Milwaukee River Parkway

Habitat and Interpretive Access Improvement Project

Final Report

Prepared for:

River Revitalization Foundation

Milwaukee County Parks

Prepared by:

Marek Landscaping, LLC

Final Report: 2016-03-08

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Introduction

The Milwaukee River Parkway Habitat Improvement and Interpretive Access Project has multiple elements and phases that will provide a highly visible, usable, and effective stormwater management and public access system. The site is located at the corner of Humboldt Blvd. and Capitol Drive and currently includes a highly eroded bluff which has degraded significantly since 2010. The approach is to restore the actively eroding slope and add an ADA access path and a stairway to allow pedestrians to reach the Milwaukee River. At the top of the restored slope a large bioswale will capture and treat stormwater flows from the surrounding area and help ensure that further slope erosion is minimized. In addition, two educational plazas will be installed, one highly visible interpretive plaza overlooking the river at the corner of Capitol and Humboldt, and one near the shoreline at the bottom of the slope. These plazas will help promote green infrastructure, water management, and river health for the local community and site visitors.

The Project builds on previous work by the River Revitalization Foundation (RRF) and Milwaukee County Parks to provide meaningful enhancements to nearly 500 feet of highly degraded urban river way (see image 1). In July 2010, heavy rains, equivalent to a 500-year storm event, inundated the greater Milwaukee area. Washouts occurred in several locations along the Milwaukee River, including the project site. Runoff from Capitol Drive aggravated three erosional slides from street level down to the river. It is estimated that over 1,100 cubic yards of sediment could have entered the river from these slumps.

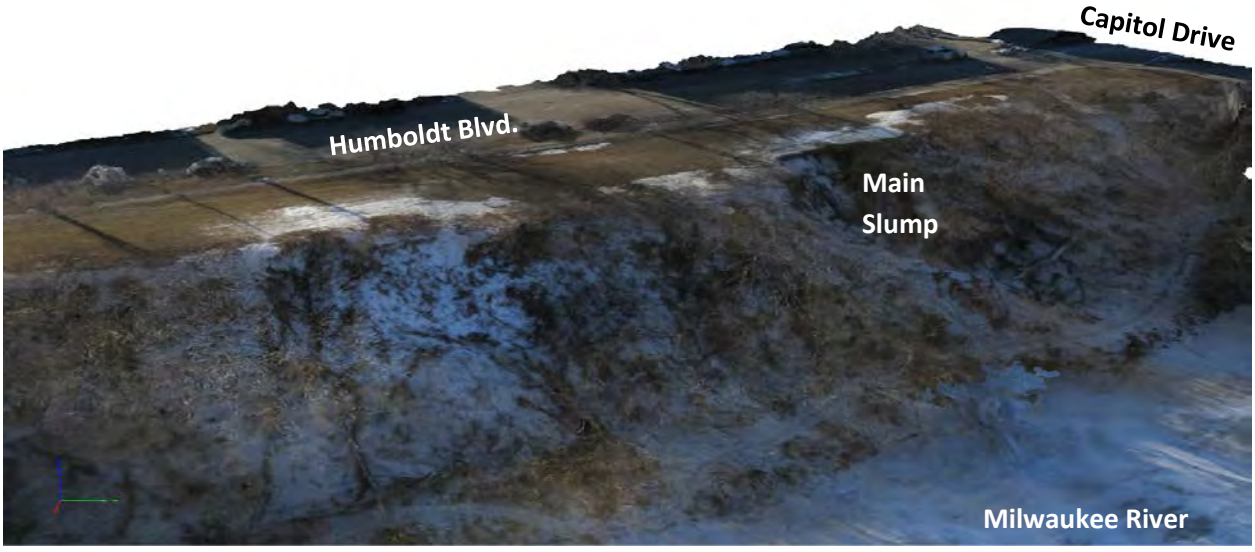


Image 1: 3D reconstruction of proposed project site.

The project goals are to restore riparian and instream habitat, improve water quality, increase species diversity, manage invasive species, stabilize the bluff, build an accessible trail to the river, and create interpretive environmental educational opportunities. The investment in this project will provide ongoing and lasting benefits to Lake Michigan fisheries as the community becomes engaged and dedicated to the preservation of the river way.

Existing Conditions

The project is located on the Milwaukee River, approximately 5.75 miles upstream of Lake Michigan, though only one mile west of Lake Michigan geographically. Significant effort has been applied to the Milwaukee River to provide linear connectivity between the Lake, the estuary, and upstream habitat. The project is located just south of the Capitol Drive Bridge, approximately one mile downstream of the Estabrook dam, and roughly two miles upstream of the former North Avenue dam. The Southeast Regional Planning Commission defines the river way as a Primary Environmental Corridor that provides connectivity and significant concentrations of natural resources. The urban area east of the project site is the Village of Shorewood. West of the project are the Riverwest and Harambee neighborhoods of the City of Milwaukee. There is currently no formal access to the west bank of the Milwaukee River for nearly three miles downstream and almost four miles upstream of the proposed project near the Capitol Drive Bridge, allowing for few opportunities to access the river for these densely populated areas.

In July of 2010 severe storms caused massive erosion at the project site, carving out large eroded slumps along the bluff. The erosion slumps are located adjacent to a storm sewer drop structure which drains into the river. The largest of these slumps is approximately 15-20’ wide and 10’ deep running from the top of the slope to its base (See image 2). This large sediment disturbance caused the destabilization of the storm sewer outfall and shoreline. On top of the bluff there is a large expanse of turf grass that based on site visits and research into the site appears seldom used (See image 3). There is an existing trail running along the shoreline, but it is unevenly graded and in need of repairs and stabilization (See image 4). In addition, the site is constantly littered with trash and debris, such as oil cans, plastics, and assorted pieces of metal (See image 5).

Image 2: Main erosion slump caused by 2010 severe storm.

Image 3: Open turf grass area that rarely receives use.

Image 4: Existing trail that runs along shoreline.

Image 5: Garbage and Debris is commonly found on site. Evidence that oil was changed here and likely dumped into storm sewer.

Many invasive and noxious species, such as Norway maple, box elder, honeysuckle, and buckthorn, have established on site as a result of the disturbance. The ground layer is also covered with invasive species. Within the Milwaukee River there is currently limited fish reproduction, but strong fall runs of Pacific Salmon, brown trout, and steelhead do occur. There are likely no federal or state listed species, but greater redhorse (previously listed as a state threatened species), golden redhorse, shorthead redhorse,

and silver redhorse are present. Sturgeon have been stocked in recent years, but will not reach spawning maturity for another 8-10 years. Substrate and slope of this reach of river indicates that habitat is ideal for spawning and will cater to lithophilic spawners such as sturgeon, sucker, redhorse, walleye, among others.

Image 6: Shoreline view of Milwaukee River at project location.

Proposed Solutions

Our proposed solution is a multi-phased process that begins with the stabilization and re-vegetation of the slope and concludes with the construction of an educational plaza and node. Work will consist of a construction phase; beginning with initial site stabilization and sediment control, invasive species removal, hazardous tree removal, grading, integrated slope restoration, native seed and tree and shrub plantings. The project continues with interpretive access to the river and environmental education components and construction of a bioswale to treat stormwater from Humboldt Boulevard. By connecting the community with the river, our hope is that stewardship values will be imparted in fisherman, hikers, runners, dog walkers, bikers, birders, boaters, commuters, school groups, community groups, and local businesses.

Initially, invasive species and hazardous trees will be removed from the slope, followed by the re-grading of bluff to achieve an average of 2:1 slope (2 feet horizontal to 1 foot vertical). Slope interrupters will be installed and the slope will then be seeded with an east facing bluff native seed mix and cover crop. Erosion protection will be provided with the goal of offering biodegradable erosion resistance needed until the plants are established. Additional plantings on the slope will include approximately 16-20 herbaceous species (grasses, sedges, and forbs), 5-8 shrub species, and 1-3 tree species. All of these species will be native to Milwaukee County and sourced from the closest genotypic source available.

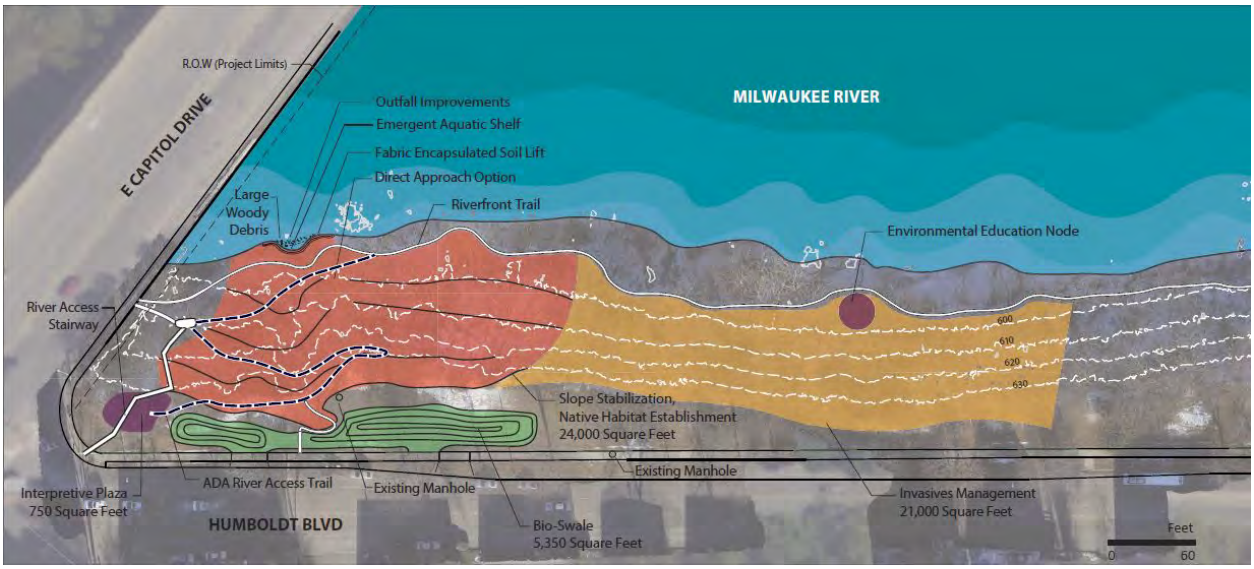


Image 7: Proposed Plan.

