPOSED SECTION
RAILROAD BUILDING
BUILDING FLOOD PROOFING (OPTION 2)
F.F.E. 253.7±
PROPOSED CONC. FLOODWALL, EL. 255.0 (OPTION 1)
20'-0"
TREATED LUMBER BOARDWALK
POST AND RAILING
EL. 253.20
EXIST. 10"x12" BEAM (TO REMAIN)
12" x 12" CONCRETE PIER @ 8'-0" O.C.
18" MEDIUM STONE FILL
PROPOSED MODIFIED FOOTING (OPTION 1)
1'-0" SUBBASE COARSE TYPE 2
GEOTEXTILE BEDDING
10" CONCRETE RETAINING WALL
APPROX. GRADE
12" DIA. TIMBER PILE (TYP.)
ZONE E - PROPOSED BANK SECTION
PED. PATH MIN. EL. 253.40 AND VARIES
EXISTING GRADE
MEDIUM STONE FILL
EL. 252.00
EL. 251.00
OPTION 1 : RIP-RAP EXTENSION
OPTION 2 : VEGETATIVE EROSION CONTROL
EL. 247.00
GEOTEXTILE BEDDING
MATCH LINE - SEE FIGURE NO. 2A
N
LEGEND
SITE FEATURE
TAX PARCEL
490 PARCEL ADDRESS
ZONE A PROJECT ZONE
125' 0 125'

