

Muskegon River Veterans Memorial Park Fish and Wildlife Habitat Restoration Project

West Michigan Shoreline Regional Development Commission

Muskegon County, Michigan

April 2017

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MICHIGAN STATE MAP

NOT TO SCALE



PROJECT LOCATION MAP

NOT TO SCALE



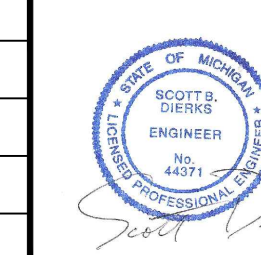
DETAIL SITE AERIAL

NOT TO SCALE

APPROXIMATE
PROJECT
LIMITS

NO.	DATE	ISSUE/REVISION	APP
2	03/26/17	CONSTRUCTION DOCUMENTS	WL
1	02/13/17	PERMIT FIGURES	WL

Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- 44371
Submittal Date:	04/26/17



GEI Project 1414800

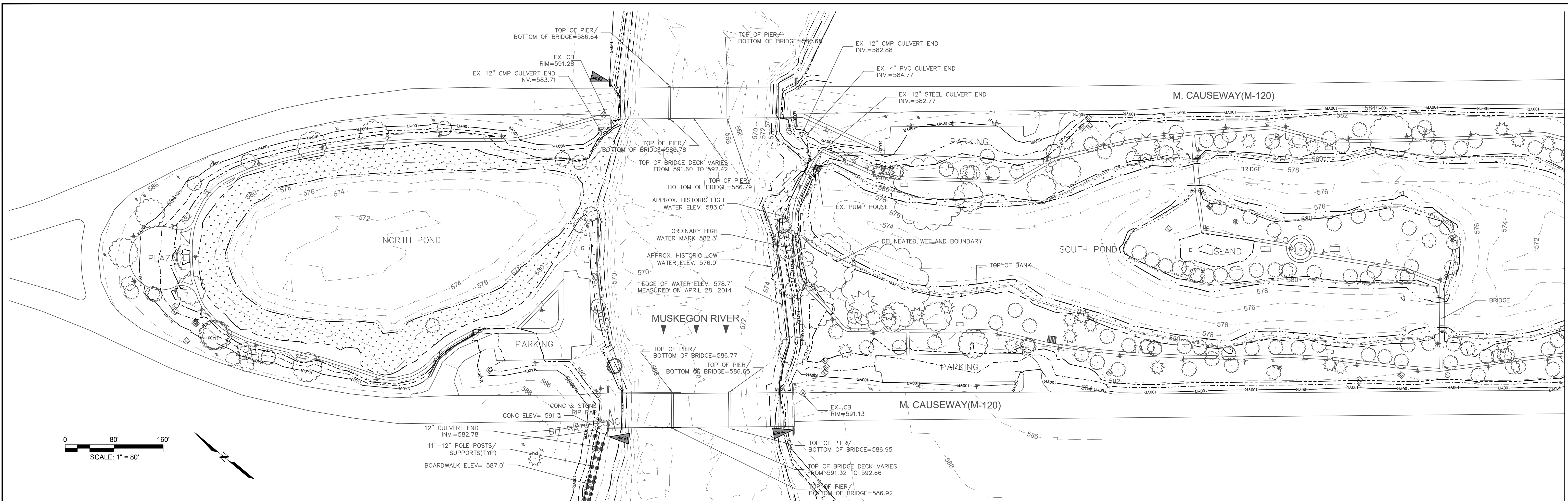
VETERANS MEMORIAL PARK
HABITAT RESTORATION

COVER SHEET

DWG. NO.
G1

REV
2

Permit Figures



MATCHLINE - SEE BELOW

EXISTING FEATURES LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	TREE (DECIDUOUS)		CABLE BOX		BOUNDARY LINE
	BUSH		TELEPHONE RISER		PROPERTY LINE
	TREE (CONIFEROUS)		TELEPHONE MANHOLE		WATERMAIN
	DEAD TREE		TELEPHONE HANDHOLE		SANITARY SEWER
	STUMP		ELECTRICAL RISER		STORM SEWER
	MANHOLE		ELECTRICAL MANHOLE		CULVERT (21" AND UNDER)
	SANITARY CLEANOUT		ELECTRICAL HANDHOLE		CULVERT (24" AND UP)
	RD. CATCH BASIN		POWER POLE		CABLE T.V.
	SQ. CATCH BASIN		LIGHT POLE		TELEPHONE
	FIRE HYDRANT		GUY POLE		ELECTRIC
	WATER VALVE		GUY ANCHOR		GAS
	CURB STOP & BOX		PED CROSSING SIGNAL		OVERHEAD LINES
	WELL		YARD LIGHT		GUARDRAIL
	WATER MANHOLE		SIGN		FENCE
	WATER METER		MAILBOX		WOODLINE
	SOIL BORING		GUARD POST		WATERLINE 578.7'
	MONITORING WELL		FOUND CONC. MONUMENT		APPROX. HISTORIC HIGH WATER 583.0'
	BENCHMARK		FOUND IRON ROD		APPROX. HISTORIC LOW WATER 576.0'
	SECTION CORNER		SET IRON ROD		ORDINARY HIGH WATER MARK 582.3'
	WETLAND AREA		SURVEY CONTROL POINT		TOP OF BANK
					EXISTING MAJOR CONTOUR
					EXISTING MINOR CONTOUR
					WETLAND LINE
					100-YEAR FLOODPLAIN 584.0'

NOTE: ALL ITEMS LISTED ON THE LEGEND MAY NOT BE PRESENT ON DRAWING.

BM #1 EL. 586.23'
S MOST CORNER TOP OF CONC. BRIDGE ABUTMENT, N SIDE OF MUSKEGON RIVER (NAVD88 VIA OPUS AND GPS OBSV.)

BM #2 EL. 591.98'
"L" CUT INTO TOP NORTH MOST NE COR. CONC. WING WALL, NW BOUND LANE

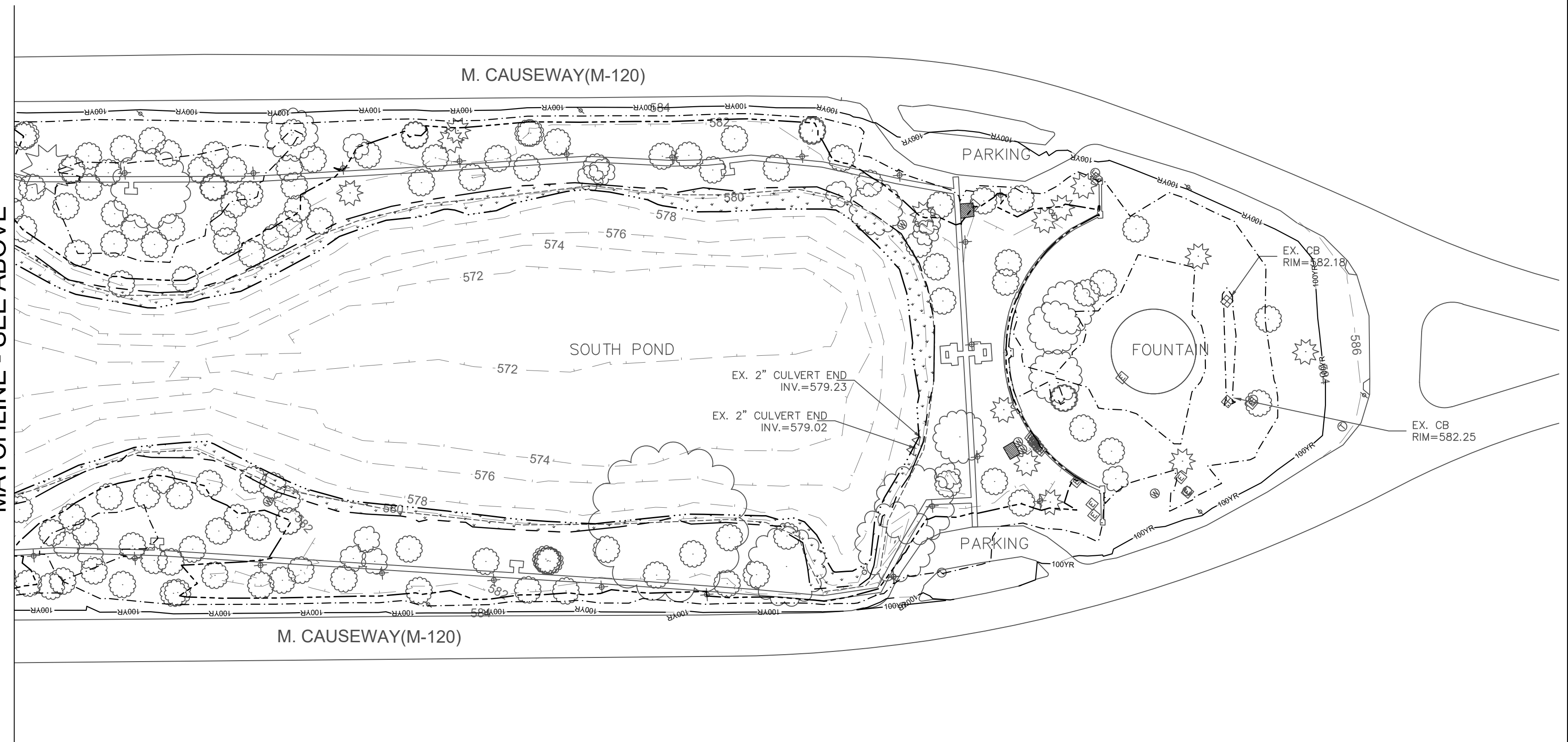
BM #3 EL. 592.52'
"L" CUT INTO TOP SOUTH MOST SW COR. CONC. WING WALL, SE BOUND LANE

CP #1 EL. 589.51'
SET CAPPED IRON ROD BETWEEN CAUSEWAY M-120 AND PAVED PATH, NORTHERN SIDE OF RIVER @ NW END OF GUARD RAIL

CP #2 EL. 594.35'
CENTER OF COMPASS INSERT CENTER OF BOARDWALK OVER LOOK AT WEST MOST END OF BOARDWALK

WETLAND DELINEATION COMPLETED BY GEI CONSULTANTS ON SEPTEMBER 15, 2015.

MATCHLINE - SEE ABOVE

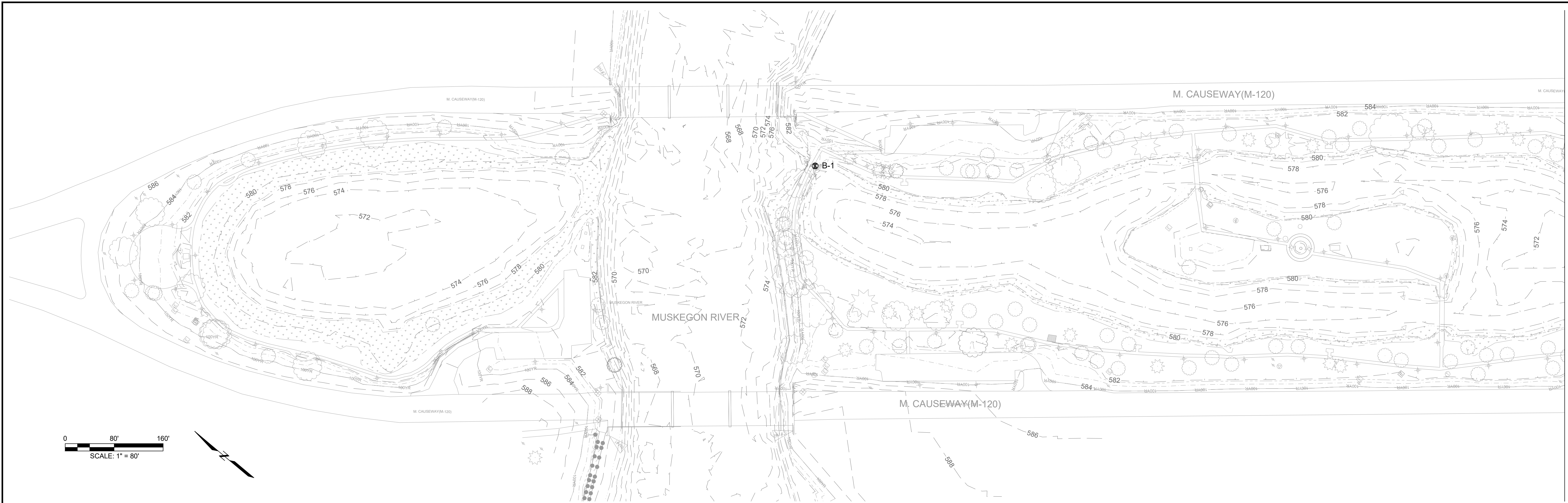


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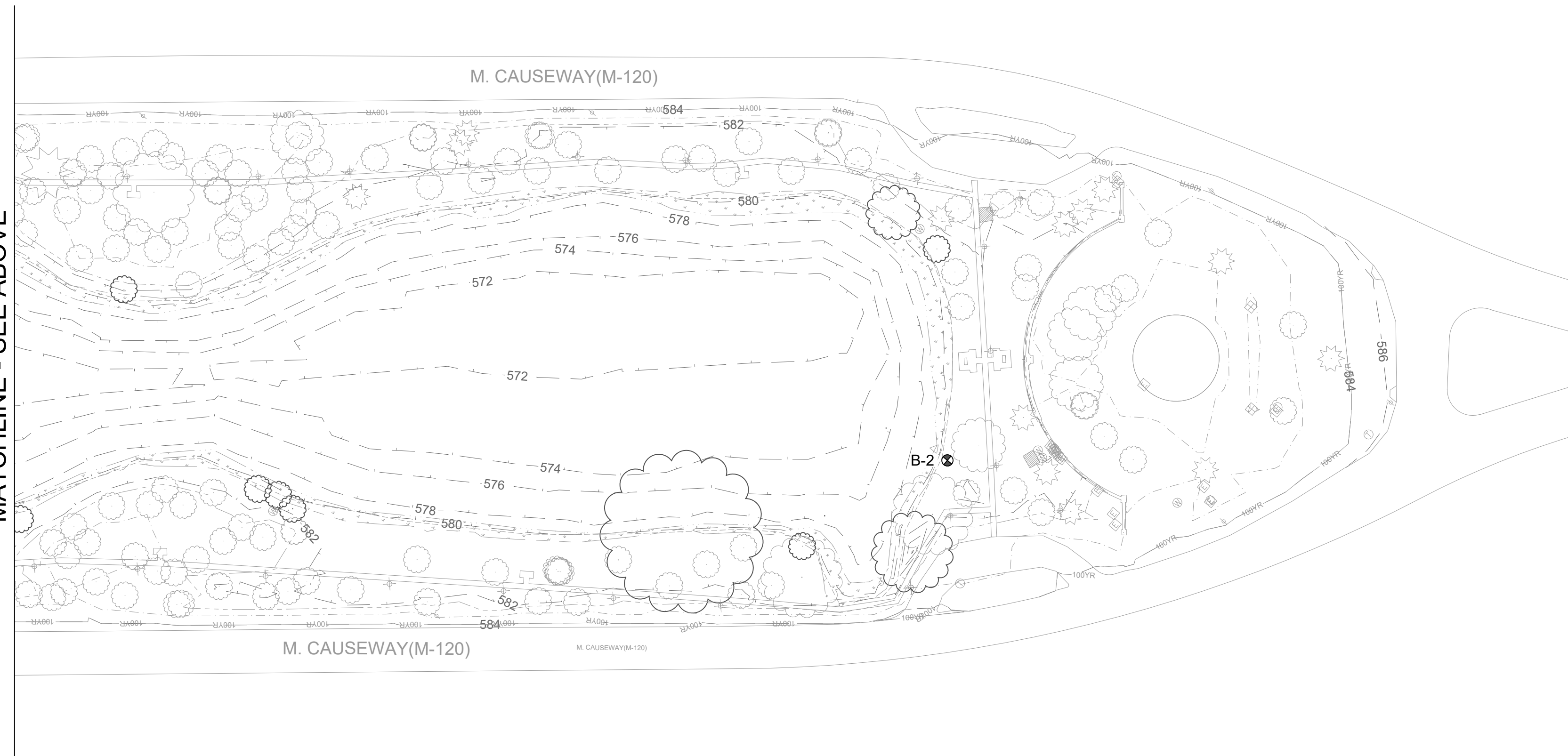
VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. C1
EXISTING CONDITIONS	REV 2



MATCHLINE - SEE BELOW

LEGEND

B-1
 SOIL BORING ID
 SOIL BORING LOCATION



MATCHLINE - SEE ABOVE

NO.	DATE	ISSUE/REVISION	APP
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VETERANS MEMORIAL PARK
HABITAT RESTORATION