At the base of the slope, fabric encapsulated soil lifts will be installed around the sewer outfall to help stabilize the outfall and shoreline. Riprap will be placed within this area and planted with emergent aquatic plugs to create an emergent aquatic shelf at the sewer outfall. These features will provide benefits for phytophilic spawners such as northern pike and yellow perch, in addition many more. Macroinvertibrates will benefit from diverse substrate and more stable, course sediment inputs.

At the top of the bluff in the existing turf grass area, a large 595 square yard bioswale will be installed to help slow and reduce runoff from the surrounding sub-watershed to minimize possible future erosion. This bioswale will have the ability to capture approximately 40,000 gallons of storm water during each rain event. The bioswale will be planted with native plugs, with future phases that include curb cuts and boardwalks that would allow additional runoff from Humboldt Blvd to enter the swale. Maintenance will be conducted through mowing and selective weeding following the installation of these features to ensure the success of the plantings and slope restoration.

The access trail stage of the project will include the installation of an ADA access trail from the top of the bluff connecting to the existing shoreline trail. The existing shoreline trail will be re-graded and refurbished with new stone aggregate making it more user friendly in all weather conditions. Near the corner of Humboldt and Capitol there a stairway is provided for direct access from the top of the bluff to the West Bank trail below (see image 8). This is a well-established desire line that sees frequent erosion and is somewhat perilous in wet weather. The stairs would be constructed of rustic materials and as of now no railing is planned. A wood or rope railing with wrought iron standards would both be suitable finishing touches for this. This is an opportunity for a future project.

Along the West Bank trail an education node will feature education signage on river health, protection, ecological restoration, and stormwater management. This will also serve as a location to inform trail users that private property starts just ahead, state the importance of trail access and of being a respectful trail user.

Near the top of the staircase at the trailhead there will be a green infrastructure plaza installed. This is to serve as a welcoming entrance to the trail and also serve as the way finding node for the area, complete with maps, education signage; it will be paved with permeable pavers, and seating. This plaza will act as a demonstration of green infrastructure solutions and opportunities at the site and for what visitors can do at home to help with the water quality of the Milwaukee River.

Image 8: Proposed location of access stairway.

Proposed Cost

The Milwaukee River Parkway Habitat Improvement and Interpretive Access project provides a comprehensive approach to providing a severe erosion repair, public access, ecological restoration, public education and outreach, and stewardship of the Milwaukee River near Lake Michigan. The overall cost of this project is approximately $350,000, including installation of all discussed features and initial maintenance. Each activity was broken into subtasks, materials, and labor; and costs were estimated based on productivity rates calculated from similar projects and previous experience. Costs for each component of the project are shown on figure 1 and in Appendix B.

The funding goals for this project will be hopefully provided through a variety of grants, cash, and in-kind donations. Funding will go towards trail and stair construction that complement the slope stabilization work and allow the community to experience the benefits of invasive species management and native restoration. This will in turn promote a desire to protect, preserve, and enhance the river even further. In the event that GLFT or MMSD do not fund the project, construction of the project will be delayed until other sources of funding can be secured.

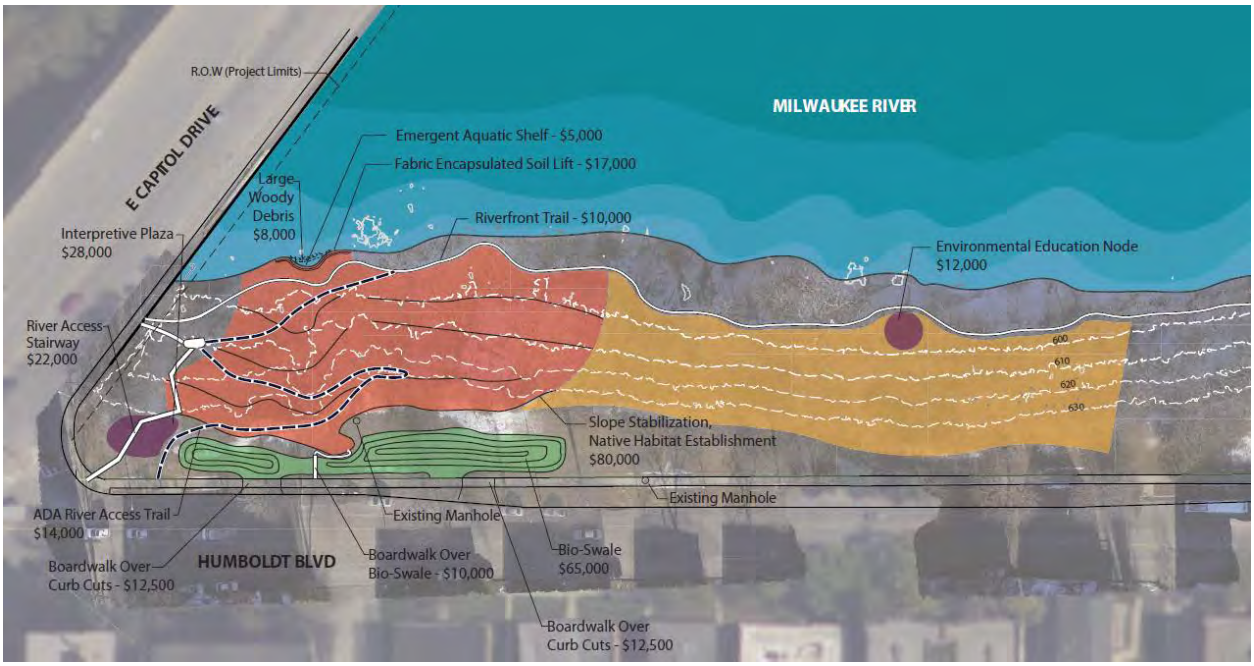


Figure 1: Plan graphic showing cost of each project component. Additional costs for permitting, quality assurance, construction oversight, post construction maintenance, and contingency not shown on plan.

Several grants have been submitted to cover construction costs. Current submitted grants, funding request, date of submittal, submitter, and included scope includes the following:

- Great Lakes Fisheries Trust - $76,000 - Not Accepted.
  - Submitted March 18, 2015 by River Revitalization Foundation. Decisions made by May 29, 2015.
  - Scope includes permitting, slope stabilization, outfall improvements & FES lifts, emergent aquatic shelf, river access stairway, ADA river access trail, and ADA riverfront trail enhancements.
- MMSD Signature Series - $48,100 – Accepted.
  - Submitted March 31, 2015 by Milwaukee County.
  - Scope includes bioswale, permeable pavers/plaza, and native landscaping.
- Recreational Trails Act - $10,000 – Accepted.
  - Submitted April 30, 2015 by River Revitalization Foundation. Decisions made in July 2015.
  - Scope includes trail and stairway.
- Fund for Lake Michigan - $20,000 - Accepted
  - Submitted: November 1, 2015 by River Revitalization Foundation
  - Scope includes improving access to the river through stair and trail connection to street level.

- Wisconsin Coastal Management: - $65,000 – Recommended for Funding
    - Submitted: November 2, 2015 by Milwaukee County
    - Scope includes slope stabilization and invasives management.

As of March 9, 2016, $143,100 has been applied through grants. Matching funds are coming from Milwaukee County [$25,000] and the Fund for Lake Michigan [$14,000 for design].

Conclusion

When the 2010 storm hit the Milwaukee area with torrential downpours, it is estimated that over 1,100 CY of sediment may have eroded from the project site into the Milwaukee River. In addition, after site visits in the spring, fall, and winter of 2014, we have seen an increase in and accelerating rates of erosion in the main slump area.

With a thoughtful combination of slope stabilization, water quality and quantity improvement, interpretive way finding, along with a good trail, and habitat improvements we can fix the river bank, inform users of the basics of urban land stewardship and prevent further erosion by providing a durable access point; simultaneously providing long term riparian and instream habitat. With care and planning, we create the capacity for human use while enhancing ecosystem services.