NEW YORK STATE OFFICE OF GENERAL SERVICES

WEST SIDE OF GENESEE RIVER IMPROVEMENTS

ROCHESTER, NY

PROPOSED IMPROVEMENT ALTERNATIVES

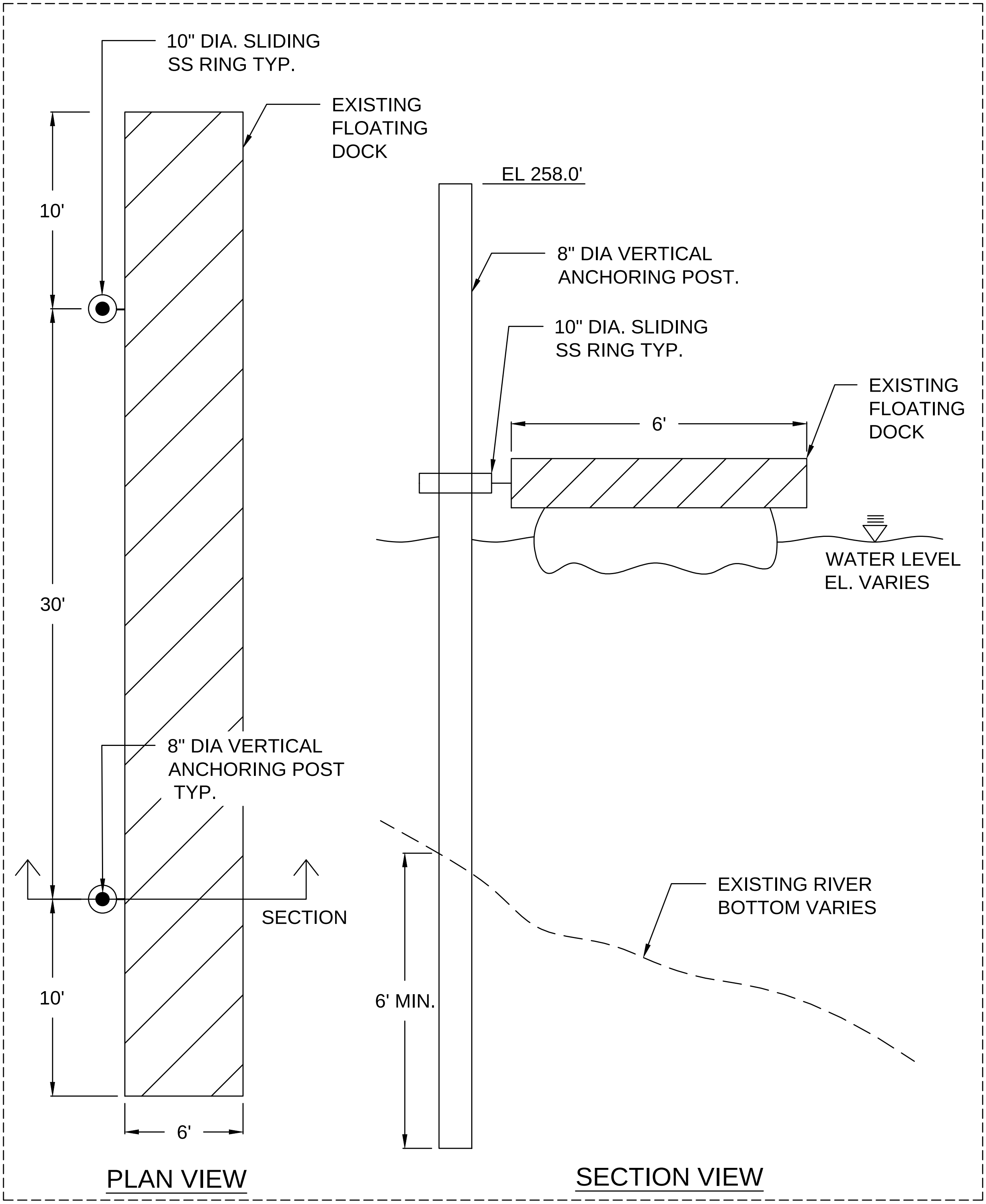
FILE NO. 2039.73070-FIG2B

FEBRUARY 2020

O'BRIEN & GERE ENGINEERS, INC

A RAMBOLL COMPANY

RAMBOLL



NEW YORK STATE OFFICE OF GENERAL SERVICES
WEST SIDE OF GENESEE RIVER IMPROVEMENTS
ROCHESTER, NY

PROPOSED POST & RING DOCK SYSTEM

N.T.S.

2069.73070-FIG3
FEBRUARY 2020

O'BRIEN & GERE ENGINEERS, INC
A RAMBOLL COMPANY

Appendix B

Supporting Cost Estimate Information

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO31 **Westside of Genesee River Improvements**

TABLE 9 - PROJECT COST ESTIMATE FOR RECOMMENDED ALTERNATIVES

Item/Description			Construction Cost Subtotal
Alternative Zones A & C - Options 2 & 4		$	8,655
Alternative Zone B - Option 2		$	13,223
Alternative Zones E - Options 2 & 3		$	9,820
Alternative Zone D - Option 1		$	40,496
Alternative Zone F-1 - Option 1		$	265,050
Alternative Zone F-2 - Option 1		$	246,875
Alternative Zone G - Option 1 - Sheet pile up to N edge of WWPS		$	786,626
Floating Docks - Option 1		$	231,792
Overall Construction Cost Subtotal		**$**	**1,602,538**
Mobilization	10.00%	$	160,000
Bonds	1.25%	$	20,000
Contractor O&P	15%	$	240,000
Total Estimated Construction Cost		**$**	**2,023,000**
Engineering, Legal, and Administrative	**25.0%**	**$**	**505,750**
Subtotal Project Cost		**$**	**2,528,750**
Contingency	30%	$	760,250
Total Estimated Project Cost		**$**	**3,289,000**

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 Westside of Genesee River Businesses

TABLE 1 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONES A & C

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Rip-Rap Extension (Construction Cost Subtotal)				**$ 6,338**
Medium stone fill	134	TONS	$ 38.83	$ 5,203
Geotextile underlayment	198	SQYD	$ 2.40	$ 475
Excavation	66	YDS	$ 10.00	$ 660
Option 2 - Vegetative Erosion Control (Construction Cost Subtotal)				**$ 5,155**
Erosion control fabric	235	SQYD	$ 2.14	$ 503
Plantings	1,836	SQFT	$ 2.00	$ 3,672
Excavation	98	YDS	$ 10.00	$ 980
Option 3 - Vegetative Berm (Construction Cost Subtotal)				**$ 31,070**
Erosion control fabric	1,130	SQYD	$ 2.14	$ 2,418
Plantings	10,147	SQFT	$ 2.00	$ 20,294
Backfill	380	YDS	$ 12.10	$ 4,598
6 inches of Topsoil	188	YDS	$ 20.00	$ 3,760
Option 4 - Wetland Enhancement				**$ 3,500**
Plantings	0.10	Acres	$ 35,000.00	$ 3,500