SOIL BORING LOCATIONS

DWG. NO.
C2

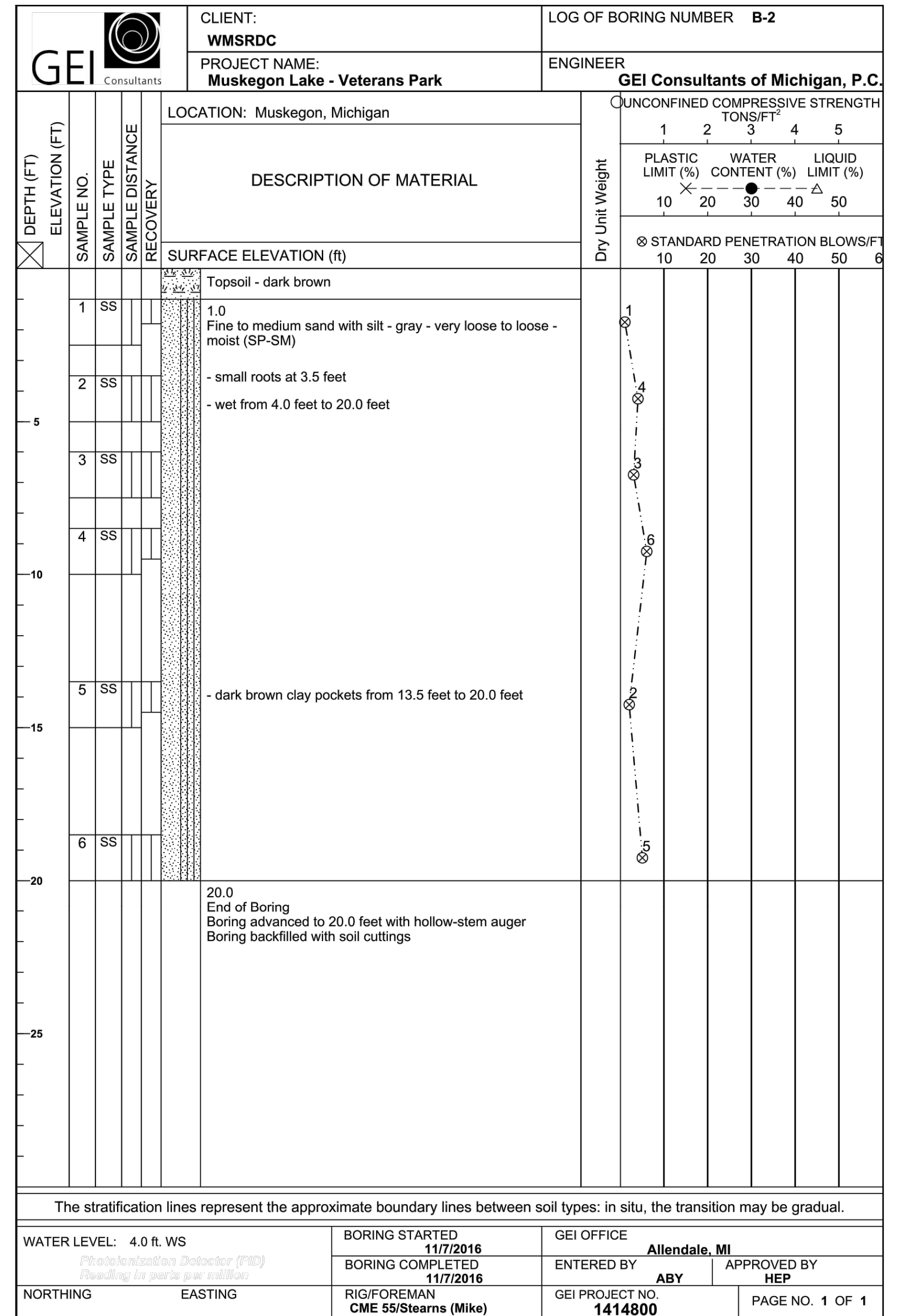
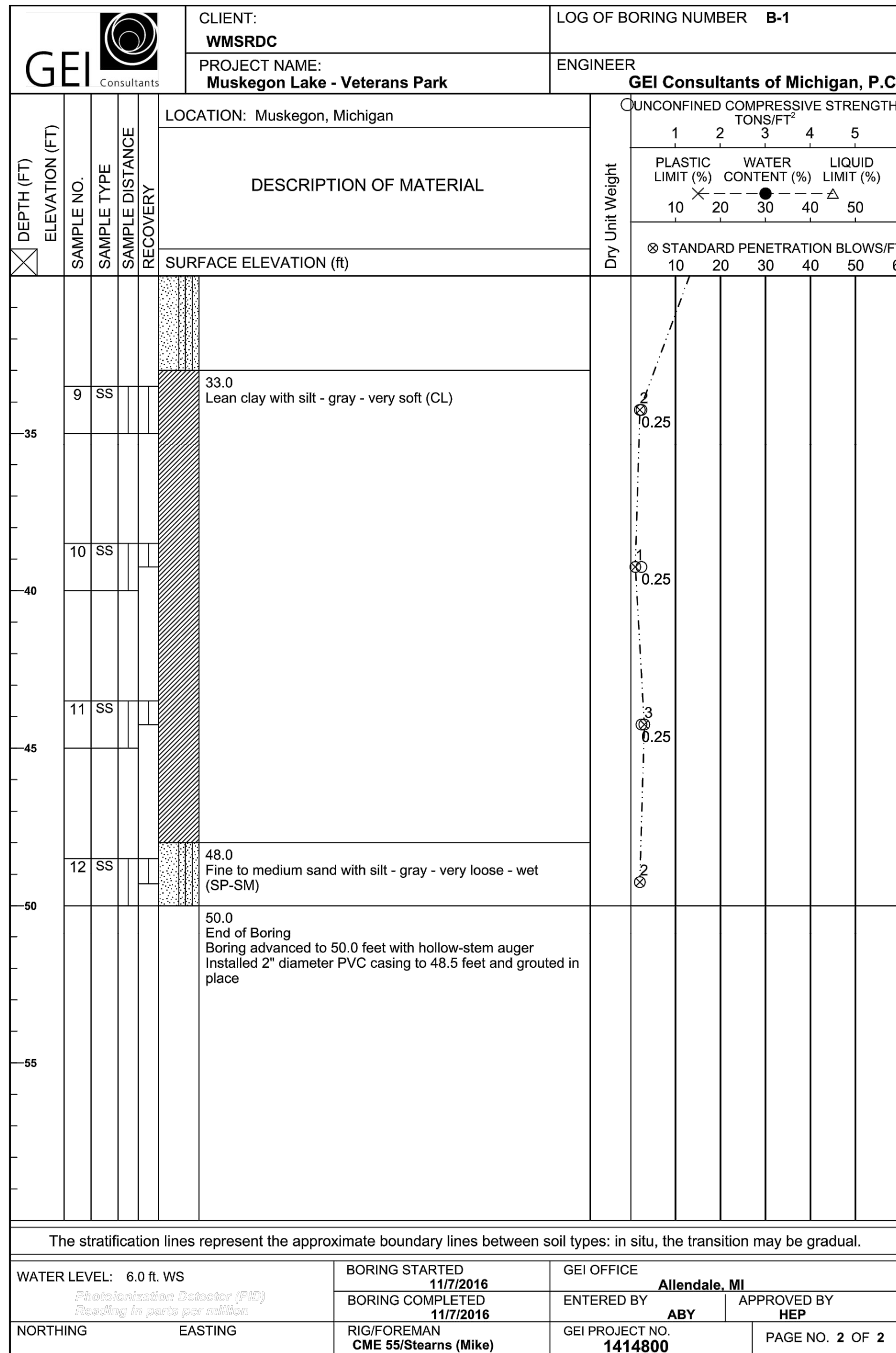
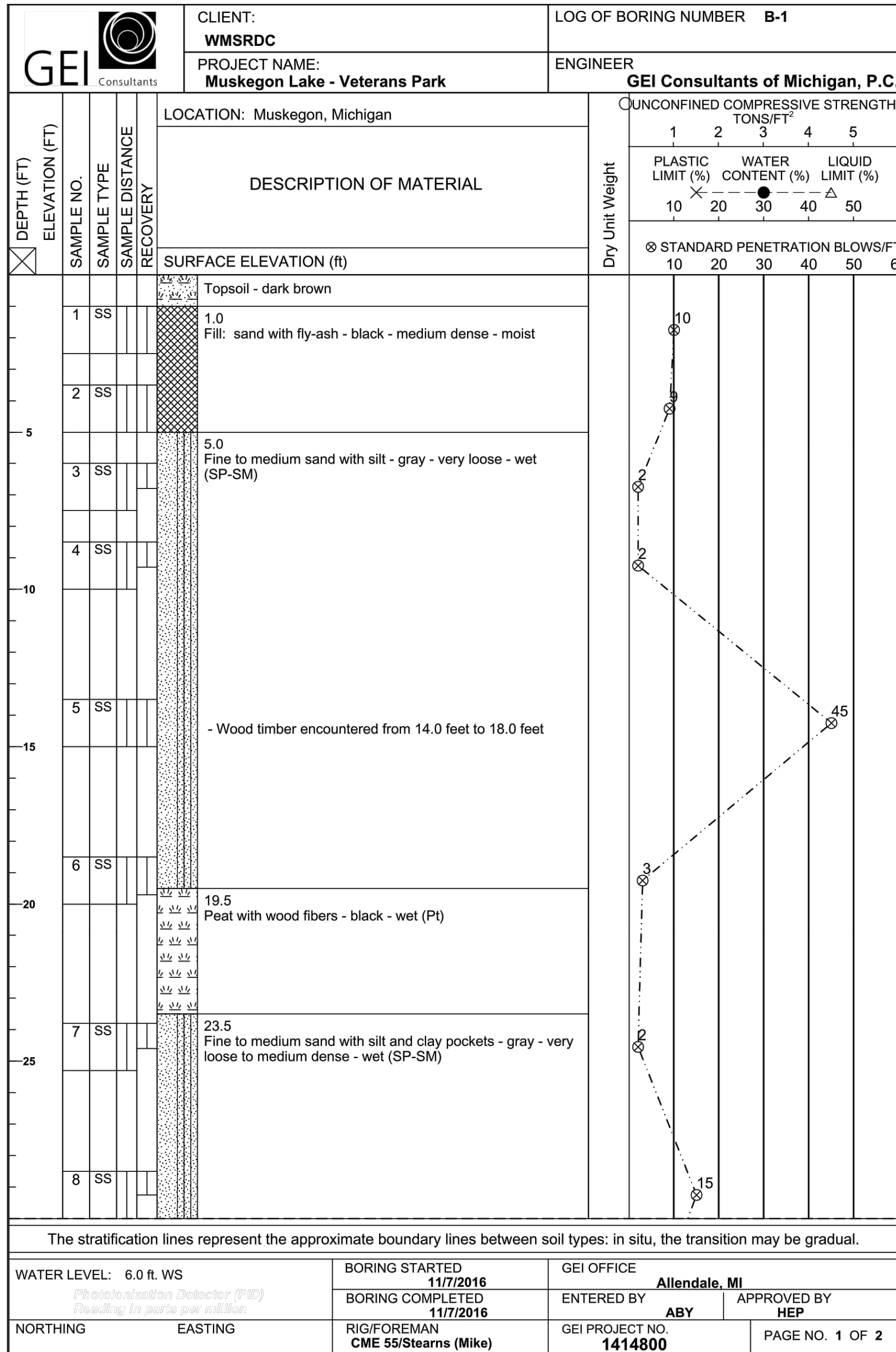
REV
2

Attention:

SCALE: 1" = 80'

If this scale bar does not measure 1" then drawing is not original scale.

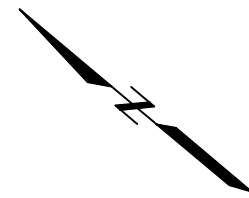
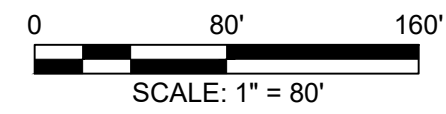
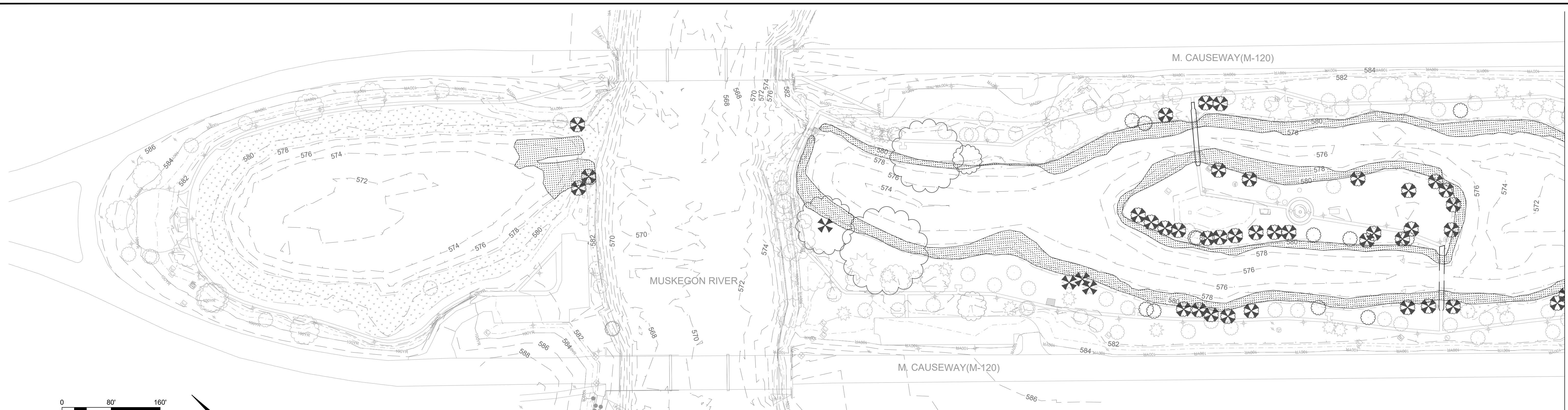
SOIL BORING LOGS



Attention:			
0 1"			
If this scale bar does not measure 1" then drawing is not original scale.			
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1	02/13/17	PERMIT FIGURES	WL

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		VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. C3
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION		SOIL BORING LOGS	REV 2
GEI Project 1414800			



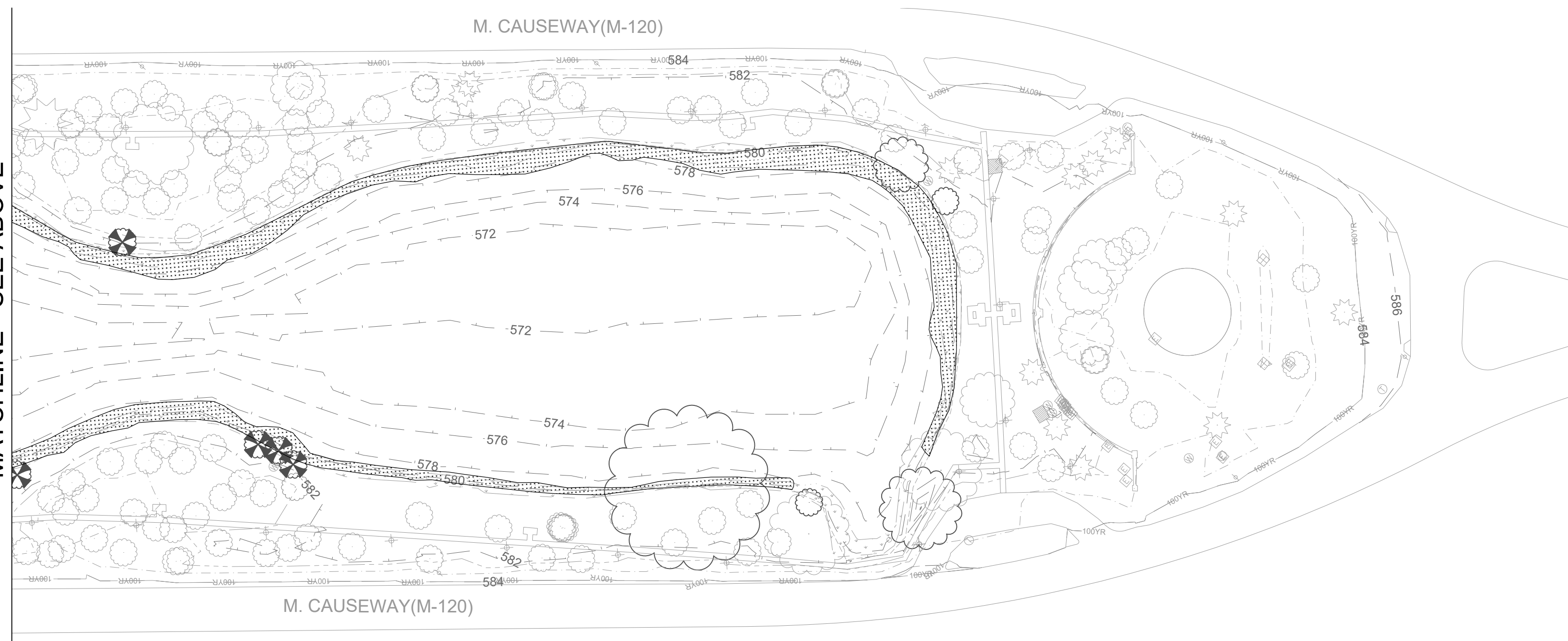
LEGEND

- EXISTING TREE TO REMAIN (WITHIN GEI'S PROJECT LIMITS)
- EXISTING TREE TO BE REMOVED - 46 TOTAL (WITHIN GEI'S PROJECT LIMITS)
- FOOTPRINT OF EXISTING CATTAILS AND SHRUBS TO BE REMOVED
- WETLAND

CLEARING AND GRUBBING NOTES

1. EXISTING TREES TO BE REMOVED SHALL BE FLAGGED IN THE FIELD BY THE ENGINEER PRIOR TO REMOVAL.
2. ALL EXISTING SHRUBS AND CATTAILS ALONG THE POND SHORELINES ARE TO BE REMOVED TO FACILITATE INSTALLATION OF THE SHORELINE TREATMENTS.
3. MATERIAL REMOVED DURING THE CLEARING AND GRUBBING PROCESS TO BE DISPOSED OF AT A LOCATION OF THE CONTRACTOR'S CHOOSING.