Appendix A: Proposed Drawings

MILWAUKEE RIVER PARKWAY

HABITAT AND INTERPRETIVE ACCESS IMPROVEMENT PROJECT

DESIGN DEVELOPEMENT DOCUMENTS JAN 4, 2016

DRAWING INDEX

Sheet 2.....Context
3.....Existing Conditions A
4.....Existing Conditions B
5.....General Arrangement Plan
6.....Slope Stabilization Plan
7.....Paths and Trails Plan
8.....Paths and Trails Cross Section
9.....Outfall Improvements Plan
10.....Bioswales Plan
11.....Construction Details

Prepared For:

RIVER REVITALIZATION foundation

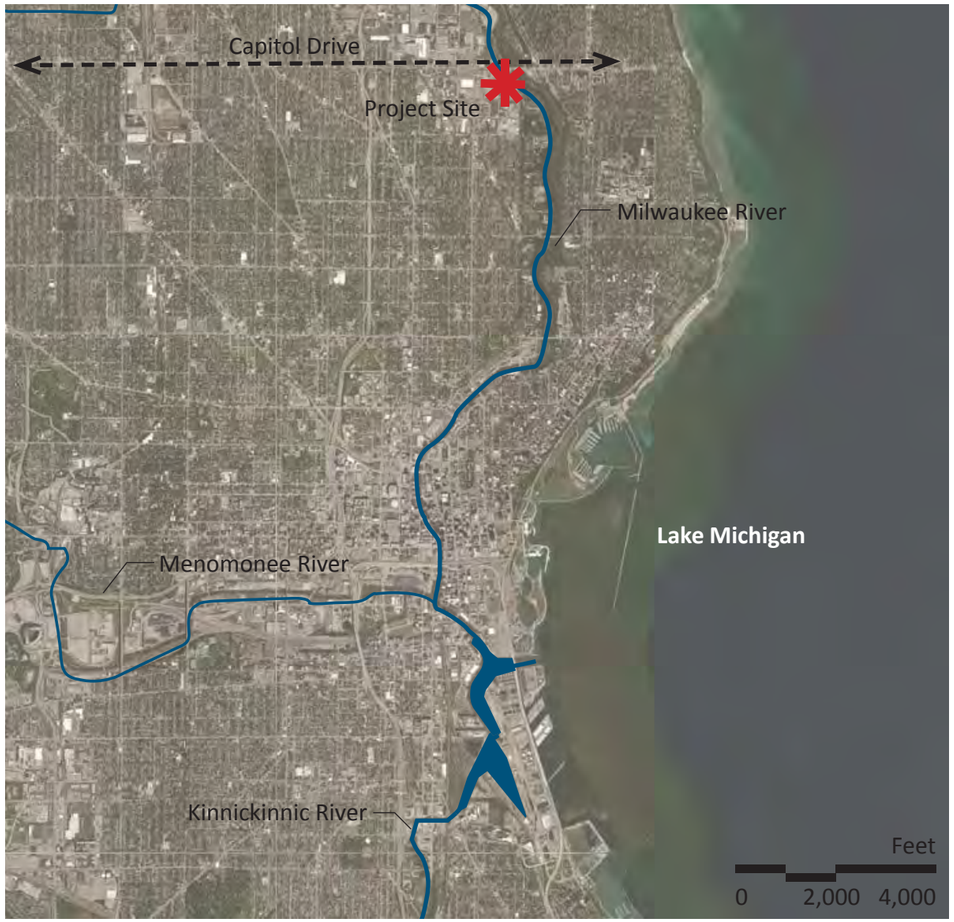
In Conjuction With:

MILWAUKEE COUNTY PARKS

Prepared By:

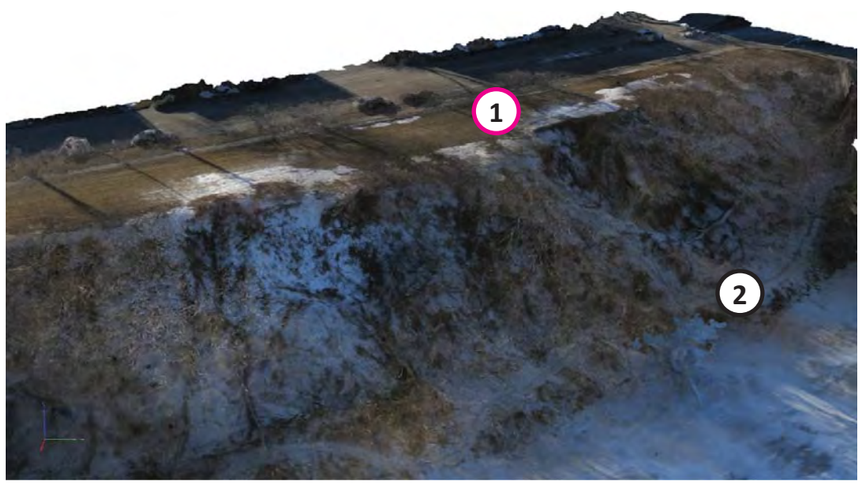
Marek Landscaping LLC

SITE CONTEXT (LARGE SCALE)



SITE CONTEXT (MEDIUM SCALE)

SITE SCALE VIEW



VIEW OF SLUMP FROM HUMBOLDT AVENUE

INVASIVES AT BASE OF SLUMP
(BUCKTHORN, BOX ELDER, NORWAY MAPLE)

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CONTEXT MAPS, EXISTING LOCATIONS