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 **Westside of Genesee River Businesses**

TABLE 2 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE B

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Wetlands to Remain As-is (Construction Cost Subtotal)				**$ -**
Option 2 - WetlandsEnhancement (Construction Cost Subtotal)				**$ 13,223**
Plantings	0.33	Acres	$ 40,000.00	$ 13,223
Option 3 - Wetland Removal				**$ 14,609**
Excavation	270	YDS	$ 10.00	$ 2,700
Erosion control fabric	160	SQYD	$ 2.14	$ 342
Plantings	1,440	SQFT	$ 2.00	$ 2,880
Medium stone fill	228	TONS	$ 38.10	$ 8,687
Option 4 - Vegetated Berm Flood Protection				**$ 25,940**
Erosion control fabric	942	SQYD	$ 2.14	$ 2,016
Plantings	8,474	SQFT	$ 2.00	$ 16,948
Backfill	317	YDS	$ 12.10	$ 3,836
6 inches of Topsoil	157	YDS	$ 20.00	$ 3,140

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 **Westside of Genesee River Businesses**

TABLE 3 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE D

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Concrete block retaining wall extension(Construction Cost Subtotal)				**$ 40,496**
Precast concrete blocks (2 courses, 440 ft long)	148	BLK	$ 230.00	$ 34,040
Drainage stone backfill	186	TONS	$ 12.10	$ 2,251
Geotextile underlayment	244	SQYD	$ 2.40	$ 587
4" topsoil	27	CUYD	$ 32.55	$ 884
Erosion control fabric	250	SQYD	$ 2.14	$ 535
Seeding	2,200	SQFT	$ 1.00	$ 2,200
Option 2 - Envirolok Bank Stabilization (Construction Cost Subtotal)				**$ 28,400**
Envirolok bags and stakes	2,000	EA	$ 12.00	$ 24,000
Hydroseed	2,200	MSF	$ 2.00	$ 4,400
Option 3 - Vegetated Berm Flood Protection (Construction Cost Subtotal)				**$ 15,796**
Erosion control fabric	490	SQYD	$ 2.14	$ 1,049
Plantings	4,400	SQFT	$ 2.00	$ 8,800
Backfill	356	YDS	$ 12.10	$ 4,308
6 inches of Topsoil	82	YDS	$ 20.00	$ 1,640

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 Westside of Genesee River Businesses

TABLE 4 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE E

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Rip-Rap Extension (Construction Cost Subtotal)				**$ 2,377**
Medium stone fill	51	TONS	$ 38.83	$ 1,966
Geotextile underlayment	78	SQYD	$ 2.40	$ 187
Excavation	23	YDS	$ 10.00	$ 225
Option 2 - Vegetative Erosion Control (Construction Cost Subtotal)				**$ 2,366**
Erosion control fabric	88	SQYD	$ 2.14	$ 188
Plantings	789	SQFT	$ 2.00	$ 1,578
Excavation	60	YDS	$ 10.00	$ 600
Option 3 - Flood Curbing (Construction Cost Subtotal)				**$ 7,454**
Cast-in-place concrete flood curbing	370	LF	$ 18.00	$ 6,660
Excavation	54	YDS	$ 10.00	$ 540
Subbase stone	21	YDS	$ 12.10	$ 254

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 **Westside of Genesee River Businesses**