MATCHLINE - SEE ABOVE



MATCHLINE - SEE BELOW

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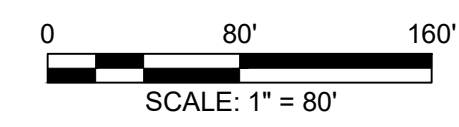
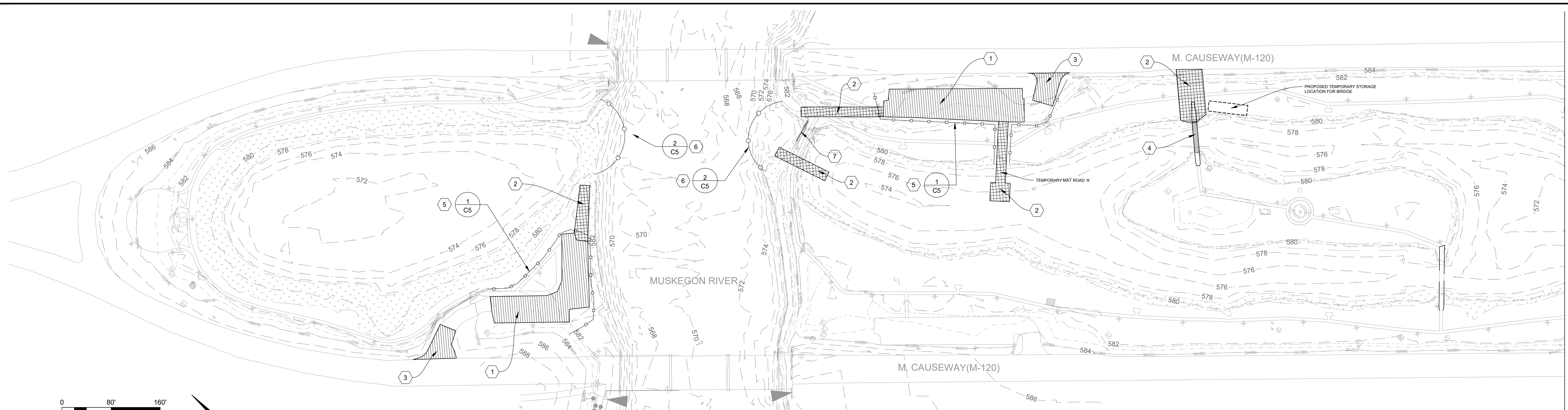
WMSRDC
 WEST MICHIGAN SHORELINE
 REGIONAL DEVELOPMENT COMMISSION
 GEI Project 1414800

**VETERANS MEMORIAL PARK
 HABITAT RESTORATION**

CLEARING & GRUBBING

DWG. NO.
C4

 REV
2



DRAWING KEY

- 1 **STAGING AREA.** UTILIZE EXISTING PARKING LOTS TO STAGE MATERIALS FOR CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE EXISTING PARKING LOT, AND SHALL REPAIR ANY DAMAGE UPON COMPLETION OF PROJECT SPECIFIC CONSTRUCTION ACTIVITIES.
- 2 **TEMPORARY TIMBER MAT POND CONSTRUCTION ACCESS.** ACCESS PATHS SHALL BE CONSTRUCTED USING TIMBER MATS PLACED DIRECTLY ON GRADE. TIMBER MAT ACCESS ROAD 'A' SHALL BE 16 FT. WIDE BY 100 FT. LONG, AND SHALL HAVE A 32 FT. BY 30 FT. LANDING PAD, OR ALTERNATE CONFIGURATION APPROVED BY ENGINEER. ALL OTHER ACCESS PATHS SHALL BE CONSTRUCTED USING ONE ROW OF TIMBER MAT AND EXPANDED AS NECESSARY. ALL EFFORTS MUST BE UTILIZED TO AVOID DAMAGING EXISTING VEGETATION, PARTICULARLY WETLANDS AND TREES, TO THE GREATEST EXTENT POSSIBLE. CONTRACTOR TO REMOVE (AND REPLACE) OR PROTECT PLAQUES OR OTHER MONUMENTS AS NECESSARY TO FACILITATE CONSTRUCTION.
- 3 **CONSTRUCTION ENTRANCE.** CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE EXISTING PARKING LOT ENTRY, AND SHALL REPAIR ANY DAMAGE UPON COMPLETION OF PROJECT SPECIFIC CONSTRUCTION ACTIVITIES.
- 4 **PEDESTRIAN BRIDGE REMOVAL.** TEMPORARILY REMOVE PEDESTRIAN BRIDGE DURING CONSTRUCTION TO ALLOW ACCESS FOR CONSTRUCTION EQUIPMENT. CONTRACTOR SHALL IDENTIFY TEMPORARY STORAGE LOCATION AND BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY BRIDGE STORAGE.
- 5 **SILT FENCE.** 1,250 L.F. OF SILT FENCE SHALL BE INSTALLED DOWN SLOPE OF DISTURBANCE AREAS. SEE DETAIL 1 ON SHEET C5.
- 6 **TURBIDITY CURTAIN.** ANCHOR 150 L.F. OF TURBIDITY CURTAIN IN PLACE AS SHOWN AROUND BOTH THE SOUTH AND NORTH POND OPENINGS TO THE MUSKEGON RIVER. SEE DETAIL 2 ON SHEET C5.
- 7 **TEMPORARY COFFER DAM.** INSTALL 40 L.F. OF SHEET PILE WALL IMMEDIATELY NORTH OF THE SOUTH POND CONNECTION TO THE MUSKEGON RIVER IN PREPARATION FOR DEWATERING ACTIVITIES. EXACT LOCATION, LAYOUT, AND SPECIFICATIONS TO BE DETERMINED BY THE CONTRACTOR AND APPROVED BY ENGINEER.

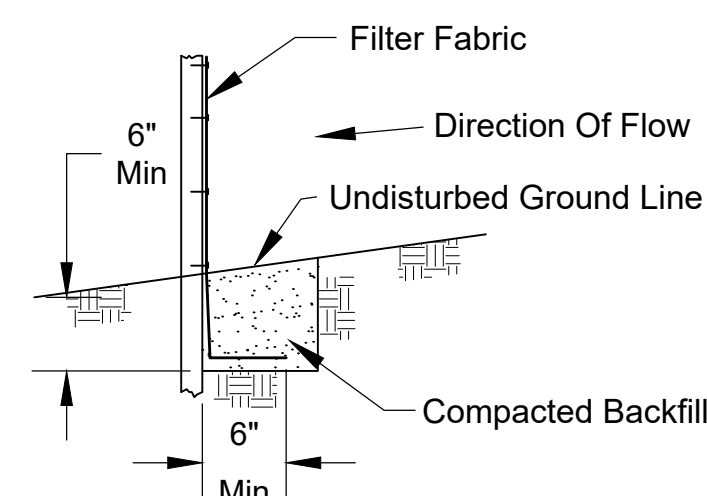
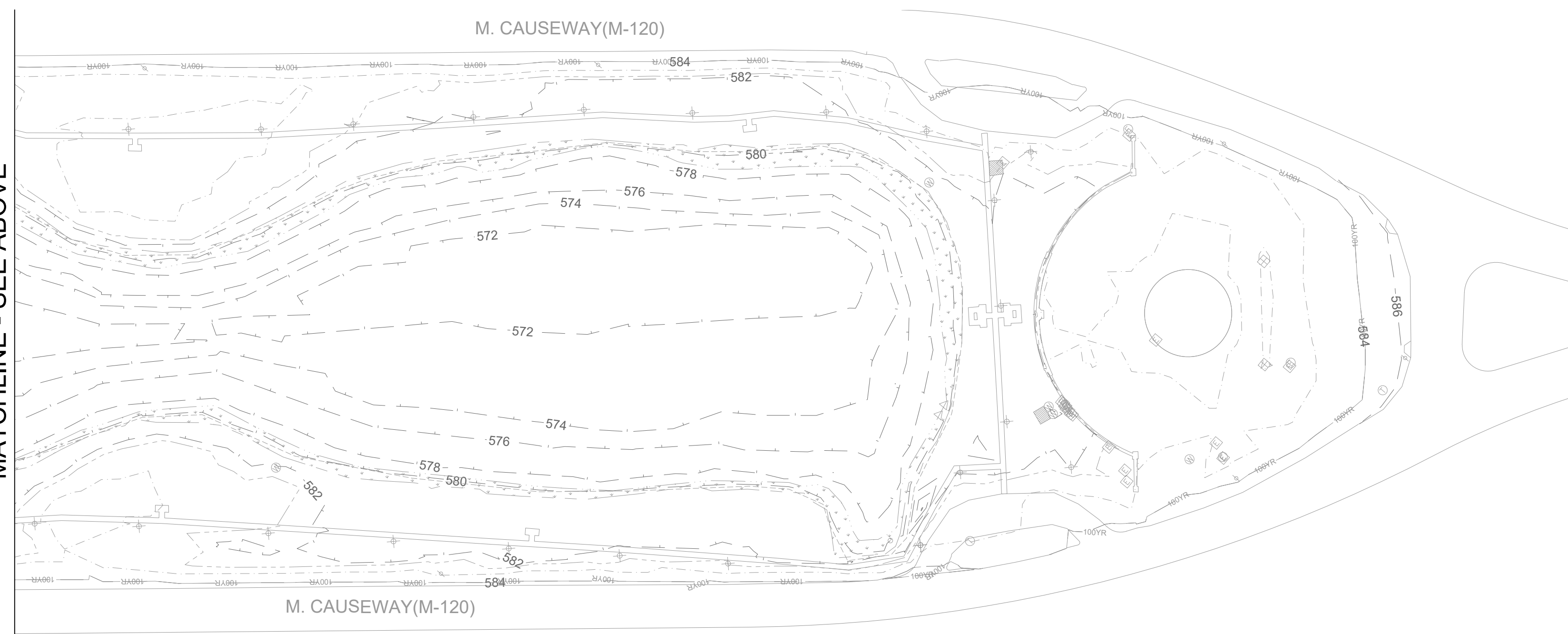
CONSTRUCTION SEQUENCE

1. CLEAR AND GRUB SITE AS NEEDED WITHIN EXCAVATION LIMITS OR FOR CONSTRUCTION ACCESS ONLY.
2. BEGIN CONSTRUCTION OF ACCESS ROAD IMPROVEMENTS AND CONSTRUCTION STAGING.
3. INSTALL SITE PREPARATION AND SOIL EROSION CONTROL FEATURES AS SEEN ON SHEET C5.
4. INSTALL COFFER DAM AND TURBIDITY CURTAINS.
5. OPERATE EXISTING PUMP TO DRAW SOUTH POND DOWN TO THE MAXIMUM EXTENT.
6. INSTALL WELL POINTS/SUMP AND DISCHARGE WATER IN ACCORDANCE WITH THE DEWATERING PLAN (SEE SHEET C6).
7. COMPLETE EXCAVATION, SHORELINE TREATMENTS, AND WATER CONTROL STRUCTURE MODIFICATIONS.
8. DISPOSE OF ALL EXCAVATED MATERIAL AT AN APPROVED TYPE II LANDFILL.
9. APPLY AQUATIC-APPROVED GLYPHOSATE-BASED HERBICIDE TO TURF GRASS TO PREPARE SITE FOR SEEDING AND PLANTING.
10. INSTALL HABITAT STRUCTURES, NATIVE SEED, AND FINAL SOIL EROSION CONTROL MEASURES.
11. DECONSTRUCT ACCESS PAD IN DEWATERED AREA.
12. ALLOW POND TO NATURALLY RE-FILL OR RE-FILL USING WATER FROM THE MUSKEGON RIVER.
13. REMOVE TEMPORARY COFFER DAM.
14. REMOVE TEMPORARY CONSTRUCTION IMPACTS.
15. INSTALL NATIVE PLANTS.
16. MAINTAIN PLANTINGS FOR ONE GROWING SEASON FOLLOWING INSTALLATION IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

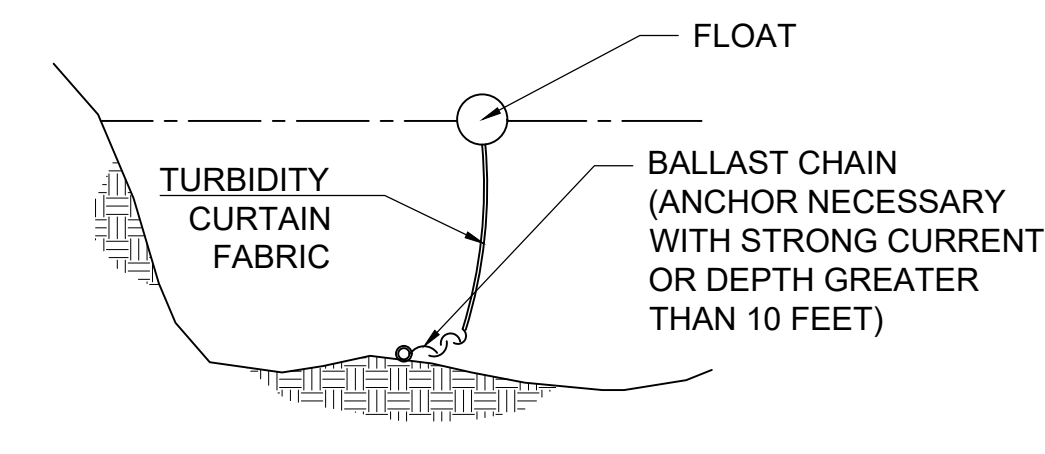
ADDITIONAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF SIDEWALK, PLAQUES, OR ANY OTHER INFRASTRUCTURE DAMAGED DURING PROJECT CONSTRUCTION. REPLACEMENT MUST BE TO PRE-CONSTRUCTION CONDITIONS OR BETTER, AS DETERMINED BY THE OWNER, ENGINEER, AND/OR PROJECT STAKEHOLDERS.
2. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS WITH ANY MONUMENTS, PLACARDS, MEMORIALS, OR VEGETATION PRESENT ON-SITE THAT MEMORIALIZES UNITED STATES VETERANS. THIS SHALL INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, REMOVAL AND REPLACEMENT OF MEMORIALS TO FACILITATE CONSTRUCTION OR USE OF ADEQUATE PROTECTION TO ENSURE MEMORIALS ARE NOT DAMAGED DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF ANY DAMAGED STRUCTURES TO PRE-CONSTRUCTION CONDITION, OR BETTER, TO THE SATISFACTION OF THE OWNER, ENGINEER, AND PROJECT STAKEHOLDERS.
3. CONTRACTOR MAY PROPOSE ALTERNATE PROTECTIONS FOR ACCESS AND STAGING, IN LIEU OF TIMBER MATS, IF DESIRED. ALL ALTERNATE PROTECTIONS MUST BE APPROVED BY THE ENGINEER.

MATCHLINE - SEE ABOVE



1 C5 **SILT FENCE**
NOT TO SCALE



2 C5 **TURBIDITY CURTAIN**
NOT TO SCALE

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 WEST MICHIGAN SHORELINE
 REGIONAL DEVELOPMENT COMMISSION

GEI Project 1414800

VETERANS MEMORIAL PARK
 HABITAT RESTORATION

PREP., DEMO., ACCESS, SESC
 & STAGING PLAN

DWG. NO.
C5

REV
2

MATCHLINE - SEE BELOW

DEWATERING NOTES - SOUTH POND

INSTALLATION

1. The CONTRACTOR shall be responsible for providing all materials, equipment, labor, and services necessary for management of surface and groundwater, including seepage and precipitation.
2. Install a dewatering system to lower and control ground and surface water in order to permit excavation and placement of backfill materials to be performed under dry conditions. Make the dewatering system adequate to pre-drain the water-bearing strata above and below the bottom of utilities and other excavations.
3. In addition, reduce hydrostatic pressure head in water-bearing strata below utilities and other excavations, to extent that water levels in the construction area are a minimum of one foot below prevailing excavation surface at all times.
4. CONTRACTOR may utilize the existing on-site pump owned by the City of Muskegon for surface dewatering. CONTRACTOR is responsible for coordinating efforts with the City of Muskegon and for all operation, maintenance, or repair costs associated with use of said pump.

WATER DISPOSAL

1. Dispose of water removed from the excavations in such a manner that will not endanger portions of work under construction or completed, and will not cause inconvenience to the OWNER, adjacent landowners, or to others working near the site.
2. All surface water pumped prior to the start of construction activities may be discharged into the Muskegon River.
3. Once construction activities have begun, maintenance pumping must be discharged or handled in one of the following ways:
 - a. A vacuum well point system may be installed that intercepts groundwater prior to entering the area of excavation. If groundwater is intercepted prior to contact with any disturbed, excavated, or filled material, it may be discharged into the Muskegon River.
 - b. Water entering the construction area may be discharged into the upland location shown on the attached figure, which is owned by the Muskegon Lake Nature Preserve. Preparation of the site will require cut, chip, and removal of invasive woody plant species in the area used for dewatering.
 - b.1. All water from the dewatering operation must be discharged through a Pump Discharge Filtration Unit (Ecolobag or approved equal). CONTRACTOR will be responsible for ensuring that discharged water infiltrates into the existing soil prior to entering any adjacent regulated wetlands, lakes, streams, or rivers. CONTRACTOR will be responsible for arranging staging with the Muskegon Lake Nature Preserve, and all final plans for dewatering must be approved by the ENGINEER.
 - b.2. Area impacted by dewatering activities at the Muskegon Lake Nature Preserve must be seeded and planted utilizing seed mixture provided in the attached plans and specifications.
4. All maintenance dewatering must be conducted in one of the manners described above until excavation, fill, and placement of structures is complete. The CONTRACTOR shall be responsible for control of runoff in all work areas including, but not limited to, excavations, access roads, parking area, and staging areas. The CONTRACTOR shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas.

OPERATION

1. Prior to any excavation below the ground water table, place system into operation to lower water table as required to facilitate construction. Operation may include the existing on-site City of Muskegon owned pump or another pump system provided by the CONTRACTOR.
2. The CONTRACTOR shall be responsible for providing all facilities required to divert, collect, control, and remove water from all construction work areas and excavations. Surface water shall drain away from active excavations.
3. Dewatering equipment shall be provided to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work during construction. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the excavation work is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result. Water levels in the construction area shall be a minimum of one foot below the prevailing excavation surface.
4. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least one foot below lowest subgrade or bottom of pipe trench and to allow material to be excavated and/or placed in a reasonably dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed. Drainage features shall have sufficient capacity to avoid flooding of work areas.
5. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
6. Maintain stability of sides and bottom of excavation. Control of surface and subsurface water is part of dewatering requirements. Maintain adequate control so that the stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
7. Drainage features shall be so arranged and altered as required to avoid degradation of the final excavated surface(s). The CONTRACTOR shall utilize all necessary erosion and sediment control measures as described herein to avoid construction related degradation of the natural water quality.