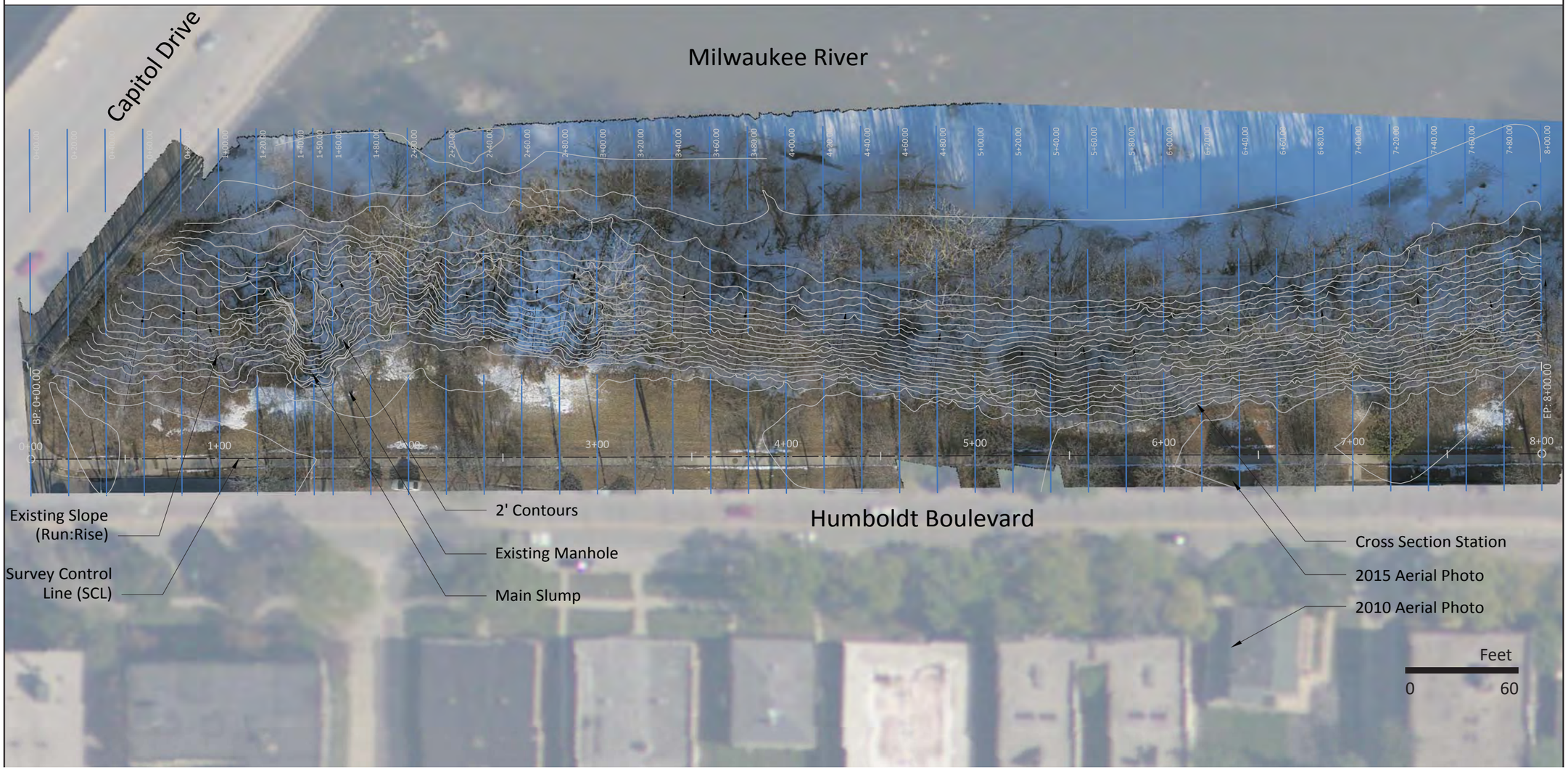
MKE River at Capitol Drive

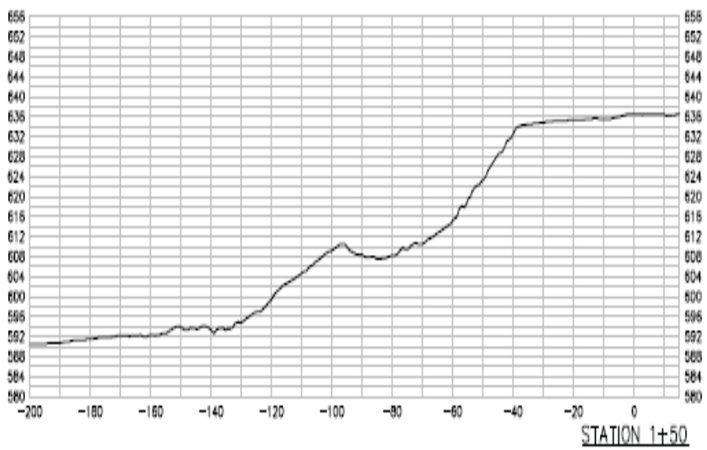
DRAWN BY: TDT

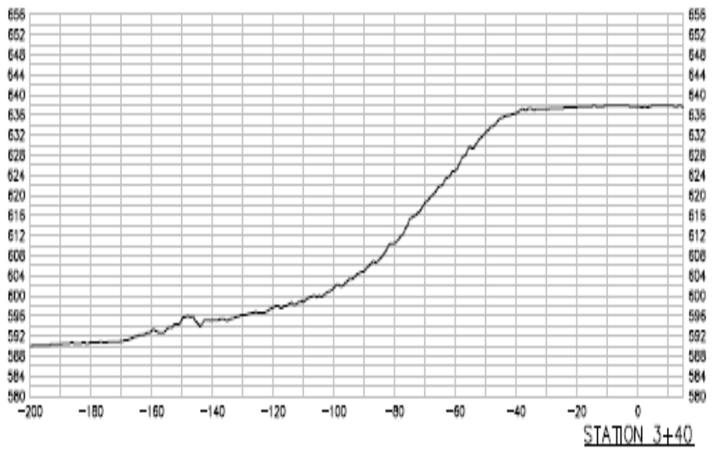
DATE: 4/28/2015

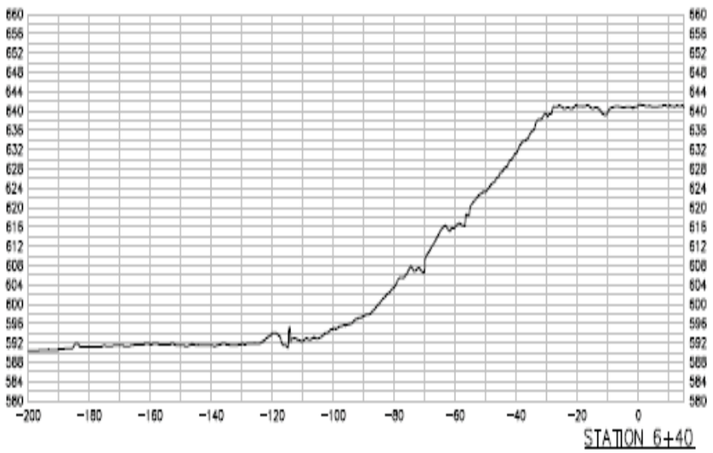
LARGE SCALE & MEDIUM SCALE SITE CONTEXT, PERSPECTIVE VIEW OF SITE

SHEET: 2
OF 12









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EXISTING CONDITIONS - OVERVIEW

MKE River at Capitol Drive

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DATE: 4/28/2015

EXISTING CONDITIONS PLAN A

SHEET: 3
OF 12

Capitol Drive

Milwaukee River

Humboldt Boulevard

BP: 0+00.00

2' Contours

Existing Manhole

Main Slump

Tree Species		
Symbol	Common Name	Latin Name
AN	Box Elder	Acer negundo
AS	Silver Maple	Acer saccharinum
FA	White Ash	Fraxinus americana
GT	Honey Locust	Gleditsia triacanthos
M. spp	Crabapple	Malus coronaria
PD	Eastern Cottonwood	Populus deltoides
PS	White Pine	Pinus strobus
UP	Chinese Elm	Ulmus parvifolia
RT	Staghorn Sumac	Rhus hirta
SN	Black Willow	Salix nigra

Tree to be Removed

Tree to Remain

0 30 60 FEET

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EXISTING CONDITONS PLAN - TREE SPECIES

MKE River at Capitol Drive

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DATE: 4/28/2015

EXISTING CONDITIONS PLAN B

SHEET: 4
OF 12

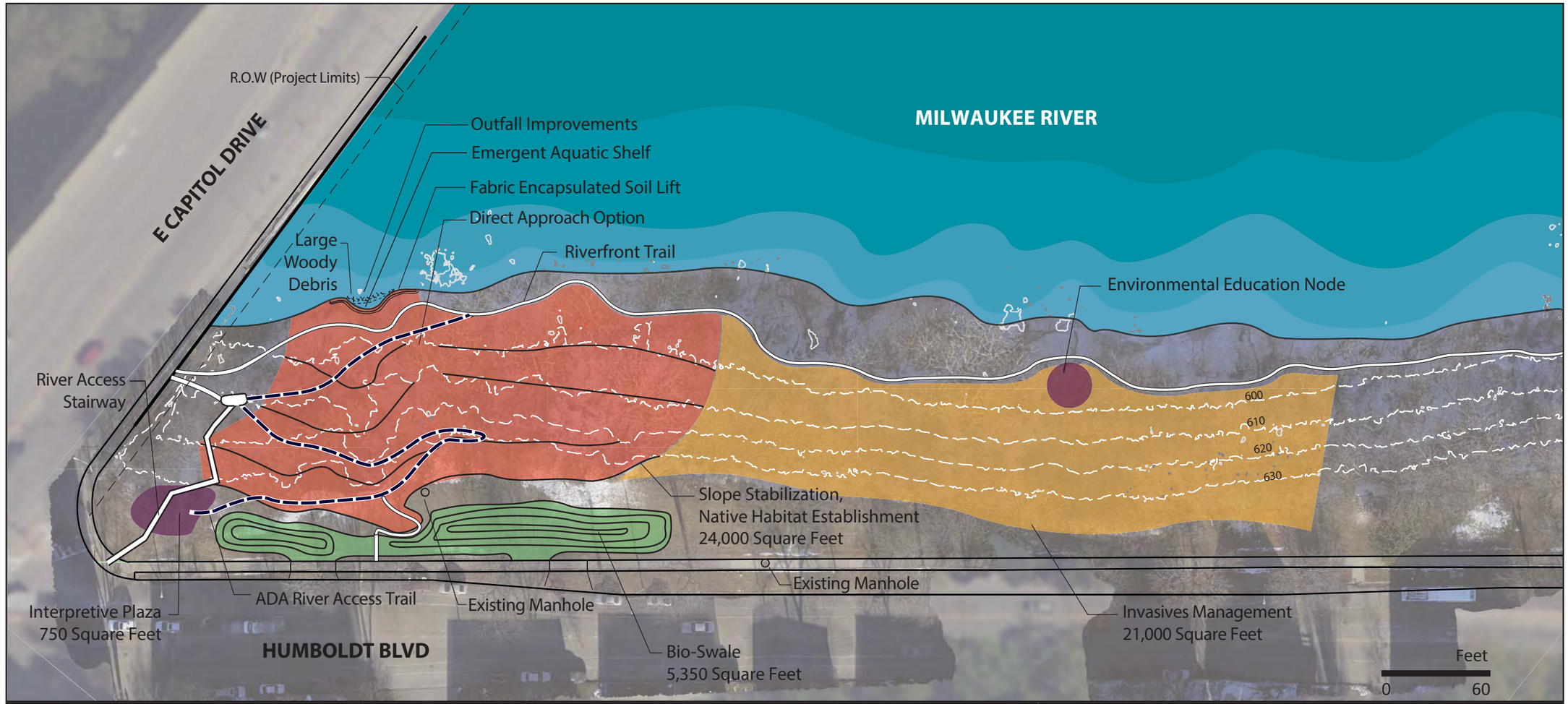

Image 1: Proposed Location of FES Lifts and Emergent Aquatic Shelf.

Image 2: Proposed Location of Stairway.

Image 3: Proposed Location of Bio-Swale.

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GREEN INFRASTRUCTURE PUBLIC ACCESS

MKE River at Capitol Drive

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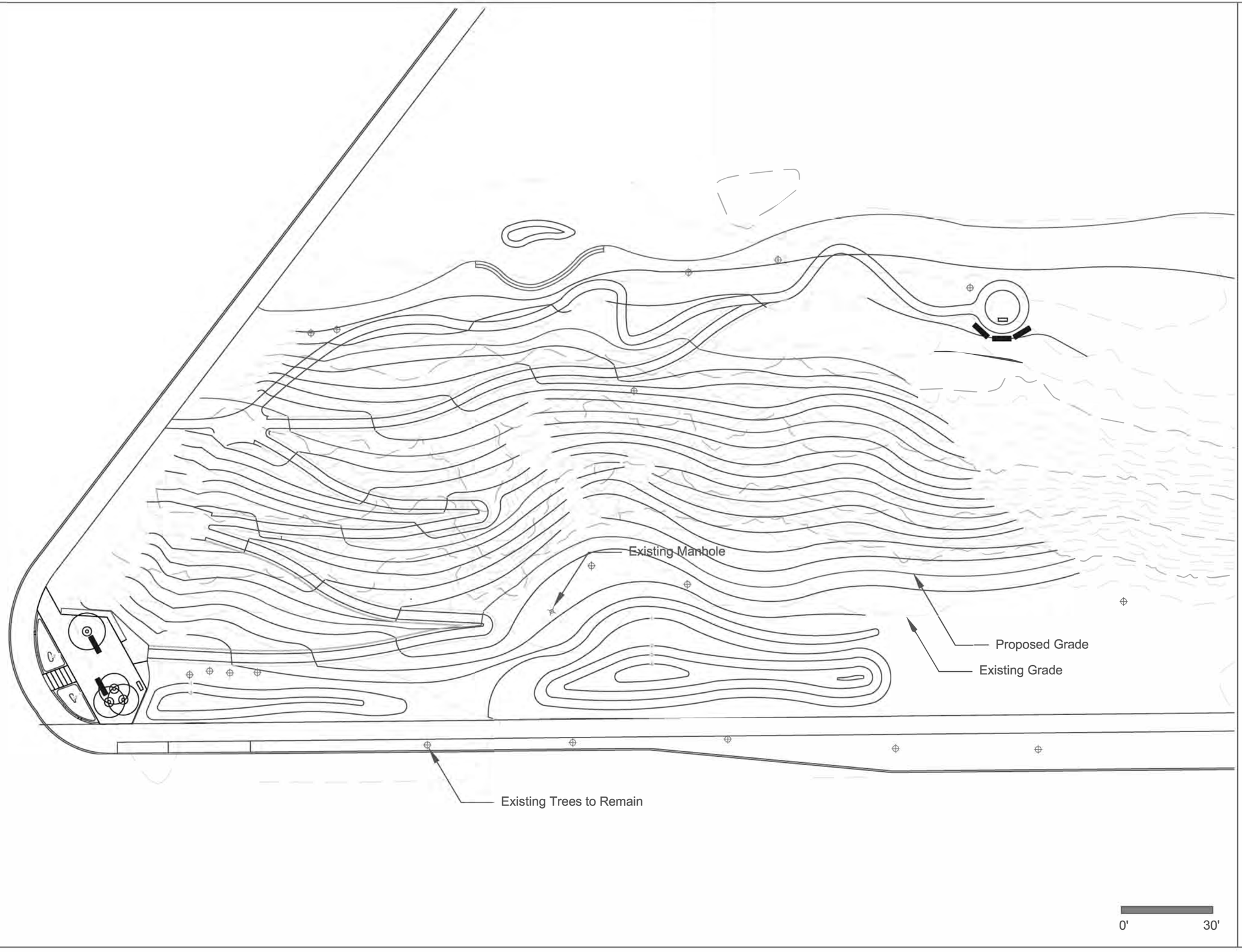
SLOPE STABILIZATION AND TRAIL PLAN