TABLE 5 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE F-1

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Retaining Wall Modifcations and Extension (Construction Cost Subtotal)				**$ 265,050**
Cast-in-place concrete wall (8' tall x 1' thick)	210	LF	$ 450	$ 94,500
Footer modifications (footing extension of 4' long x 1' thick)	210	LF	$ 120	$ 25,200
Boardwalk modifications	1	LS	$ 50,000	$ 50,000
Stop Logs	5	EA	$ 5,000	$ 25,000
Coffer dams (1 month)	210	LF	$ 335	$ 70,350
Option 2 - Historic Railroad Building Flood Proofing (Construction Cost Subtotal)				**$ -**
NO COST PROVIDED, ADDITIONAL BUILDING EVALUATION REQUIRED*				$ -
				$ -
				$ -
Option 3 - Steel Sheet Pile Sea Wall (Construction Cost Subtotal)				**$ 528,627**
Steel sheet pile (36 ft tall)	7,560	SQFT	$ 50.00	$ 378,000
Backfill	925	CUYD	$ 12.10	$ 11,193
Rip-rap toe	168	TONS	$ 38.30	$ 6,434
Concrete cap assumed to be 30" x 30"	210	LF	$ 300.00	$ 63,000
Boardwalk modifications	1	LS	$ 50,000.00	$ 50,000
Dewatering	1	LS	$ 20,000.00	$ 20,000

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 **Westside of Genesee River Businesses**

TABLE 6 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE F-2

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Cast-in-place Concrete Floodwall (Construction Cost Subtotal)				**$ 246,875**
12" x 22" cast-in-place floodwall (pile cap extension)	615	LF	$ 125.00	$ 76,875
Aluminum Stopgate System	4	EA	$ 12,000.00	$ 48,000
Boardwalk Restoration	1	LS	$ 15,000.00	$ 15,000
Dock Access Platforms	2	EA	$ 16,000.00	$ 32,000
Manual stormwater pumping system	1	LS	$ 75,000.00	$ 75,000
Option 2 - Cast-in-place Concrete Floodwall w/ Partial Earthen Berm (Construction Cost Subtotal)				**$ 241,665**
12" x 22" cast-in-place floodwall (pile cap extension)	170	LF	$ 125.00	$ 21,250
Earthen berm material and placement	164	YDS	$ 45.00	$ 7,380
Seeding	5,200	SQFT	$ 1.00	$ 5,200
Topsoil (4")	63	YDS	$ 45.00	$ 2,835
Sidewalk/Paving Restoration	1	LS	$ 35,000.00	$ 35,000
Boardwalk Restoration	1	LS	$ 15,000.00	$ 15,000
Dock Access Platforms	2	EA	$ 16,000.00	$ 32,000
Aluminum Stopgate System with Concrete Wing Walls	4	EA	$ 12,000.00	$ 48,000
Manual stormwater pumping system	1	LS	$ 75,000.00	$ 75,000
Option 3 - Steel Sheet Pile Sea Wall (Construction Cost Subtotal)				**$ 1,397,405**
Steel sheet pile (36 ft tall)	21,600	SQFT	$ 50.00	$ 1,080,000
Backfill	2,460	CUYD	$ 12.10	$ 29,766
Rip-rap toe	330	TONS	$ 38.30	$ 12,639
Concrete cap assumed to be 30" x 30"	600	LF	$ 300.00	$ 180,000
Boardwalk modications	1	LS	$ 75,000.00	$ 75,000
Dewatering	1	LS	$ 20,000.00	$ 20,000

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 **Westside of Genesee River Businesses**

TABLE 7 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE G

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Steel Sheet Pile Sea Wall (Construction Cost Subtotal)				**$ 786,626**
Steel sheet pile (36 ft tall)	13,536	SQFT	$ 50.00	$ 676,800
Rip-rap toe	126	TONS	$ 38.30	$ 4,826
Concrete cap assumed to be 30” x 30”	350	LF	$ 300.00	$ 105,000
Option 2 -Cast-in-place Concrete Sea Wall (Construction Cost Subtotal)				**$ -**
NO COST PROVIDED, CONSIDERED COST AND CONSTRUCTION DIFFICULTY PROHIBITIVE				