STANDBY EQUIPMENT

1. Provide complete standby equipment, installed and available for immediate operation, as may be required to adequately maintain dewatering on a continuous basis and in the event that all or any part of the system may become inadequate or fail.

CORRECTIVE ACTION

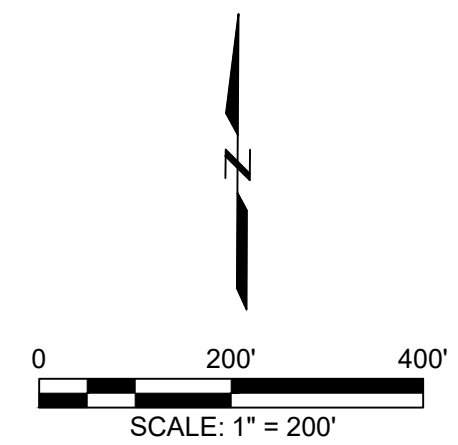
1. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, perform work necessary for reinstatement of damages to grading or work in place resulting from such inadequacy or failure by CONTRACTOR, at no additional cost to the OWNER.

DAMAGES

1. Immediately repair damages to any adjacent facilities or properties caused by dewatering operations at no additional cost to the OWNER.



**MUSKEGON LAKE NATURE PRESERVE -
POTENTIAL MAINTENANCE DEWATERING
INFILTRATION AREA**



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GEI Project 1414800

VETERANS MEMORIAL PARK
HABITAT RESTORATION

DEWATERING PLAN

DWG. NO.

C6

REV

2

EARTHWORK

CUT: 21,644.5 CY (All below OHWM)
 FILL: 4,647.5 CY (All below OHWM)
 NET: 16,563 CY CUT (All below OHWM)
 *Fill comprised of stone and wood from shoreline treatment areas and habitat structures.

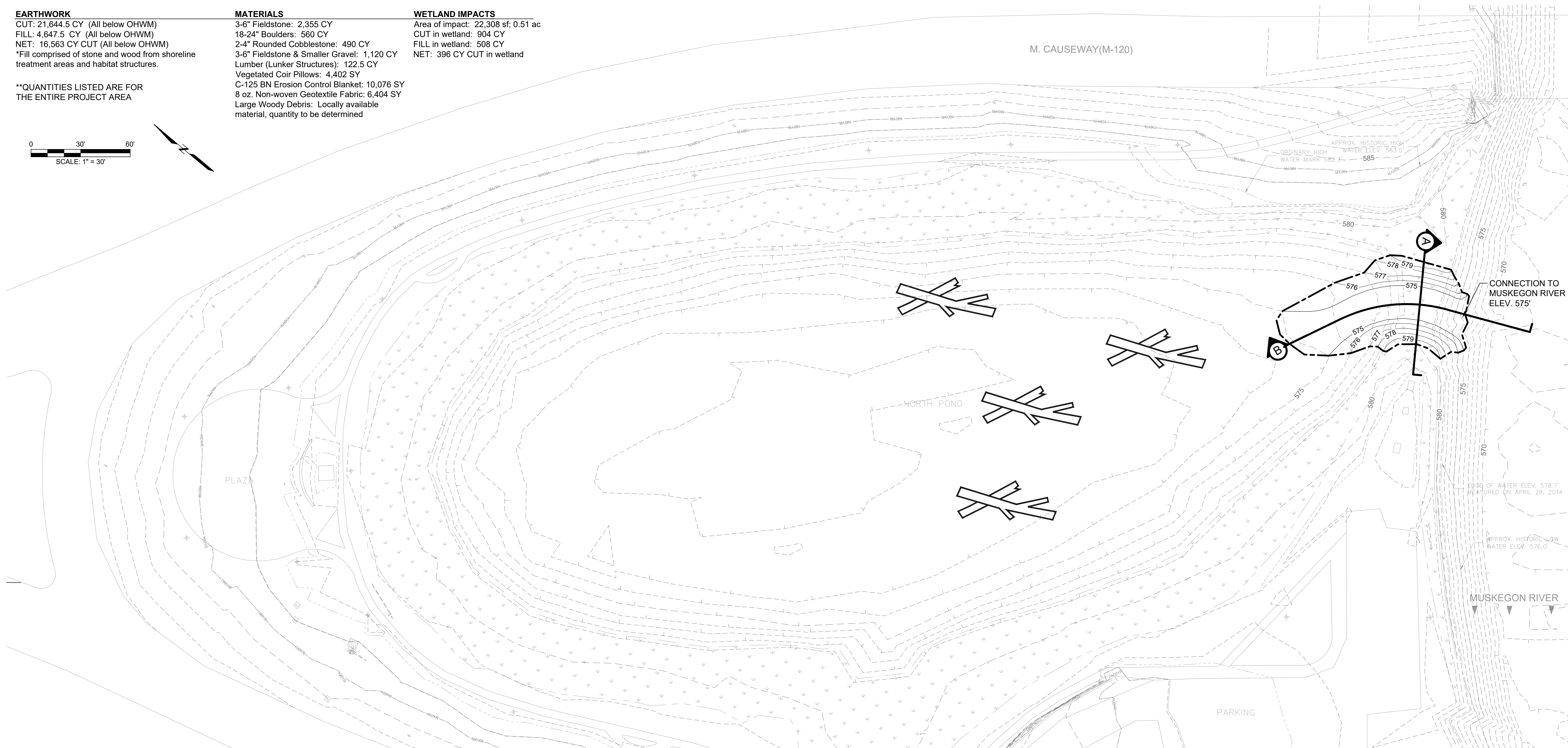
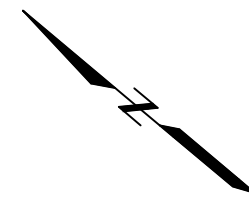
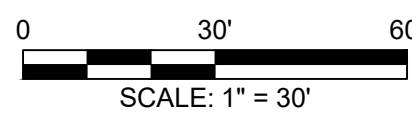
**QUANTITIES LISTED ARE FOR THE ENTIRE PROJECT AREA

MATERIALS

3-6" Fieldstone: 2,355 CY
 18-24" Boulders: 560 CY
 2-4" Rounded Cobblestone: 490 CY
 3-6" Fieldstone & Smaller Gravel: 1,120 CY
 Lumber (Lunker Structures): 122.5 CY
 Vegetated Coir Pillows: 4,402 SY
 C-125 BN Erosion Control Blanket: 10,076 SY
 8 oz. Non-woven Geotextile Fabric: 6,404 SY
 Large Woody Debris: Locally available material, quantity to be determined

WETLAND IMPACTS

Area of impact: 22,308 sf; 0.51 ac
 CUT in wetland: 904 CY
 FILL in wetland: 508 CY
 NET: 396 CY CUT in wetland



MATCHLINE - SEE SHEET C6

LEGEND

- WATER ELEV. MEASURED ON 04/28/2014 - 578.7'
- 100-YEAR FLOODPLAIN ELEV. - 584.0'
- APPROX. HISTORIC HIGH WATER ELEV. - 583.0'
- APPROX. HISTORIC LOW WATER ELEV. - 576.0'
- ORDINARY HIGH WATER MARK (OHWM) - 582.3'
- TOP OF BANK
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WETLAND BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- GRADING LIMITS
- ⊗ CROSS-SECTION LOCATION

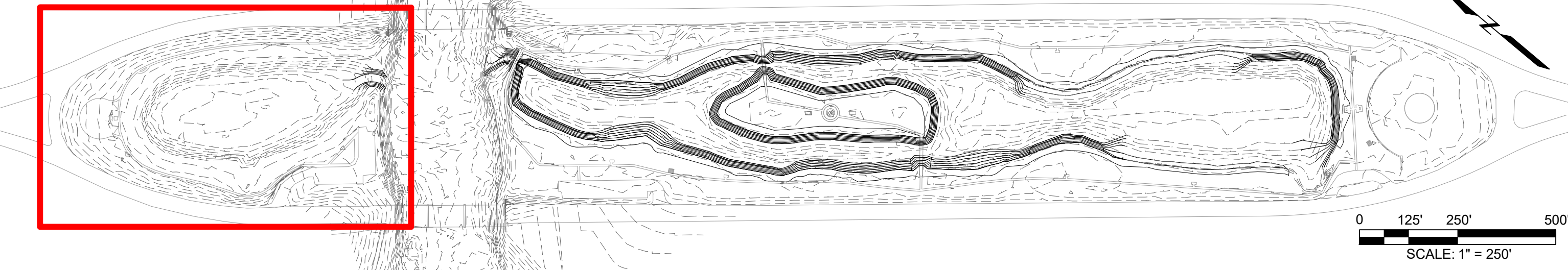
- ▲ **SHORELINE TREATMENT 'A'** - 3-6" FIELDSTONE FROM TOE OF SLOPE @ 574.0' TO TOP OF BANK @ 580.0'. AT SOUTH POND INLET STONE COVERS RE-SHAPED CHANNEL BOTTOM. (SEE DETAIL 4 ON SHEET D1)
- ▲ **SHORELINE TREATMENT 'B'** - 3-6" FIELDSTONE FROM TOE OF SLOPE @ 574.0' TO 578.0'. TWO ROWS OF 3' WIDE VEGETATED COIR PILLOWS PLACED FROM 578.0' TO 580.0'. COIR PILLOWS TO BE PLANTED WITH NATIVE SEED AND PLUGS. (SEE DETAIL 5 ON SHEET D1)
- ▲ **SHORELINE TREATMENT 'C'** - APPROX. 5' WIDE LUNKER STRUCTURE PLACED AT TOE OF SLOPE @ 574.0' WITH 18-24" BOULDERS PLACED DIRECTLY ON TOP OF THE STRUCTURE. 3-6" FIELDSTONE PLACED BEHIND BOULDERS EXTENDS TO ELEV. 580'. (SEE DETAIL 6 ON SHEET D1)
- ▲ **SHORELINE TREATMENT 'D'** - TWO ROWS OF 3' WIDE VEGETATED COIR PILLOWS PLACED FROM 578.0' TO 580.0'. COIR PILLOWS TO BE PLANTED WITH NATIVE SEED AND PLUGS. (SEE DETAIL 7 ON SHEET D1)
- HABITAT STRUCTURES - ROCK PILES CONSISTING OF 3-6" FIELDSTONE AND SMALLER GRAVEL (SEE DETAIL 3 ON SHEET D1)
- ⊗ HABITAT STRUCTURES - LARGE WOODY DEBRIS (SEE DETAIL 2 ON SHEET D1)

- ▨ EXISTING WETLAND
- ▨ 3-6" FIELDSTONE
- ▨ 3' WIDE VEGETATED COIR PILLOWS
- ▨ 5' WIDE LUNKER STRUCTURES
- ▨ C-125 BN EROSION CONTROL BLANKET

*SEE PLANTING PLAN ON SHEETS L1-L5.

NO.	DATE	ISSUE/REVISION	APP
2	04/26/17	CONSTRUCTION DOCUMENTS	WL
1	02/13/17	PERMIT FIGURES	WL
			APP

KEY MAP



Designed: - KR
 Checked: - BM
 Drawn: - WL / KP
 Submitted By: - KR
 P.E. Number: - 44371
 Submittal Date: 04/26/17



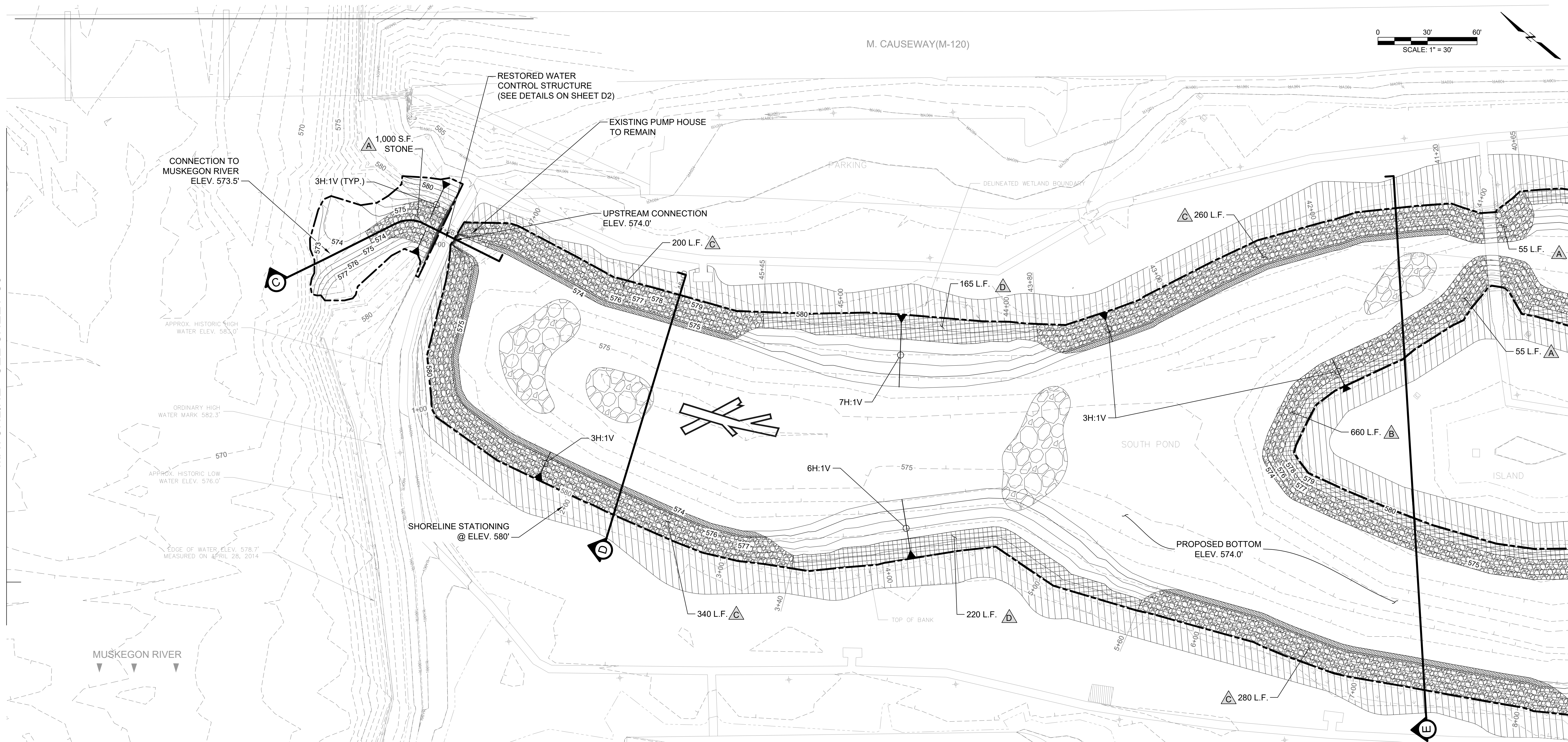
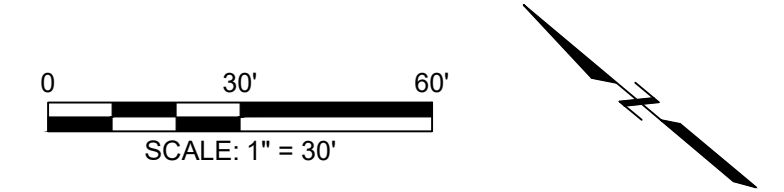
VETERANS MEMORIAL PARK
 HABITAT RESTORATION

PROPOSED CONDITIONS
 1 OF 4

DWG. NO. **C7**
 REV **2**

MATCHLINE - SEE SHEET C5

MATCHLINE - SEE SHEET C7



LEGEND

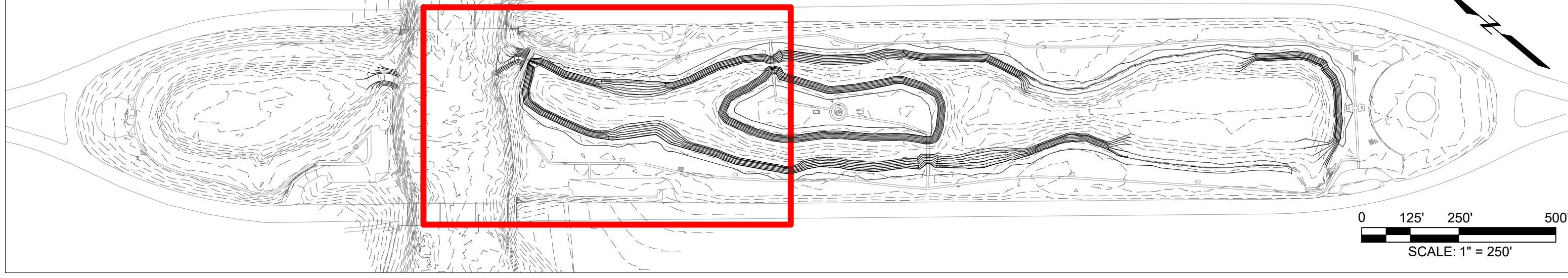
- WATER ELEV. MEASURED ON 04/28/2014 - 578.7'
- 100-YEAR FLOODPLAIN ELEV. - 584.0'
- APPROX. HISTORIC HIGH WATER ELEV. - 583.0'
- APPROX. HISTORIC LOW WATER ELEV. - 576.0'
- ORDINARY HIGH WATER MARK (OHWM) - 582.3'
- TOP OF BANK
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WETLAND BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- GRADING LIMITS
- CROSS-SECTION LOCATION

- SHORELINE TREATMENT 'A'** - 3-6" FIELDSTONE FROM TOE OF SLOPE @ 574.0' TO TOP OF BANK @ 580.0'. AT SOUTH POND INLET STONE COVERS RE-SHAPED CHANNEL BOTTOM. (SEE DETAIL 4 ON SHEET D1)
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- HABITAT STRUCTURES - ROCK PILES CONSISTING OF 3-6" FIELDSTONE AND SMALLER GRAVEL (SEE DETAIL 3 ON SHEET D1)
- HABITAT STRUCTURES - LARGE WOODY DEBRIS (SEE DETAIL 2 ON SHEET D1)

- EXISTING WETLAND
- C-125 BN EROSION CONTROL BLANKET
- 3-6" FIELDSTONE
- 3' WIDE VEGETATED COIR PILLOWS
- 5' WIDE LUNKER STRUCTURES

*SEE PLANTING PLAN ON SHEETS L1-L5.