SHEET: 5
OF 12



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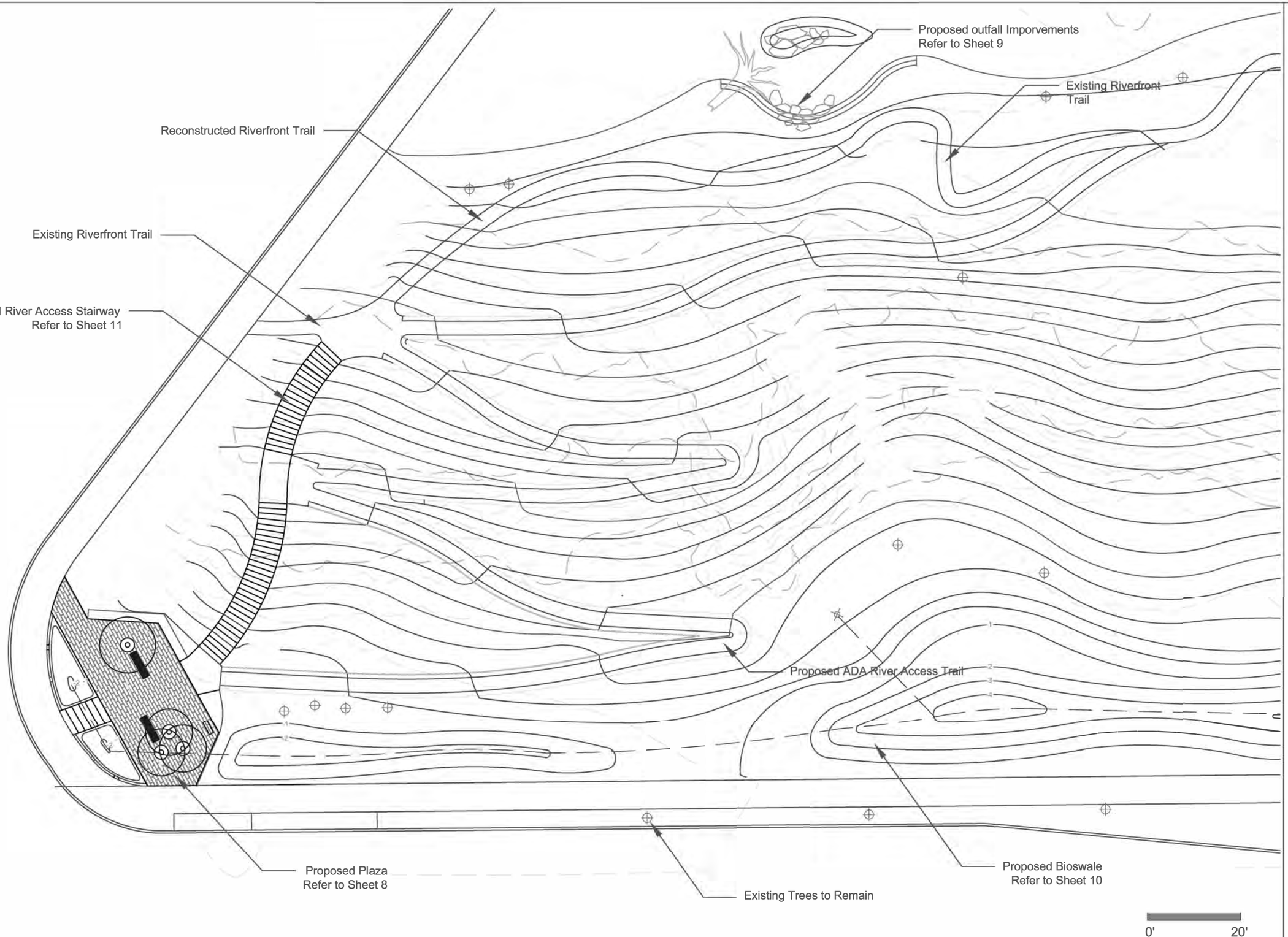
SLOPE STABILIZATION PLAN

SHEET: 6 OF 12



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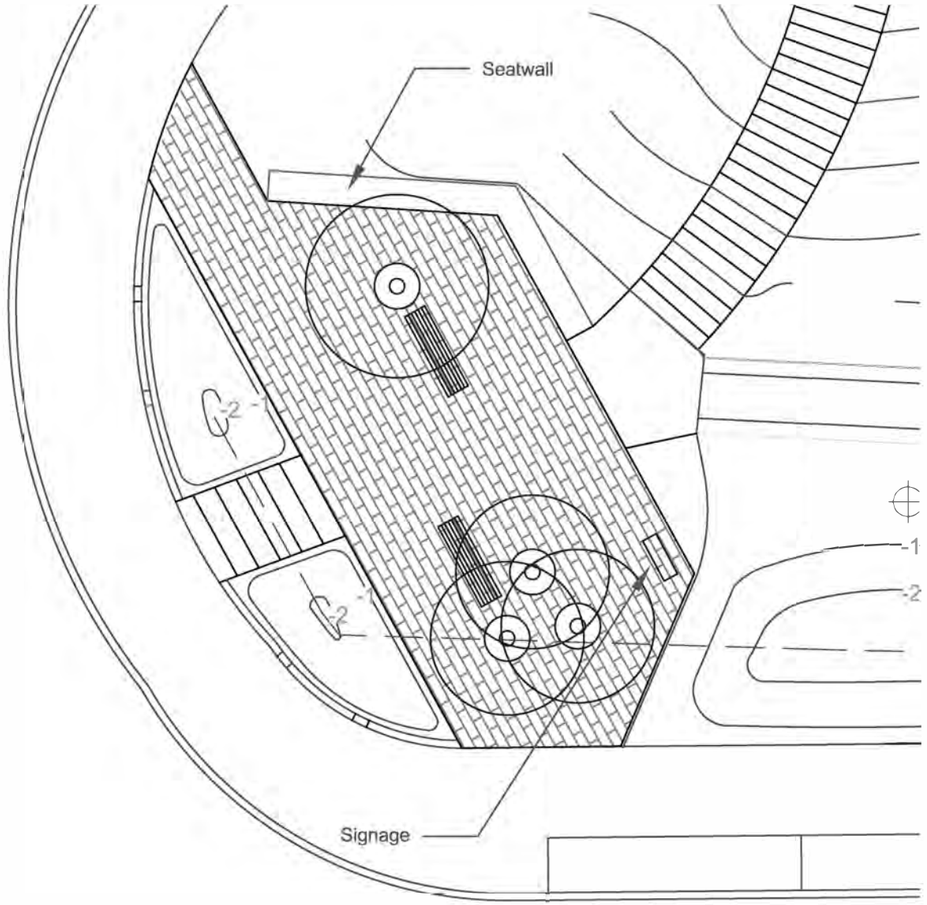
DATE: 12-23-15