Project: Lake Ontario REDI
Owner: NYSOGS
County: Monroe
Municipality: City of Rochester
Last Updated: 4/1/2020
Reviewed: Mike Manning
MO.07/10 Westside of Genesee River Businesses

TABLE 8 - CONSTRUCTION COST ESTIMATE- ALTERNATIVE ZONE G

Item/Description	Qty	Units	Unit Cost	Amount
Option 1 - Post and ring system				**$ 231,792**
Electrical and Water Modifications on Docks	1	LS	$ 45,000.00	$ 45,000
Dock Modifications	1	LS	$ 25,000.00	$ 25,000
Contractor Quote - Dock Restraints	1	LS	$ 161,792.00	$ 161,792

Appendix C

Public and Stakeholder Involvement Summary

Appendix C - Public and Stakeholder Involvement Summary

The REDI Program encompassed a near-term action phase of the initiative by reporting the processes and outcomes of the establishment and efforts of regional planning committees, teams, and stakeholders, community meetings, the prioritization and vetting of projects recommended by the planning committees, and the development of conceptual designs of selected projects. Planning committees were made up of local leaders, including local agency representatives, elected officials, and town supervisors, whose role was to gather community input, facilitate discussions, identify priorities, and recommend projects to the REDI Commission. Projects identified by the planning committees were further vetted with respect to efficacy, feasibility, relevance to REDI, permitting concerns and cost by experts within New York's agencies. Four regional meetings, up to three planning committee meetings, and township meetings were convened in each of the five REDI Regions (Niagara and Orleans, Monroe, Wayne, Cayuga and Oswego, and Jefferson and St. Lawrence) to discuss planning for addressing immediate and long-term resiliency needs and identifying assets at risk for the regions. The prioritization of needs and projects was also advanced at these meetings. A summary of the public and stakeholder meeting dates is provided in Table C.1

Table C.1 *REDI Public Stakeholder and Planning Committee Meeting Dates Held During 2019 for Each of the Five Regions*

Region	Stakeholder Meetings	Planning Committee Meetings/Calls
Niagara Orleans	1. July 10, 2019 2. July 30, 2019 3. Aug 27, 2019 4. Sept 9, 2019	1. Aug 8, 2019 2. Aug 12, 2019 3. Sept 6, 2019
Monroe	1. July 10, 2019 2. July 31, 2019 3. Aug 26, 2019 4. Sept 9, 2019	1. Aug 13, 2019 2. Aug 21, 2019 3. Sept 5, 2019
Wayne	1. July 11, 2019 2. July 24, 2019 3. Aug 29, 2019 4. Sept 11, 2019	1. Aug 9, 2019 2. Aug 16, 2019 3. Aug 22, 2019
Cayuga Oswego	1. July 10, 2019 2. July 29, 2019 3. Aug 29, 2019 4. Sept 10, 2019	1. Aug 13, 2019 2. Aug 19, 2019 3. Sept 6, 2019
Jefferson St. Lawrence	1. July 12, 2019 2. Aug 2, 2019 3. Aug 26, 2019 4. Sept 12, 2019	1. Aug 7, 2019 2. Aug 14, 2019 3. Aug 22, 2019 4. Sept 3, 2019

Appendix D

Smart Growth Assessment Form

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by the applicant's project engineer or other design professional.[1]

Applicant Information

Applicant: City of Rochester Project No.: MO.07

Project Name: West Side of Genesee River Businesses

Is project construction complete? ☐ Yes, date: ☑ No

Project Summary: (provide a short project summary in plain language including the location of the area the project serves)

This project is located near the mouth of the Genesee River in Rochester, NY and is composed of flood protection measures (flood walls/berms) and river bank stabilization for the Rochester River St. Marina. The project serves the greater City of Rochester area.