KEY MAP

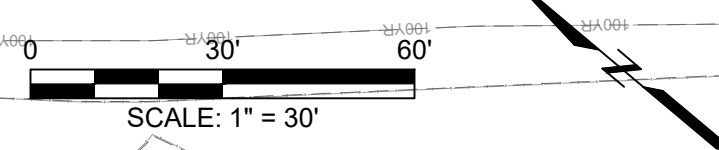


Attention:				
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1	02/13/17	PERMIT FIGURES	WL	

Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- 44371
Submittal Date:	04/26/17

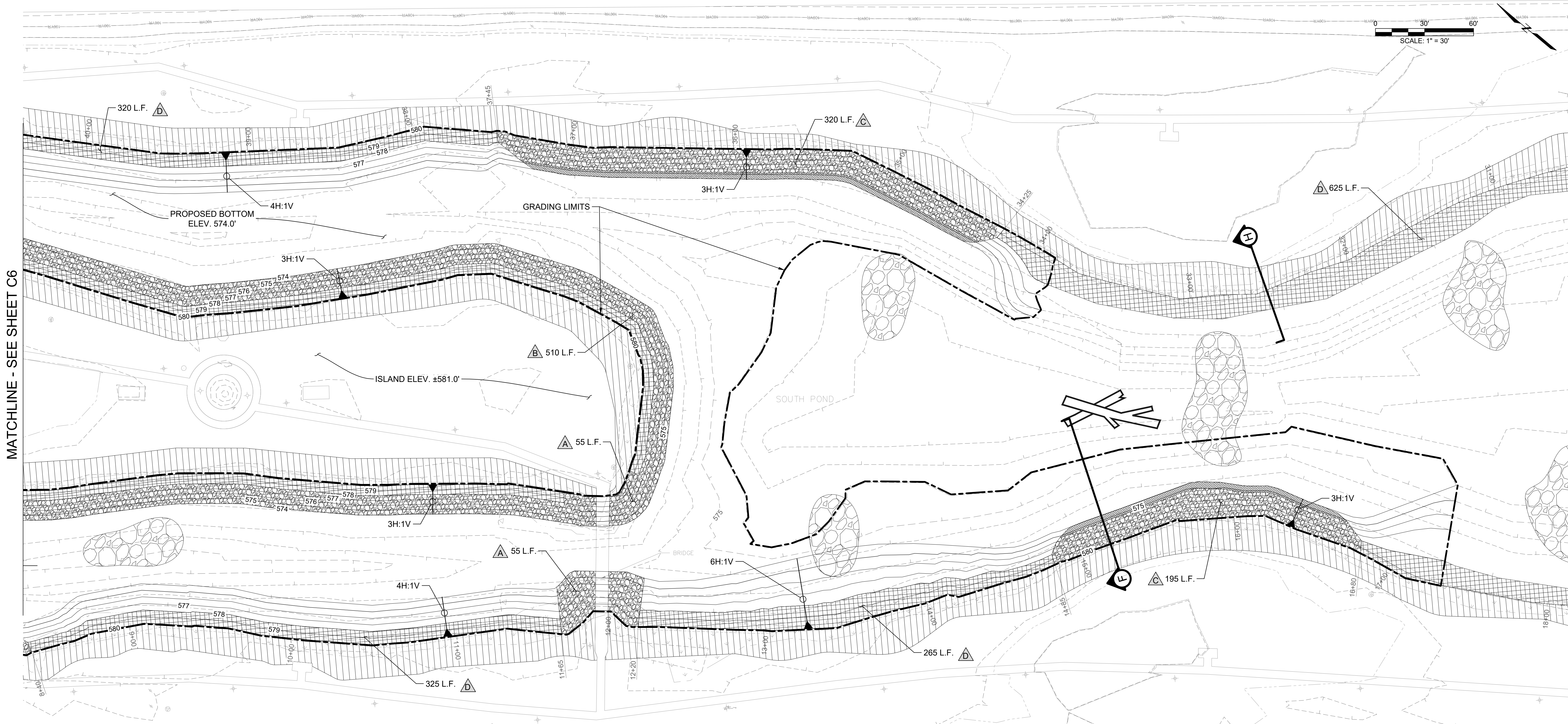


VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. C8
PROPOSED CONDITIONS 2 OF 4	REV 2



MATCHLINE - SEE SHEET C6

MATCHLINE - SEE SHEET C8



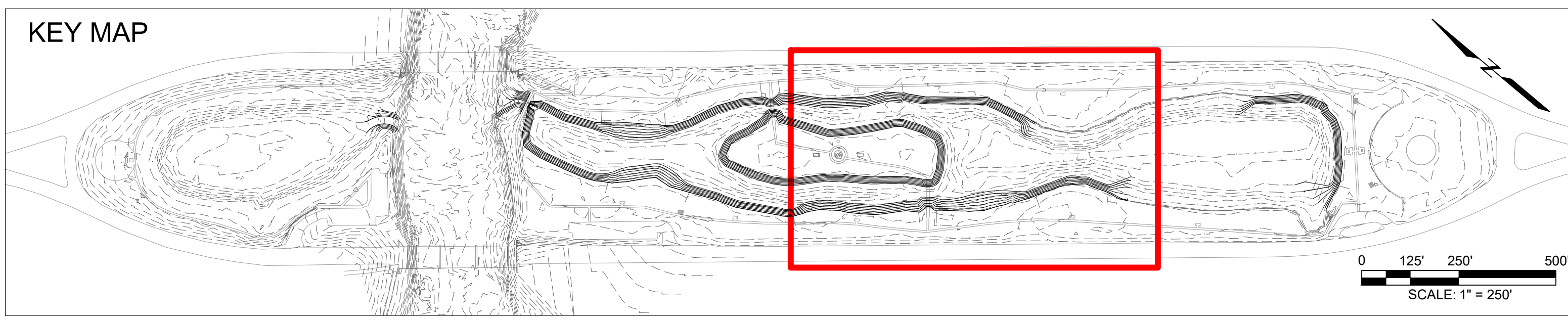
LEGEND

	WATER ELEV. MEASURED ON 04/28/2014 - 578.7'
	100-YEAR FLOODPLAIN ELEV. - 584.0'
	APPROX. HISTORIC HIGH WATER ELEV. - 583.0'
	APPROX. HISTORIC LOW WATER ELEV. - 576.0'
	ORDINARY HIGH WATER MARK (OHWM) - 582.3'
	TOP OF BANK
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	EXISTING WETLAND BOUNDARY
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	GRADING LIMITS
	CROSS-SECTION LOCATION

- A** SHORELINE TREATMENT 'A' - 3-6" FIELDSTONE FROM TOE OF SLOPE @ 574.0' TO TOP OF BANK @ 580.0'. AT SOUTH POND INLET STONE COVERS RE-SHAPED CHANNEL BOTTOM. (SEE DETAIL 4 ON SHEET D1)
- B** SHORELINE TREATMENT 'B' - 3-6" FIELDSTONE FROM TOE OF SLOPE @ 574.0' TO 578.0'. TWO ROWS OF 3' WIDE VEGETATED COIR PILLOWS PLACED FROM 578.0' TO 580.0'. COIR PILLOWS TO BE PLANTED WITH NATIVE SEED AND PLUGS. (SEE DETAIL 5 ON SHEET D1)
- C** SHORELINE TREATMENT 'C' - APPROX. 5' WIDE LUNKER STRUCTURE PLACED AT TOE OF SLOPE @ 574.0' WITH 18-24" BOULDERS PLACED DIRECTLY ON TOP OF THE STRUCTURE. 3-6" FIELDSTONE PLACED BEHIND BOULDERS EXTENDS TO ELEV. 580'. (SEE DETAIL 6 ON SHEET D1)
- D** SHORELINE TREATMENT 'D' - TWO ROWS OF 3' WIDE VEGETATED COIR PILLOWS PLACED FROM 578.0' TO 580.0'. COIR PILLOWS TO BE PLANTED WITH NATIVE SEED AND PLUGS. (SEE DETAIL 7 ON SHEET D1)
- HABITAT STRUCTURES - ROCK PILES CONSISTING OF 3-6" FIELDSTONE AND SMALLER GRAVEL (SEE DETAIL 3 ON SHEET D1)
- HABITAT STRUCTURES - LARGE WOODY DEBRIS (SEE DETAIL 2 ON SHEET D1)

	EXISTING WETLAND		C-125 BN EROSION CONTROL BLANKET
	3-6" FIELDSTONE		3' WIDE VEGETATED COIR PILLOWS
	5' WIDE LUNKER STRUCTURES		

*SEE PLANTING PLAN ON SHEETS L1-L5.

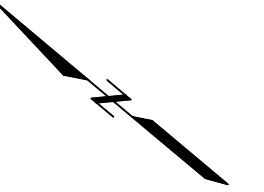
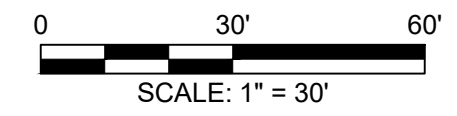


NO.	DATE	ISSUE/REVISION	APP
2	04/26/17	CONSTRUCTION DOCUMENTS	WL
1	02/13/17	PERMIT FIGURES	WL

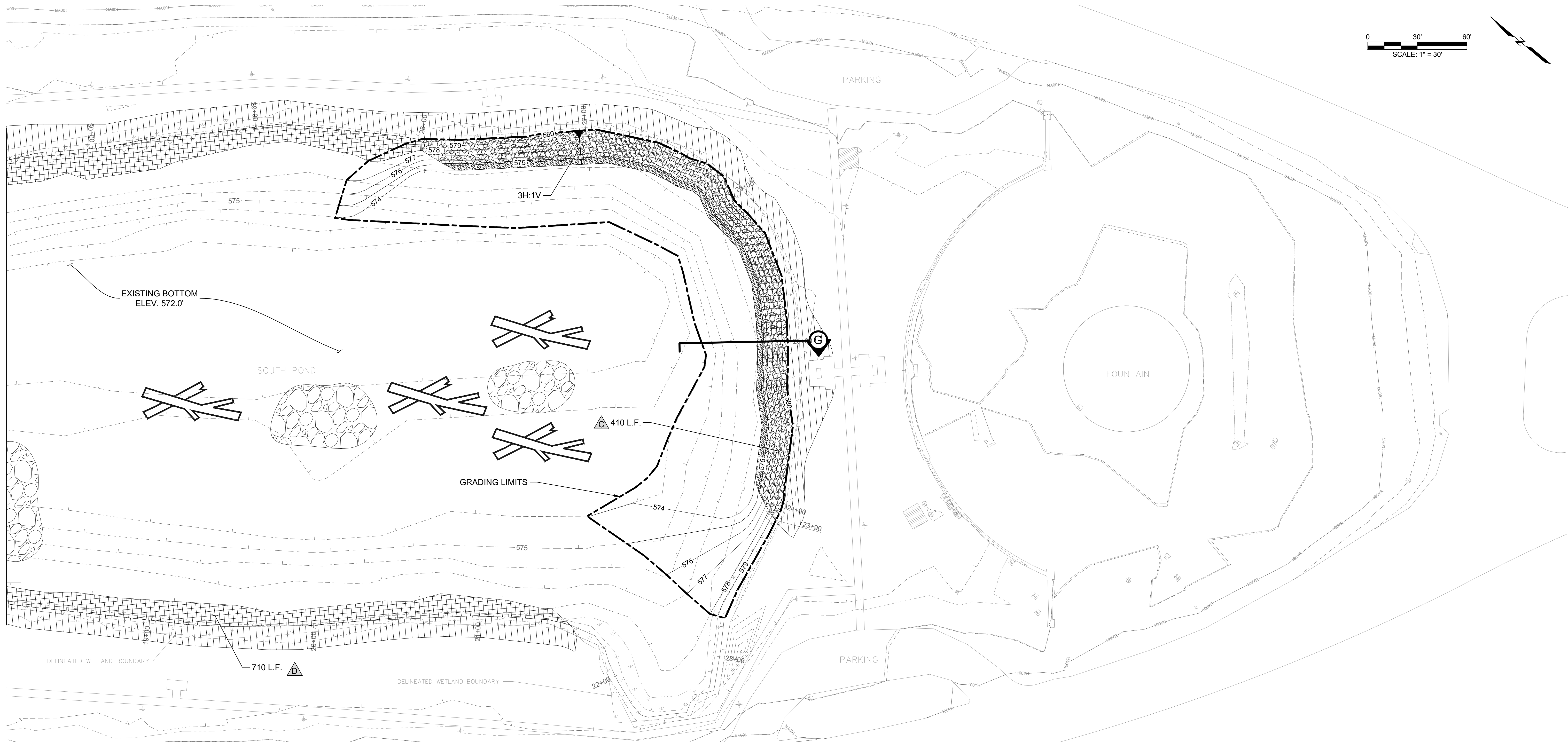
Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- 44371
Submittal Date:	08/26/16



VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. C9
PROPOSED CONDITIONS 3 OF 4	REV 2



MATCHLINE - SEE SHEET C7



LEGEND

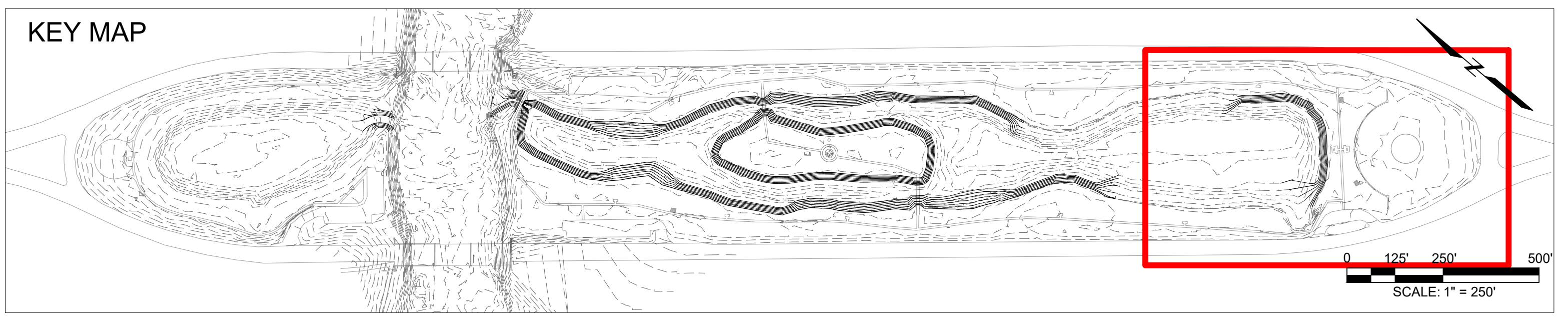
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- 100-YEAR FLOODPLAIN ELEV. - 584.0'
- APPROX. HISTORIC HIGH WATER ELEV. - 583.0'
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- ORDINARY HIGH WATER MARK (OHWM) - 582.3'
- TOP OF BANK
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING WETLAND BOUNDARY
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- GRADING LIMITS
- CROSS-SECTION LOCATION

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- HABITAT STRUCTURES - ROCK PILES CONSISTING OF 3-6" FIELDSTONE AND SMALLER GRAVEL (SEE DETAIL 3 ON SHEET D1)
- HABITAT STRUCTURES - LARGE WOODY DEBRIS (SEE DETAIL 2 ON SHEET D1)

- EXISTING WETLAND
- C-125 BN EROSION CONTROL BLANKET
- 3-6" FIELDSTONE
- 3' WIDE VEGETATED COIR PILLOWS
- 5' WIDE LUNKER STRUCTURES

*SEE PLANTING PLAN ON SHEETS L1-L5.