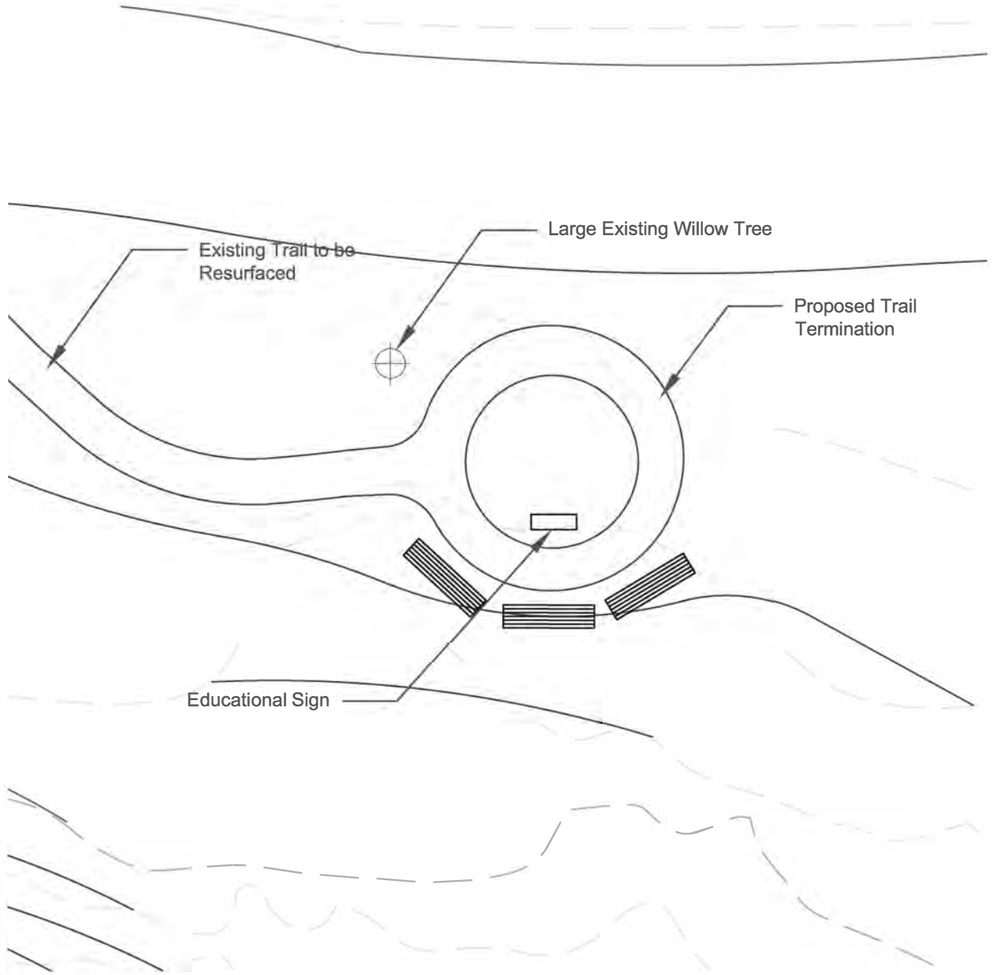
PATHS AND TRAILS

SHEET: 2 OF 12



Proposed Plaza

0' 10'



Proposed Environmental Education Node

0' 10'

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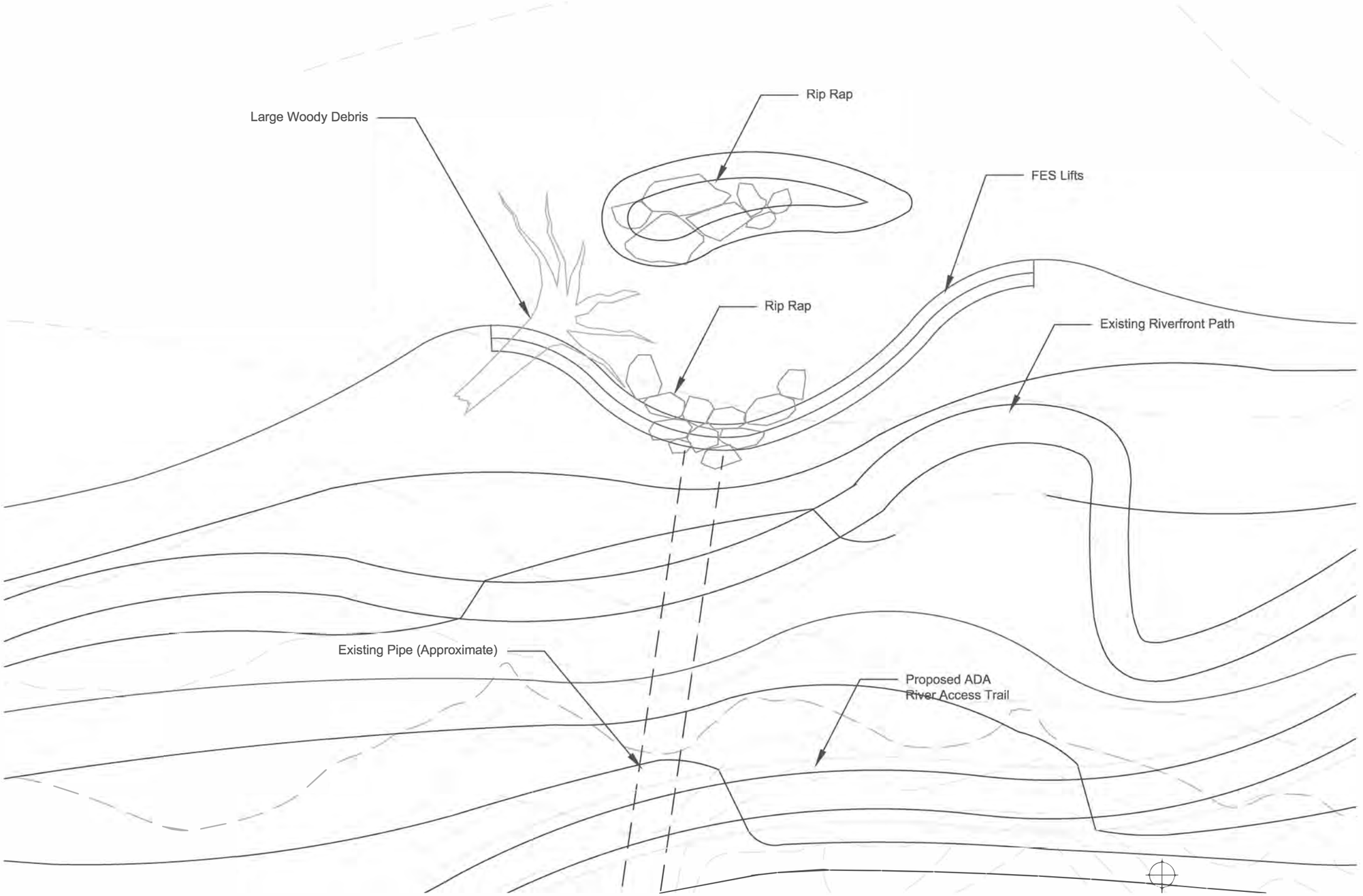
INTERPRETIVE PLAZAS

SHEET: 8 OF 12



Proposed Outfall Imporvements

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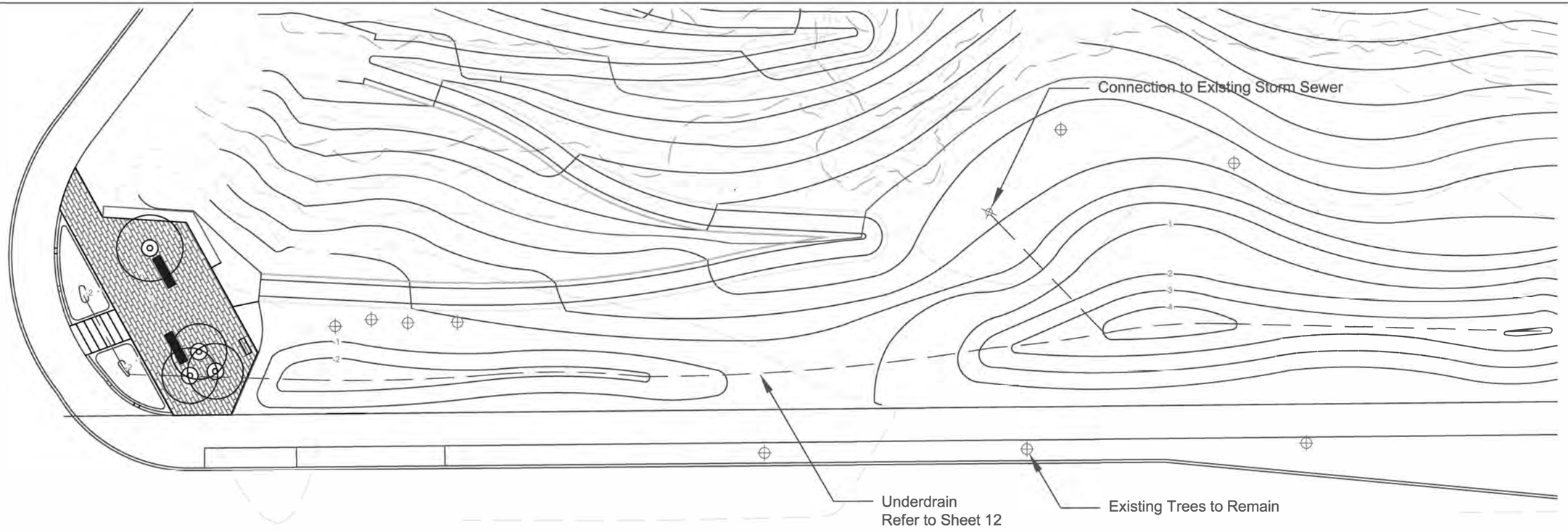
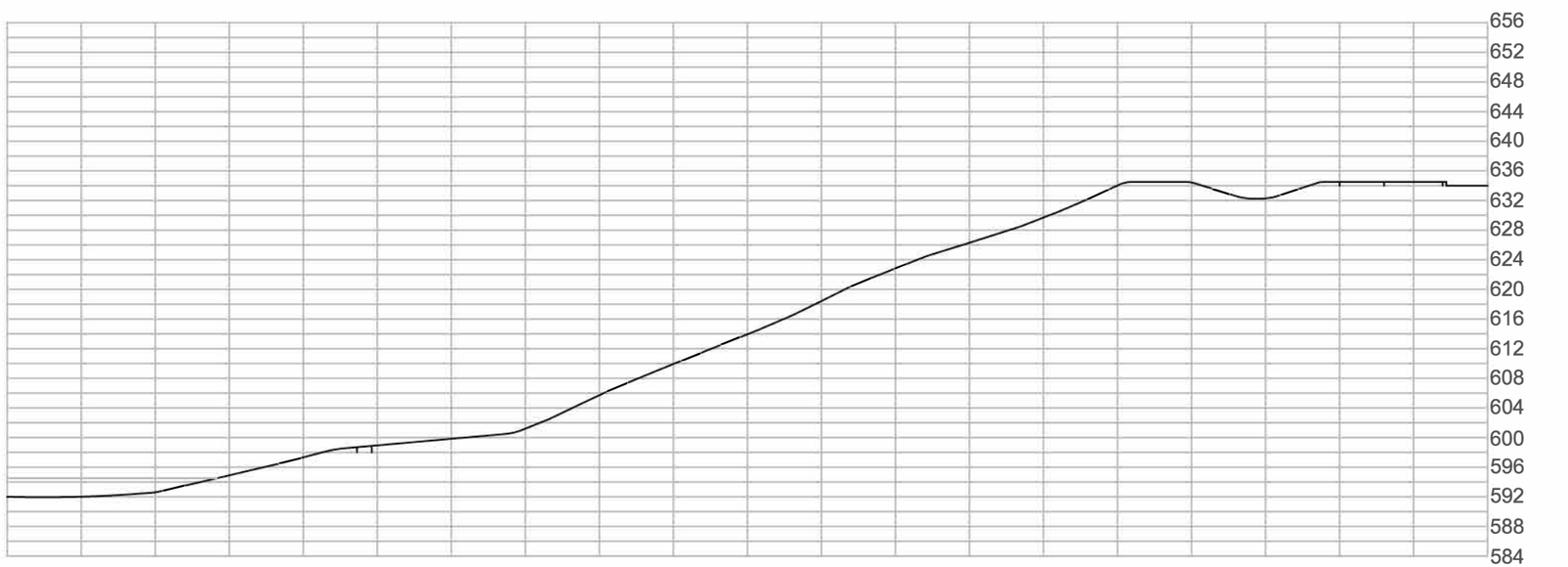
OUTFALL IMPROVEMENTS