Section 1 – Screening Questions

1. Prior Approvals

1A. Has the project been previously approved for EFC financial assistance? ☐ Yes ☑ No

1B. If so, what was the project number(s) for the prior approval(s)? Project No.:

Is the scope of the project substantially the same as that which was approved? ☐ Yes ☐ No

IF THE PROJECT WAS PREVIOUSLY APPROVED BY EFC'S BOARD AND THE SCOPE OF THE PROJECT HAS NOT MATERIALLY CHANGED, THE PROJECT IS **NOT** SUBJECT TO SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

2. New or Expanded Infrastructure

2A. Does the project add new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant? ☐ Yes ☑ No

Note: A new infrastructure project adds wastewater collection/water mains or a wastewater treatment/water treatment plant where none existed previously

2B. Will the project result in either: ☐ Yes ☑ No

An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing treatment system;

OR

An increase such that a NYSDEC water withdrawal permit will need to be obtained or modified, or result in the NYSDOH approving an increase in the capacity of the water treatment plant?

Note: An expanded infrastructure project results in an increase of the SPDES permitted flow capacity for the wastewater treatment system, or an increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system.

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

IF THE ANSWER IS "NO" TO BOTH "2A" and "2B" ON THE PREVIOUS PAGE, THE PROJECT IS NOT SUBJECT TO FURTHER SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

3. Court or Administrative Consent Orders

3A. Is the project expressly required by a court or administrative consent order? ☐ Yes ☐ No

3B. If so, have you previously submitted the order to NYS EFC or DOH? If not, please attach. ☐ Yes ☐ No

Section 2 – Additional Information Needed for Relevant Smart Growth Criteria

EFC has determined that the following smart growth criteria are relevant for EFC-funded projects and that projects must meet each of these criteria to the extent practicable:

1. Uses or Improves Existing Infrastructure

1A. Does the project use or improve existing infrastructure? ☐ Yes ☐ No

Please describe:

2. Serves a Municipal Center

Projects must serve an area in either 2A, 2B or 2C to the extent practicable.

2A. Does the project serve an area **limited** to one or more of the following municipal centers?

i. A City or incorporated Village ☐Yes ☐No

ii. A central business district ☐Yes ☐No

iii. A main street ☐Yes ☐No

iv. A downtown area ☐Yes ☐No

v. A Brownfield Opportunity Area ☐Yes ☐No
(for more information, go to www.dos.ny.gov & search "Brownfield")

vi. A downtown area of a Local Waterfront Revitalization Program Area ☐Yes ☐No
(for more information, go to www.dos.ny.gov and search "Waterfront Revitalization")

vii. An area of transit-oriented development ☐Yes ☐No

viii. An Environmental Justice Area ☐Yes ☐No
(for more information, go to www.dec.ny.gov/public/899.html)

ix. A Hardship/Poverty Area ☐Yes ☐No
Note: Projects that primarily serve census tracts and block numbering areas with a poverty rate of at least twenty percent according to the latest census data

Please describe all selections:

2B. If the project serves an area located outside of a municipal center, does it serve an area located adjacent to a municipal center which has clearly defined borders, designated for concentrated development in a municipal or regional comprehensive plan and exhibit strong land use, transportation, infrastructure and economic connections to an existing municipal center? ☐Yes ☐No

Please describe:

2C. If the project is not located in a municipal center as defined above, is the area designated by a comprehensive plan and identified in zoning ordinance as a future municipal center? ☐Yes ☐No

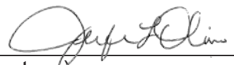
Please describe and reference applicable plans:

3. Resiliency Criteria

3A. Was there consideration of future physical climate risk due to sea-level rise, storm surge, and/or flooding during the planning of this project? ☐Yes ☐No

Please describe:

Signature Block: By entering your name in the box below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: City of Rochester	Phone Number: (585) 295-7716
Jennifer L. Olivo, PE - Vice President	
(Name & Title of Project Engineer or Design Professional or Authorized Municipal Representative)	
	2/14/2020
(Signature)	(Date)


RAMBOLL