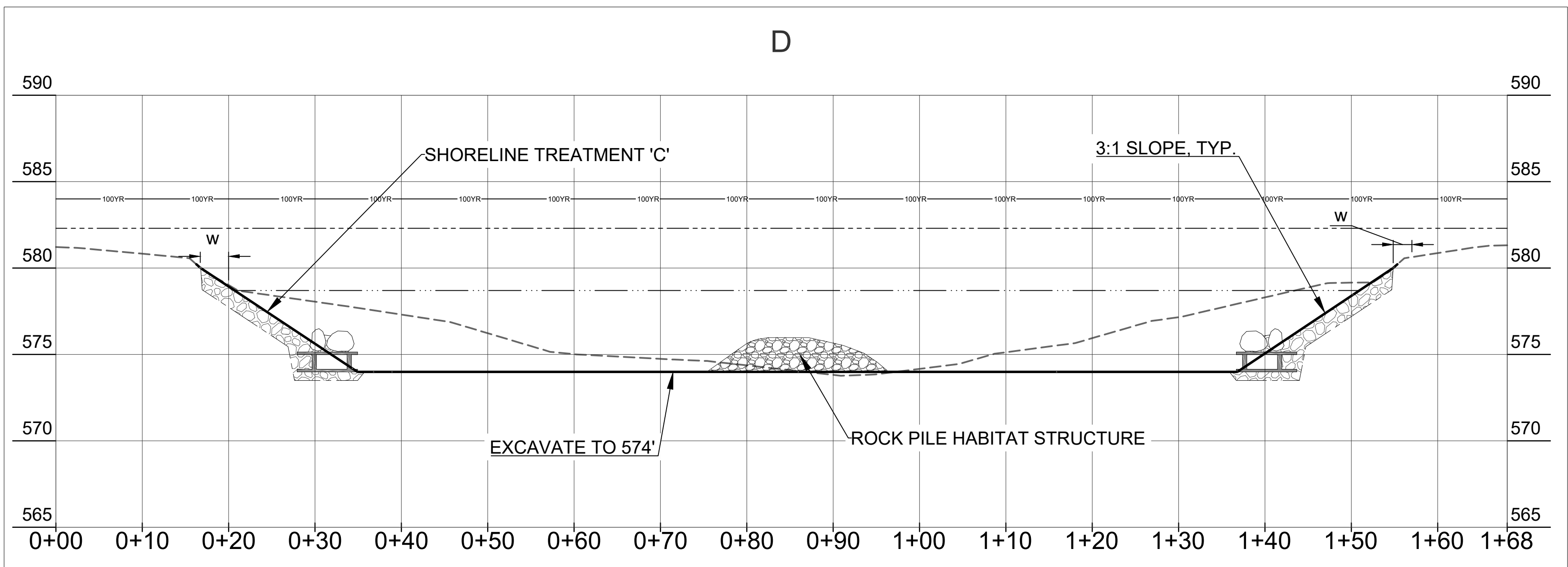
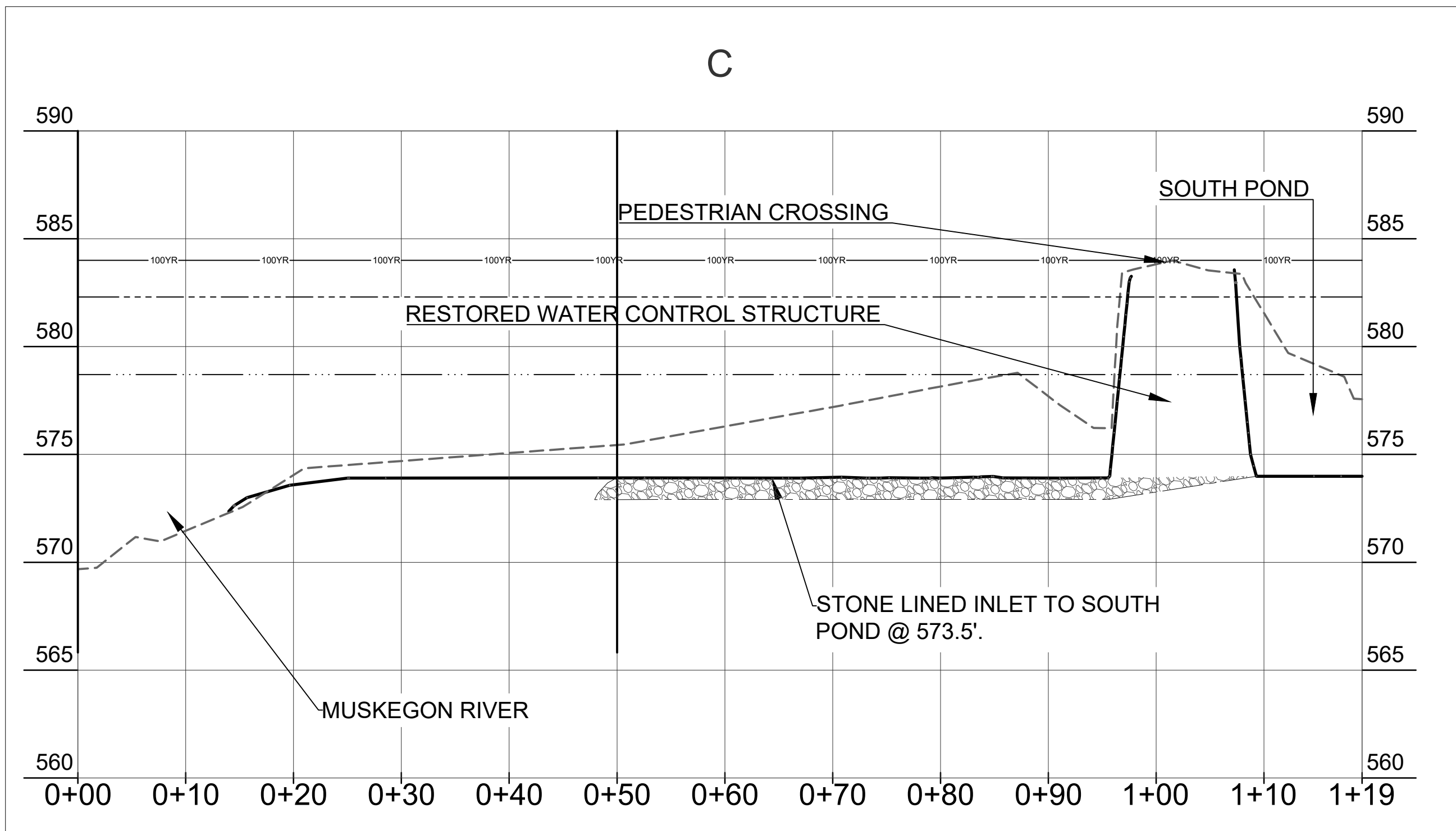
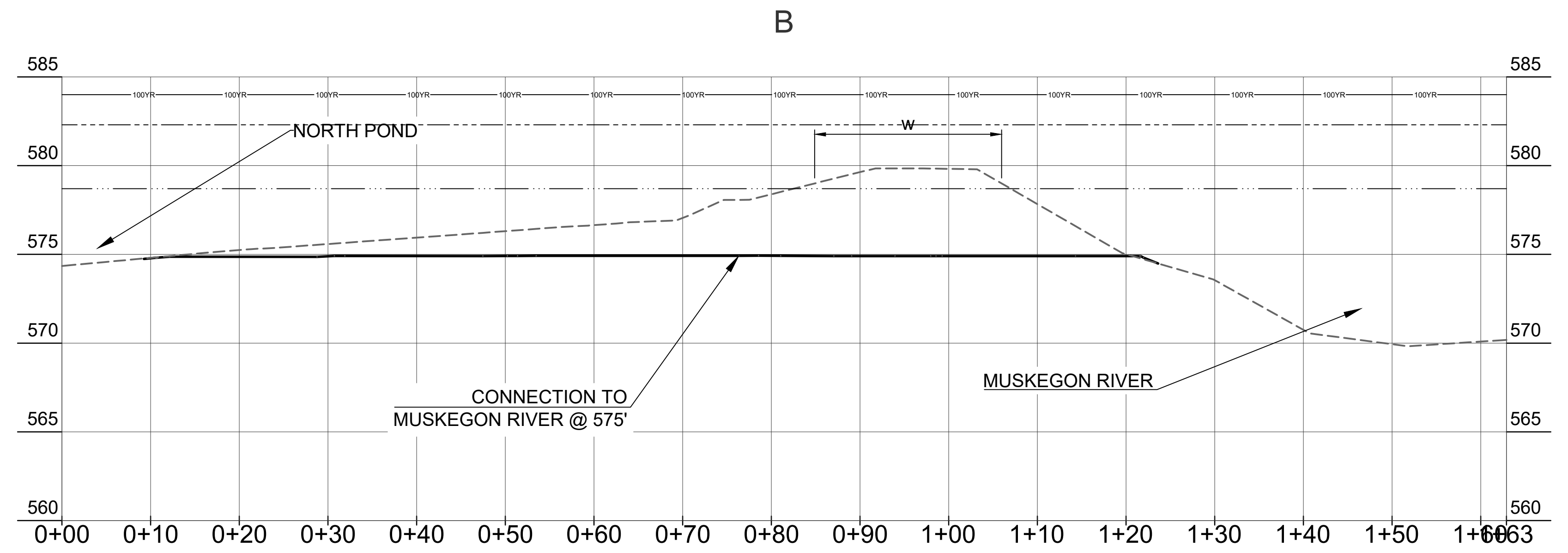
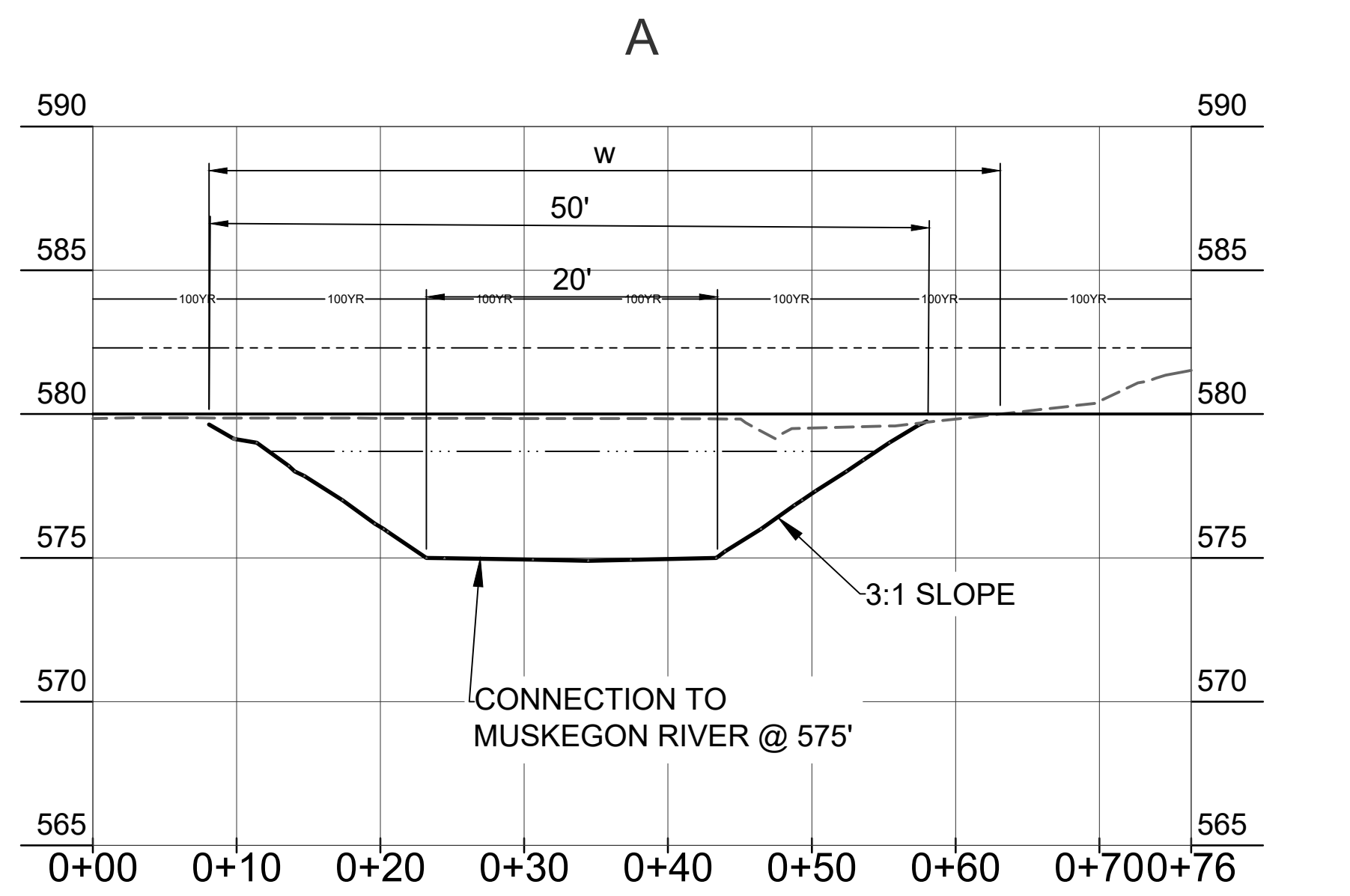
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NO.	DATE	ISSUE/REVISION	APP	
2	04/26/17	CONSTRUCTION DOCUMENTS	WL	
1	02/13/17	PERMIT FIGURES	WL	



Designed: - KR
 Checked: - BM
 Drawn: - WL / KP
 Submitted By: - KR
 P.E. Number: - - 44371
 Submittal Date: 04/26/17

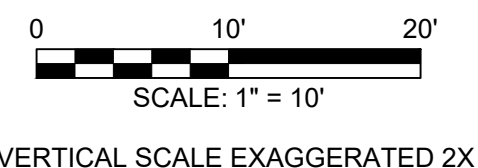


VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. C10
PROPOSED CONDITIONS 4 OF 4	REV 2



LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXCAVATION LIMITS
- ORDINARY HIGH WATER MARK (OHWM) - 582.3'
- APPROXIMATE WATER LEVEL - 578.7'
- 100-YEAR FLOODPLAIN ELEVATION - 584.0'
- W WETLAND