Proposed Bioswales



Typical Cross Section
Scale: 1" = 20'

0' 20'

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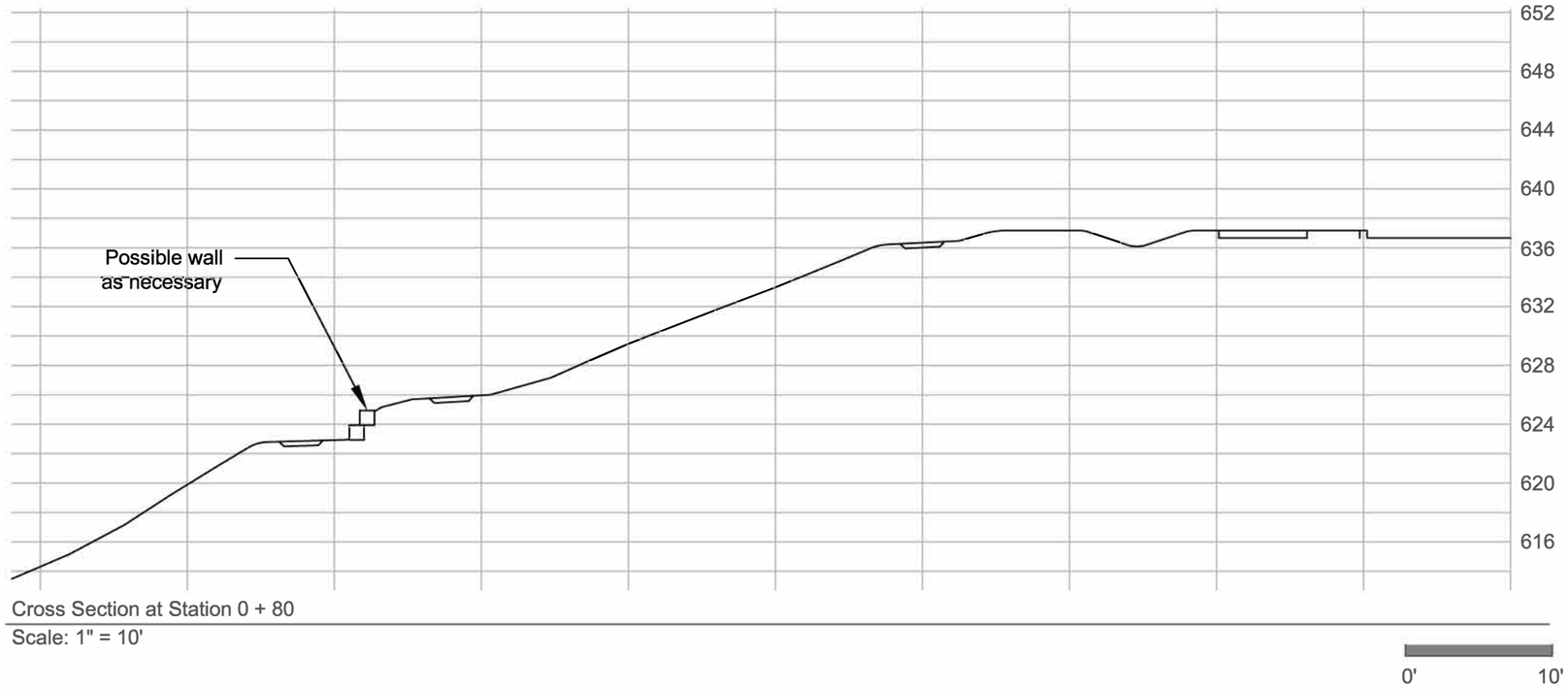
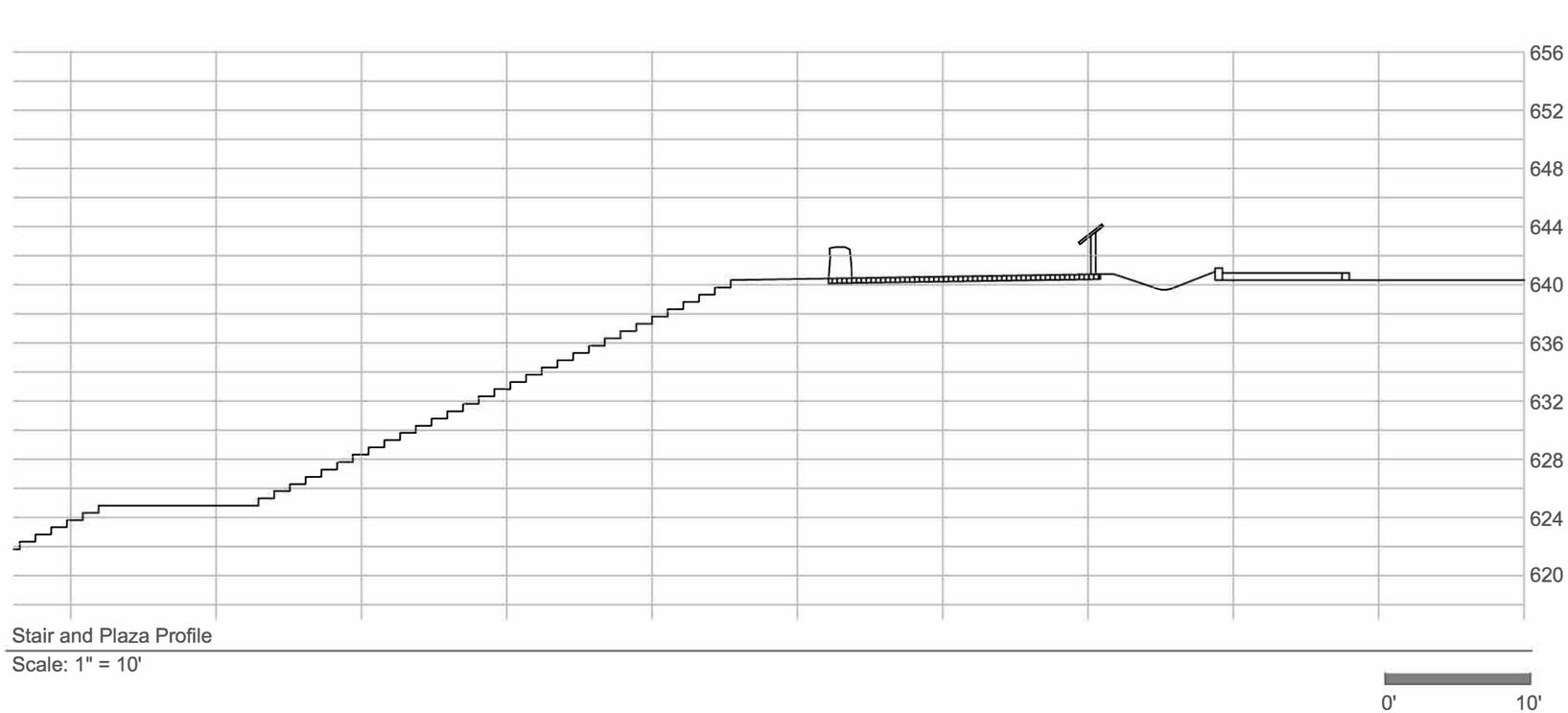
DATE: 12-18-15

BIOSWALES: PLAN AND CROSS SECTION



Cross Section at Station 0 + 80

Scale: 1" = 10'



Stair and Plaza Profile

Scale: 1" = 10'

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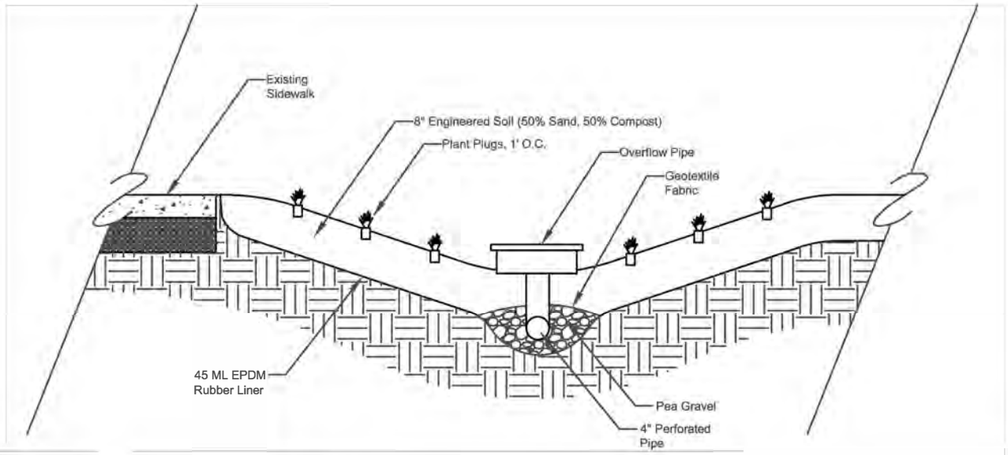
CROSS SECTIONS



1 / 12 Soil Graft Slope Stabilization Detail
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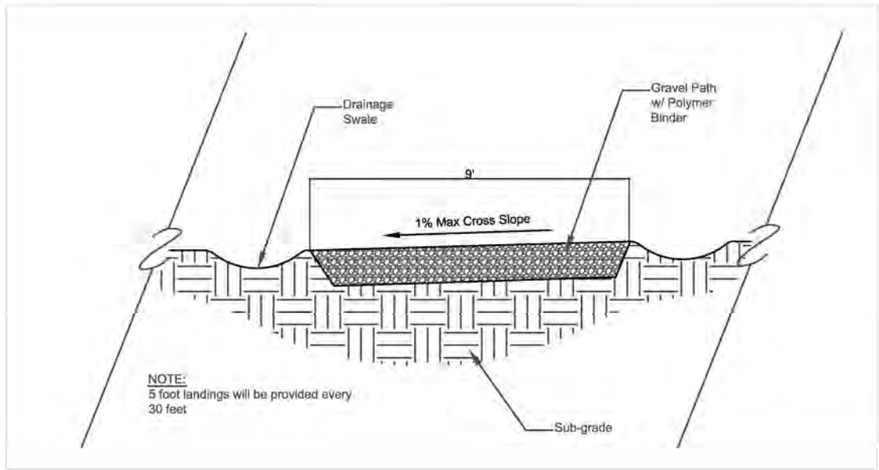
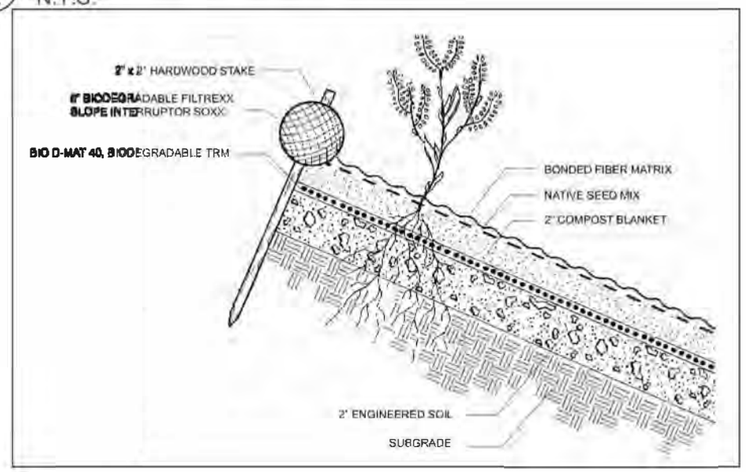
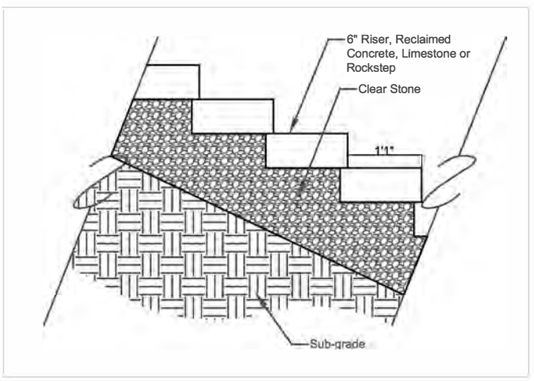


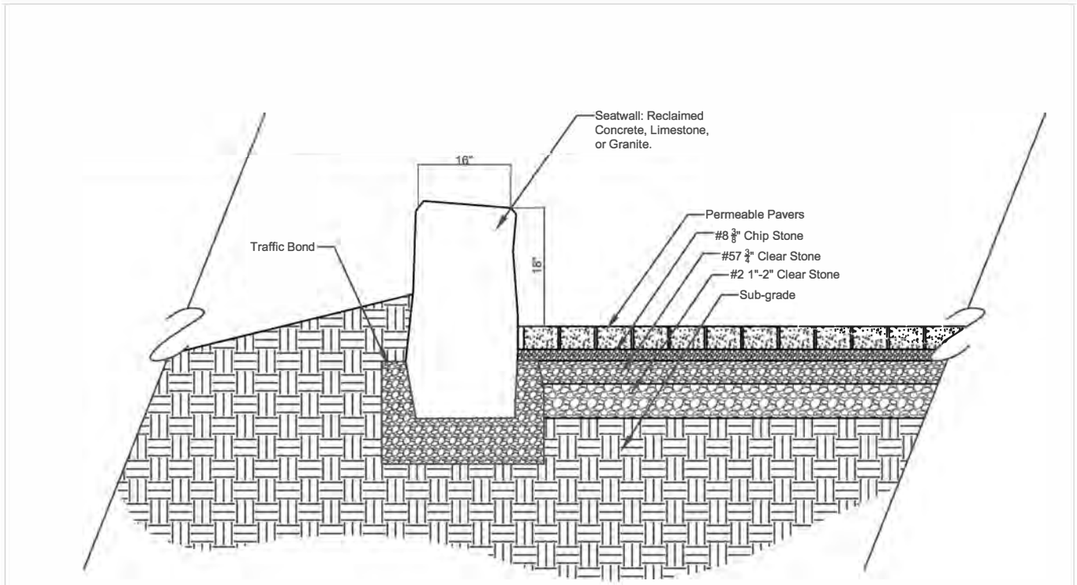
4 / 12 ADA Path Detail
N.T.S.



2 / 12 Soil Graft Slope Stabilization Detail
N.T.S.



3 / 12 Stair Detail
N.T.S.



5 / 12 Plaza Detail
N.T.S.

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NO.	REVISION/ISSUE	DATE

HABITAT AND INTERPRETIVE ACCESS IMPROVEMENT PROJECT

RIVER REVITALIZATION FOUNDATION
2134 N. RIVERBOAT RD.
MILWAUKEE, WI 53212

DRAWN BY: RJM

DATE: 12-23-15

DETAILS

SHEET: 12 OF 12

Appendix B: Proposed Costs and Schedule

4/29/2015

Milwaukee River at Capitol Drive	Months											Total Cost
	1	2	3	4	5	6	7	8	9			
Permitting, Quality Assurance, and Construction Oversight. Includes all permitting fees and work, and any additional engineering that will be needed for the project.												**$10,000.00**
Slope stabilization, Invasives Management, and native habitat establishment. Slope shall be cleared through grubbing and cutting to remove vegetation, preserving marked trees. Modifications shall be made to the slope by pulled back contours to create a 2:1 slope. Disturbed slope shall be seeded with native eastern facing bluff mix, covered with erosion control matting, and slope interrupters shall be installed.												**$80,000.00**
Outfall Improvements with FES Lift Shoreline Stabilization and Large Woody Debris Placement. Furnishing and installation of fiber encapsulated soil lifts around sewer outflow. Large woody debris shall be placed in shallows to provide additional habitat and shoreline protection.												**$25,000.00**
Emergent Aquatic Shelf. Placement of riprap shelf at sewer outflow, planted with emergent aquatic vegetation.												**$5,000.00**
River Access Stairway. Furnishing and installation of reclaimed concrete stairway, connecting sidewalk to lower existing trail near shoreline.												**$22,000.00**
ADA River Access Trail. Installation of a 3' wide trail that will meet ADA requirements that provides a connection between the street elevation and shoreline trail.												**$14,000.00**
ADA Riverfront Trail Enchancements. Replacing and refurbishing of existing stretch of trail near shoreline to meet ADA requirements.												**$10,000.00**
Bioswale. 5,350 SF lined bioswale with native plantings and overflow												**$65,000.00**
Riverfront Plaza. Environmental Education node at river level												**$12,000.00**
Porous Pavement Plaza. Interprative plaza at intersection of Humboldt and Capito												**$22,000.00**
Boardwalk over Swale and Curb Cuts. Boardwalk installation over curb cut sections and Bio-Swale.												**$35,000.00**
Post Construction Maintenance. Selective Herbiciding, mowing, and watering to establish native planting.												**$5,000.00**
Contingency (15%)												**$45,000.00**
TOTAL												**$350,000.00**