VERTICAL SCALE EXAGGERATED 2X

NO.	DATE	ISSUE/REVISION	APP
2	04/26/17	CONSTRUCTION DOCUMENTS	WL
1	02/13/17	PERMIT FIGURES	WL

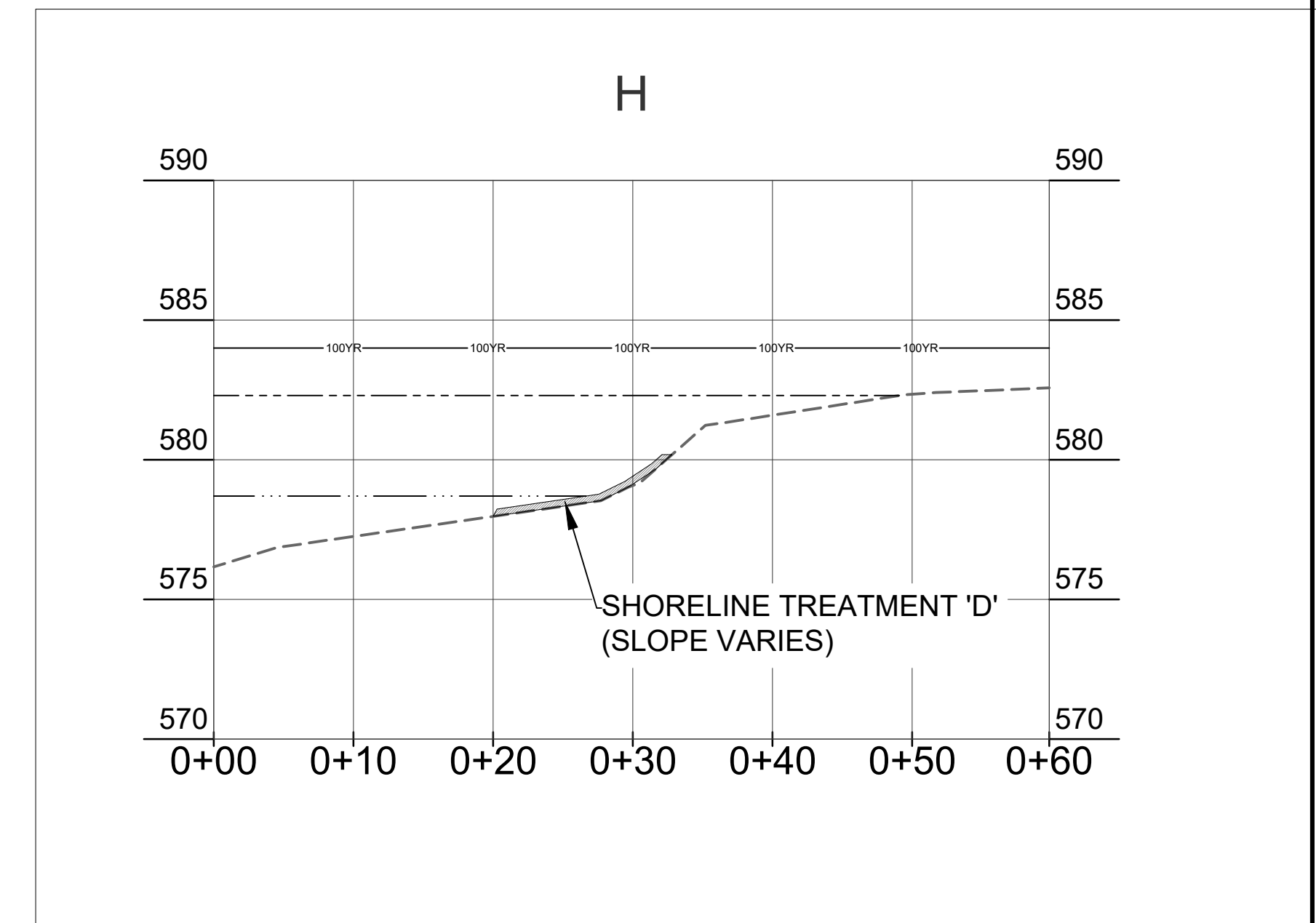
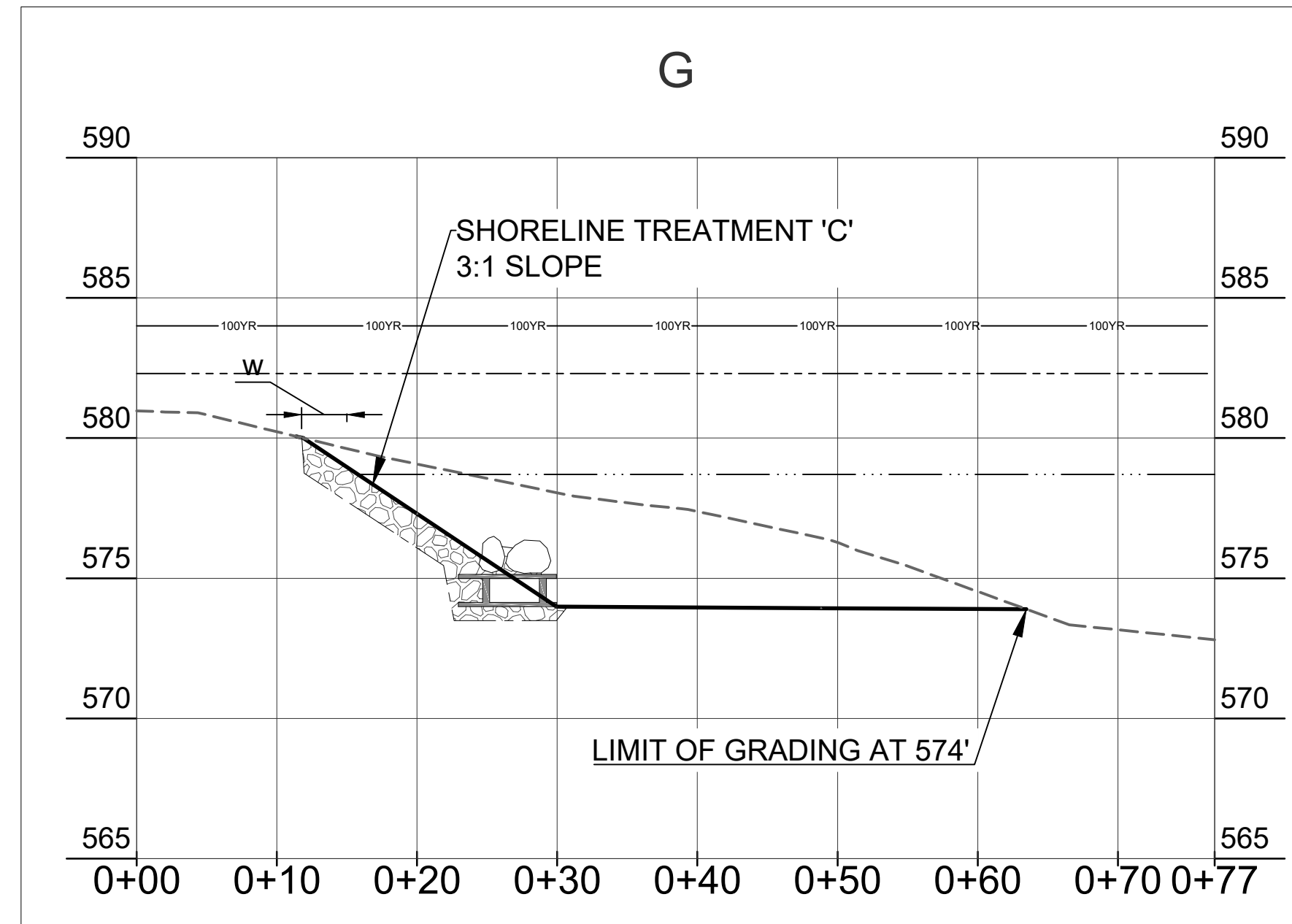
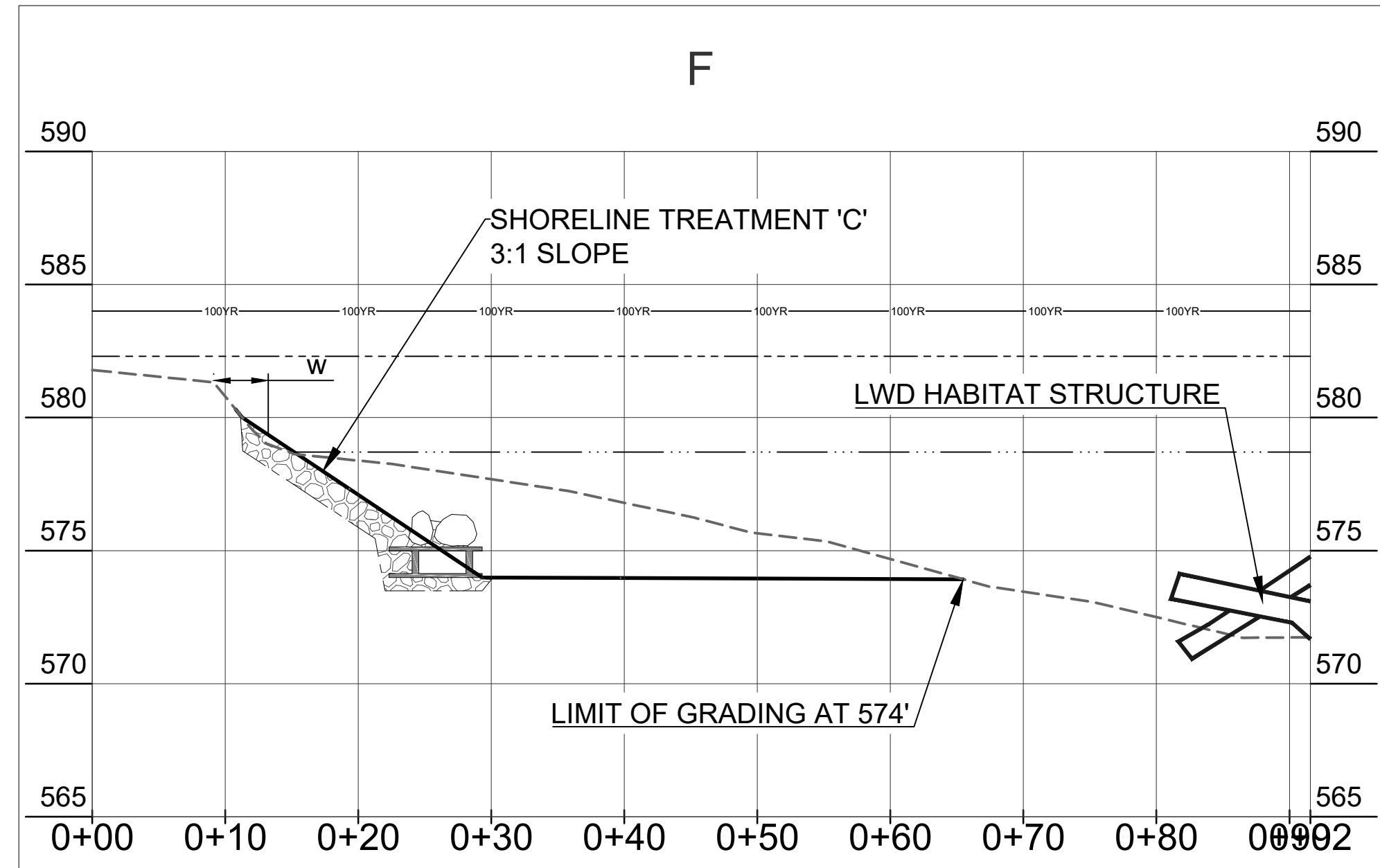
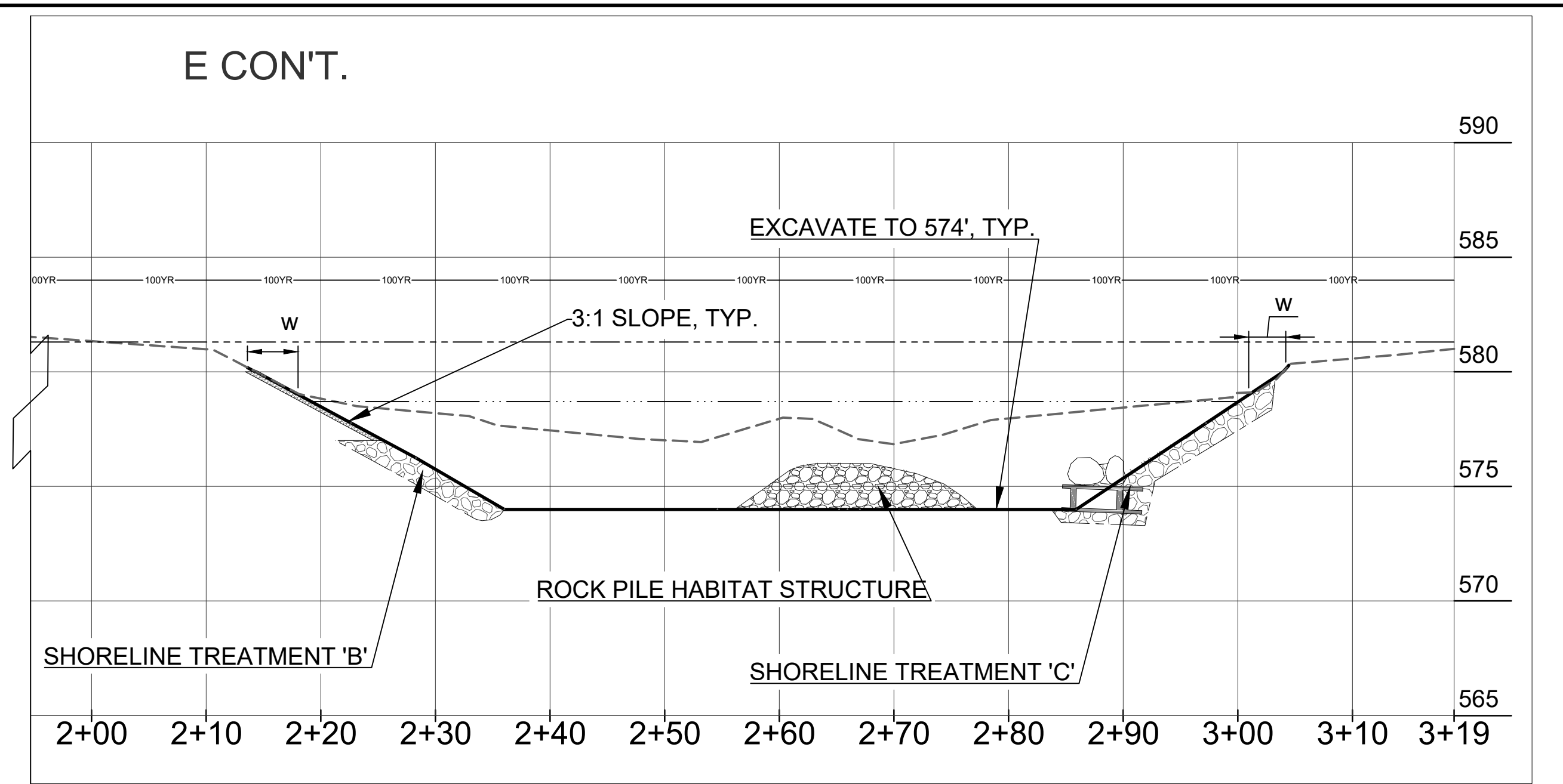
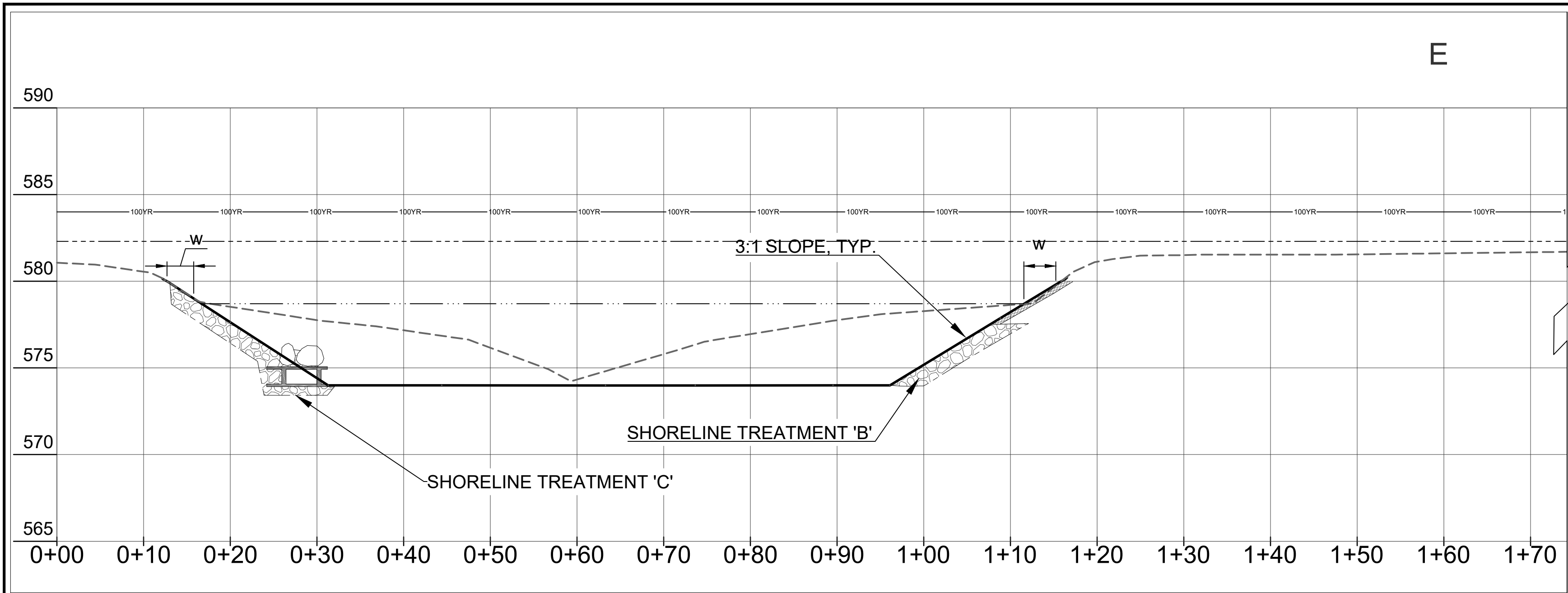
Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK
HABITAT RESTORATION

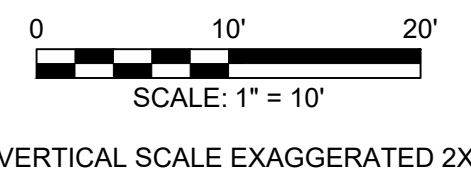
CROSS-SECTIONS
1 OF 2

DWG. NO.
C11
REV
2



LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- EXCAVATION LIMITS
- ORDINARY HIGH WATER MARK (OHWM) - 582.3'
- APPROXIMATE WATER LEVEL - 578.7'
- 100-YEAR FLOODPLAIN ELEVATION - 584.0'
- W WETLAND



VERTICAL SCALE EXAGGERATED 2X

Attention:				
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2	04/26/17	CONSTRUCTION DOCUMENTS	WL	
1	02/13/17	PERMIT FIGURES	WL	

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Checked:	- BM
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Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17

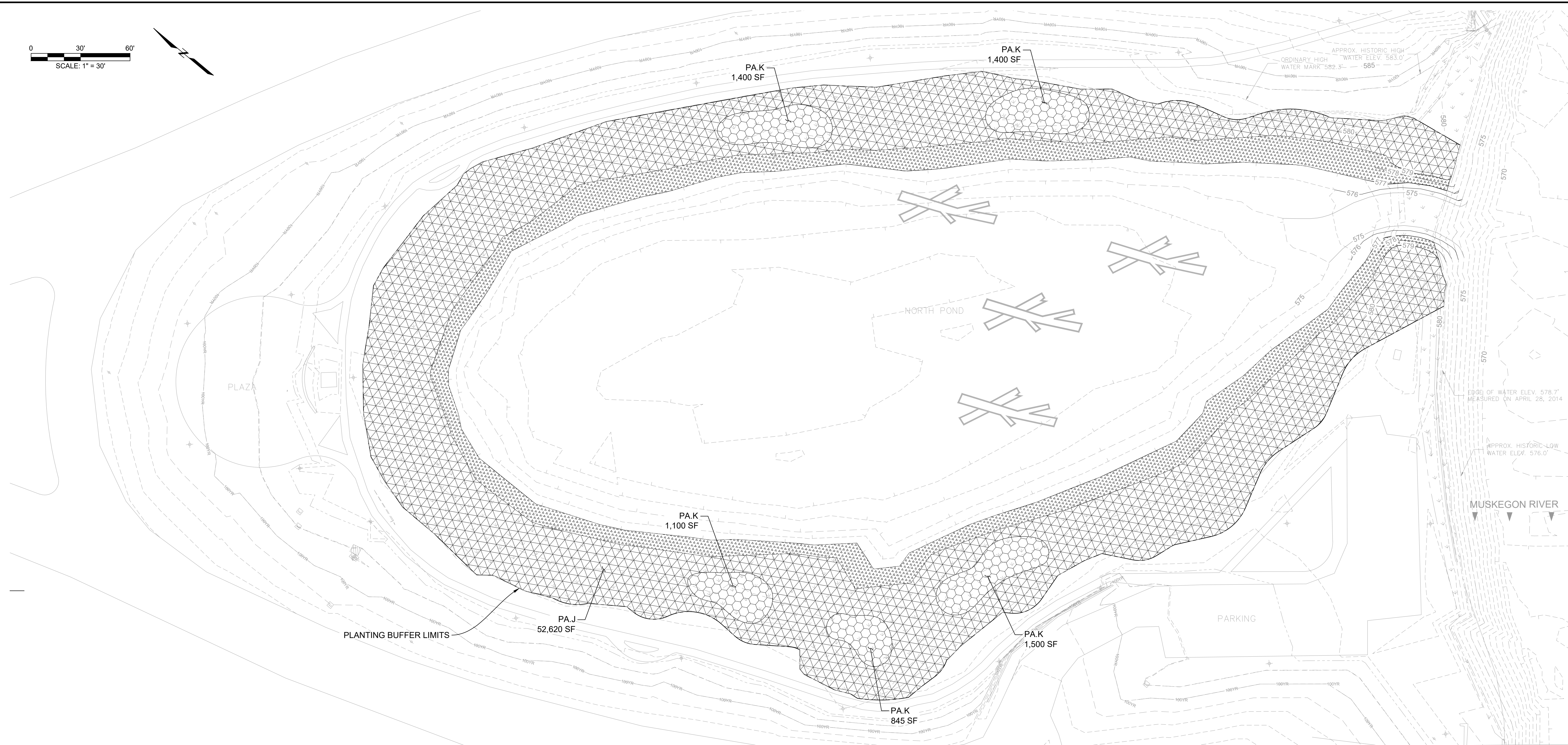
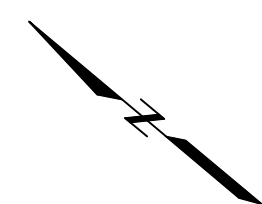
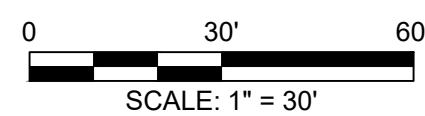


VETERANS MEMORIAL PARK
HABITAT RESTORATION

CROSS-SECTIONS
2 OF 2

DWG. NO.
C12

REV
2



MATCHLINE - SEE SHEET L2

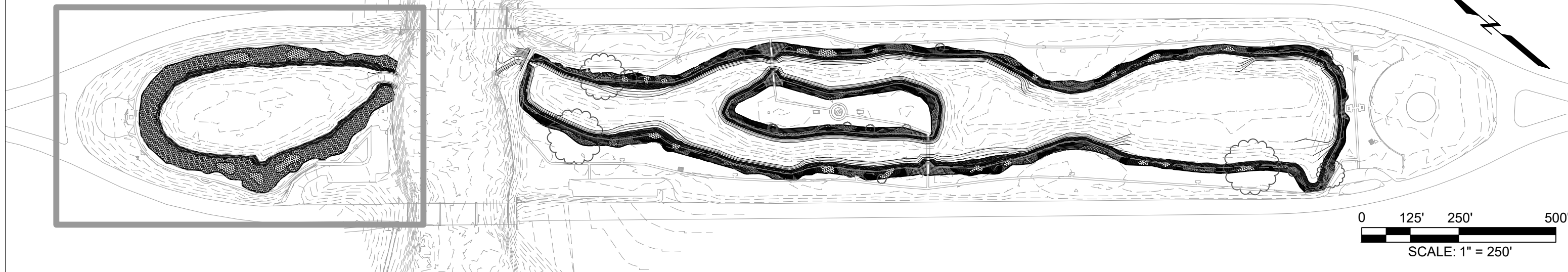
LEGEND

- PA.A - Planting zone near highly visible access points within the planting buffer. This area shall contain only plugs, and shall be top-dressed with regional leaf compost, or hardwood mulch. See details on sheet L5.
- PA.B - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
- PA.C - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
- PA.D - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
- PA.E - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
- PA.F - Submergent, perennial planting zone. This area shall be planted with plants salvaged from the existing pond, and additional plugs. See details on sheet L5.
- PA.G - Low-profile sedge planting area consisting entirely of Carex muskingumensis. See details on sheet L5.
- PA.H - Low-profile sedge planting area consisting entirely of Carex stricta. See details on sheet L5.

- PA.I - Low-profile sedge planting area consisting entirely of Carex vulpinoidea. See details on sheet L5.
- PA.J - North pond perennial planting zone. This area shall be planted with plugs at 3' spacing. See details on sheet L5.
- PA.K - Shrub planting zone. This area shall be planted with shrubs and seeded with a sedge seed mix. See details on sheet L5.

- PLANTING PLAN NOTES:**
- 1) DETAILED PLANTING INFORMATION CAN BE FOUND ON SHEET L5.
 - 2) THE BOUNDARIES OF ADJACENT PLANTING ZONES SHOULD BLEND TOGETHER SLIGHTLY TO ACHIEVE A NATURAL LOOK.
 - 3) EXISTING EMERGENT AND SUBMERGENT VEGETATION, INCLUDING NYMPHAEA ODORATA, PONTERDERIA CORDATA, AND NUPHAR ADVENA, WILL BE SALVAGED AND PLANTED IN PLANTING AREA PA.F WHERE APPROPRIATE BY OTHERS.
 - 4) THE EXACT NUMBER OF EACH SPECIES PER INDIVIDUAL PLANTING AREA CAN BE FOUND BY MULTIPLYING THE SQUARE FOOTAGE OF THE PLANTING AREA BY THE SPECIES' RELATIVE PERCENTAGE OF THE PLANTING ZONE.
 - 5) ALL TURF GRASS WITHIN PLANTING ZONES SHALL BE TREATED A MINIMUM OF THREE TIMES WITH A 2% SOLUTION OF AN AQUATIC-APPROVED GLYPHOSATE-BASED HERBICIDE PRIOR TO SEED AND PLANT INSTALLATION.

KEY MAP

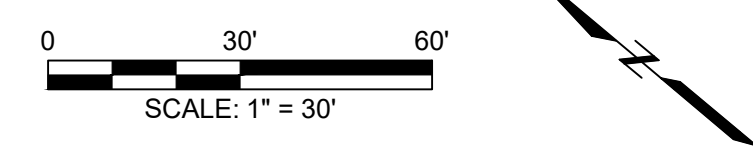
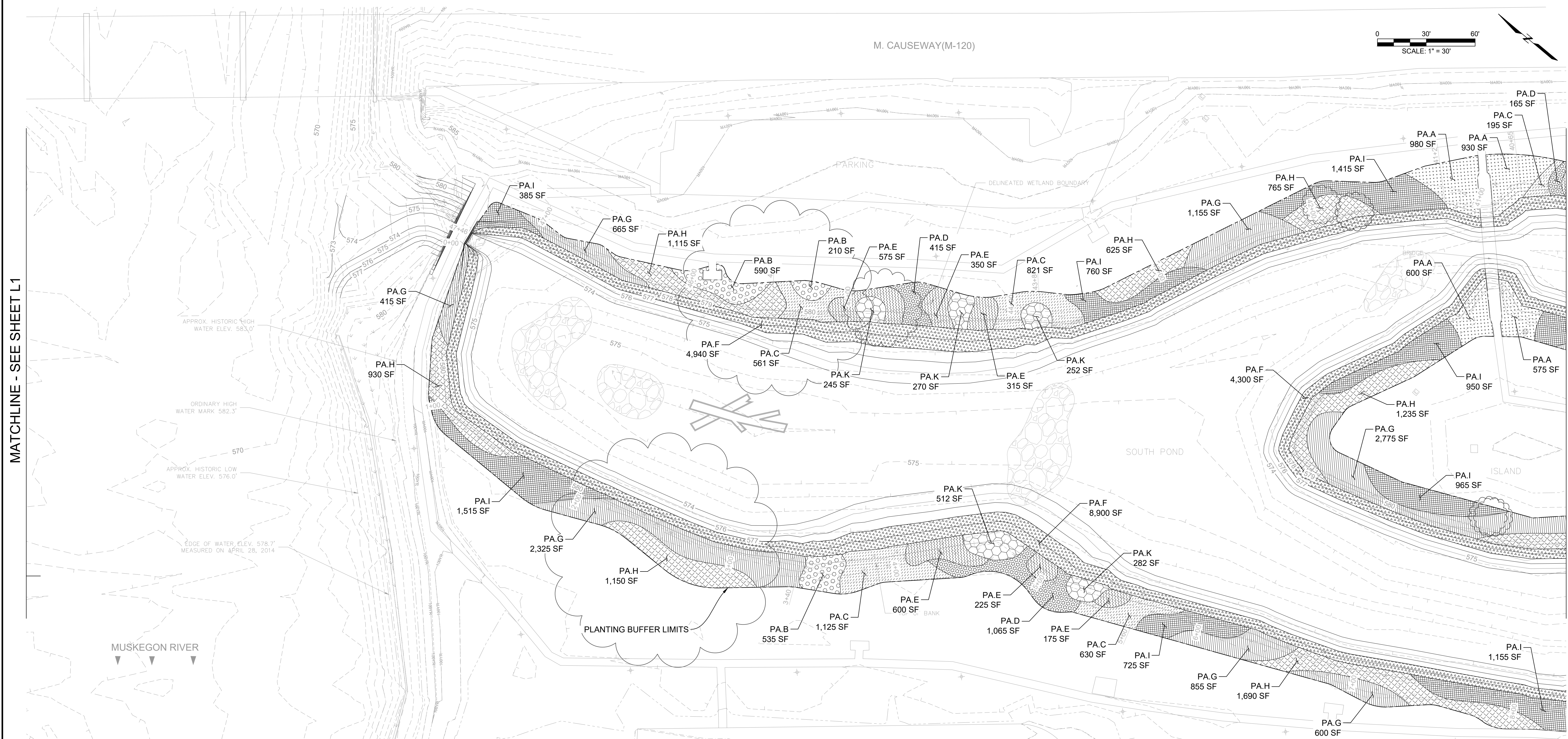


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1	02/13/17	PERMIT FIGURES	WL

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Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. L1
PLANTING PLAN 1 OF 4	REV 2



MATCHLINE - SEE SHEET L1

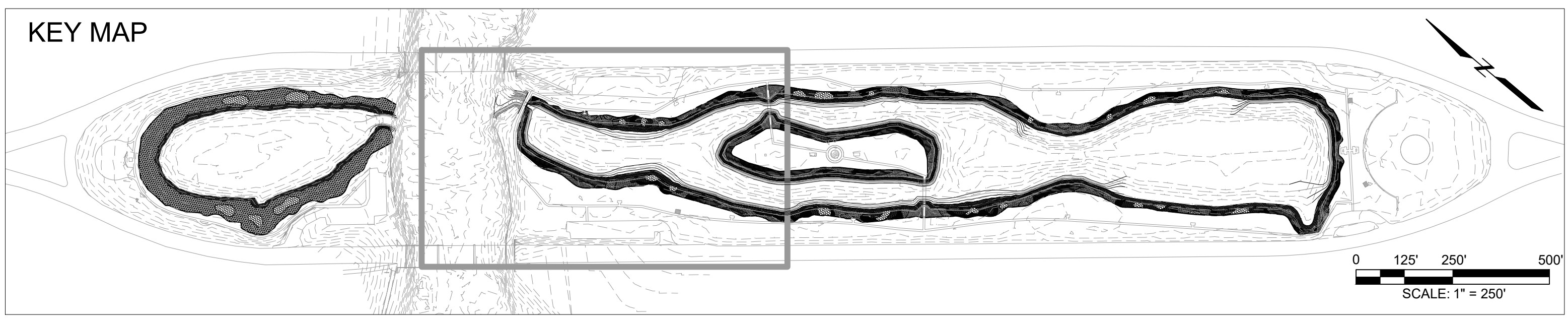
MATCHLINE - SEE SHEET L3

- LEGEND**
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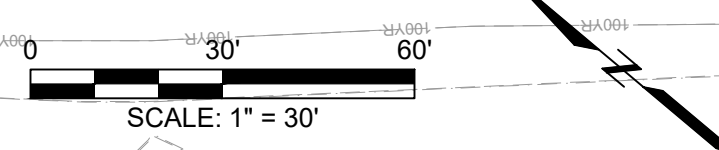


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P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. L2
PLANTING PLAN 2 OF 4	REV 2



MATCHLINE - SEE SHEET L2

MATCHLINE - SEE SHEET L4

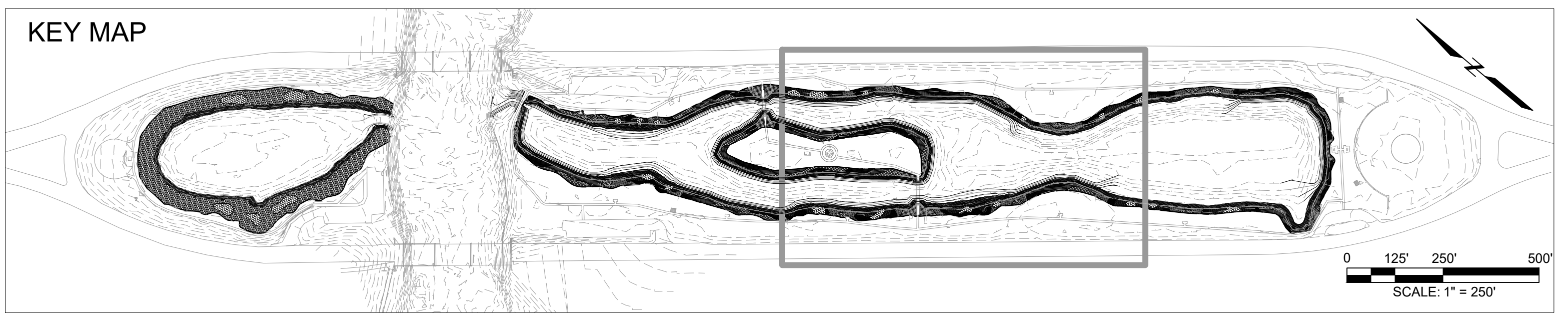


LEGEND

	PA.A - Planting zone near highly visible access points within the planting buffer. This area shall contain only plugs, and shall be top-dressed with regional leaf compost, or hardwood mulch. See details on sheet L5.
	PA.B - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
	PA.C - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
	PA.D - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
	PA.E - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
	PA.F - Submergent, perennial planting zone. This area shall be planted with plants salvaged from the existing pond, and additional plugs. See details on sheet L5.
	PA.G - Low-profile sedge planting area consisting entirely of Carex muskingumensis. See details on sheet L5.
	PA.H - Low-profile sedge planting area consisting entirely of Carex stricta. See details on sheet L5.

	PA.I - Low-profile sedge planting area consisting entirely of Carex vulpinoidea. See details on sheet L5.
	PA.J - North pond perennial planting zone. This area shall be planted with plugs at 3' spacing. See details on sheet L5.
	PA.K - Shrub planting zone. This area shall be planted with shrubs and seeded with a sedge seed mix. See details on sheet L5.

- PLANTING PLAN NOTES:**
- 1) DETAILED PLANTING INFORMATION CAN BE FOUND ON SHEET L5.
 - 2) THE BOUNDARIES OF ADJACENT PLANTING ZONES SHOULD BLEND TOGETHER SLIGHTLY TO ACHIEVE A NATURAL LOOK.
 - 3) EXISTING EMERGENT AND SUBMERGENT VEGETATION, INCLUDING NYMPHAEA ODORATA, PONTERDERIA CORDATA, AND NUPHAR ADVENA, WILL BE SALVAGED AND PLANTED IN PLANTING AREA PA.F WHERE APPROPRIATE BY OTHERS.
 - 4) THE EXACT NUMBER OF EACH SPECIES PER INDIVIDUAL PLANTING AREA CAN BE FOUND BY MULTIPLYING THE SQUARE FOOTAGE OF THE PLANTING AREA BY THE SPECIES' RELATIVE PERCENTAGE OF THE PLANTING ZONE.
 - 5) ALL TURF GRASS WITHIN PLANTING ZONES SHALL BE TREATED A MINIMUM OF THREE TIMES WITH A 2% SOLUTION OF AN AQUATIC-APPROVED GLYPHOSATE-BASED HERBICIDE PRIOR TO SEED AND PLANT INSTALLATION.

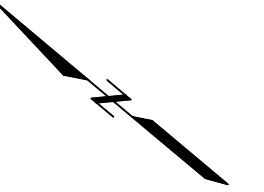
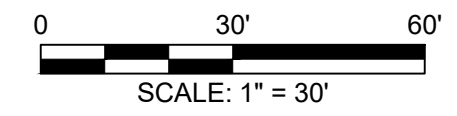


NO.	DATE	ISSUE/REVISION	APP
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1	02/13/17	PERMIT FIGURES	WL
			APP

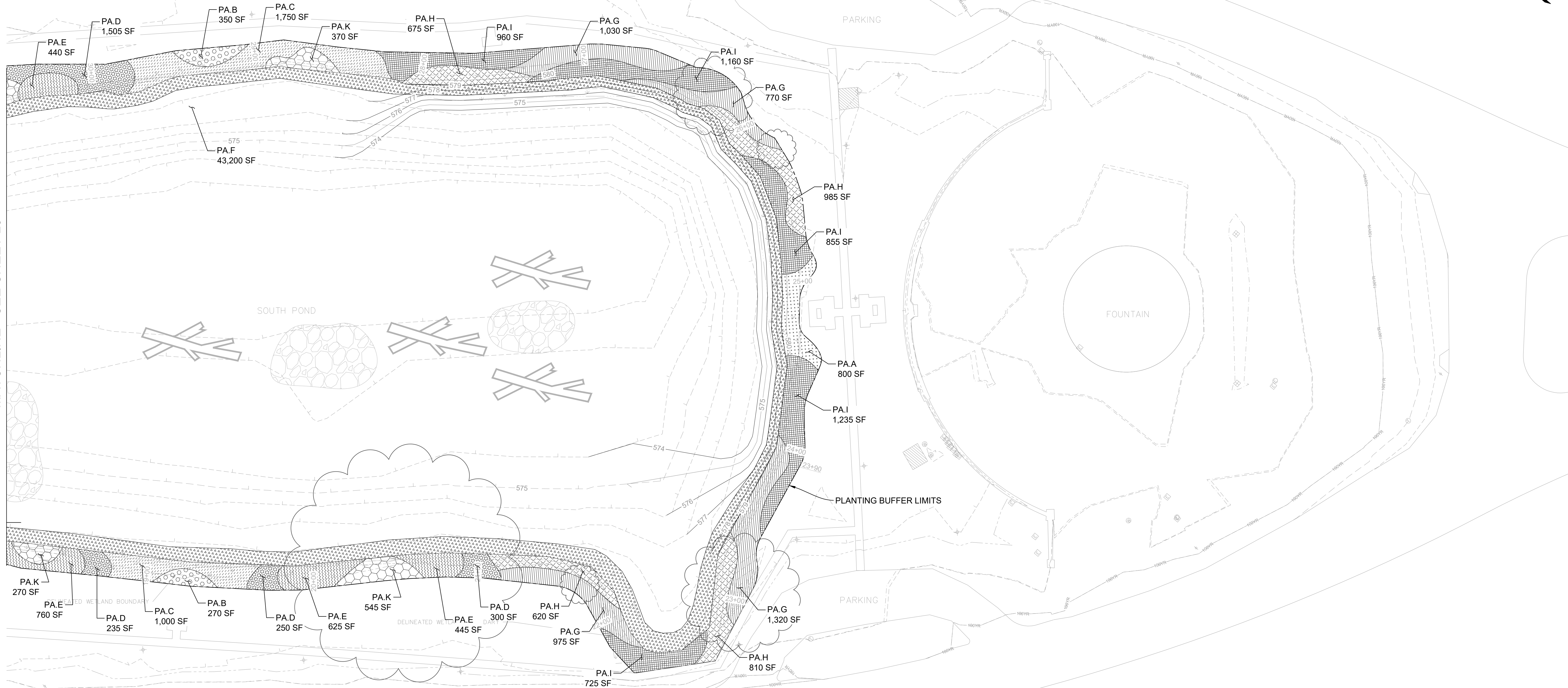
Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. L3
PLANTING PLAN 3 OF 4	REV 2



MATCHLINE - SEE SHEET L3

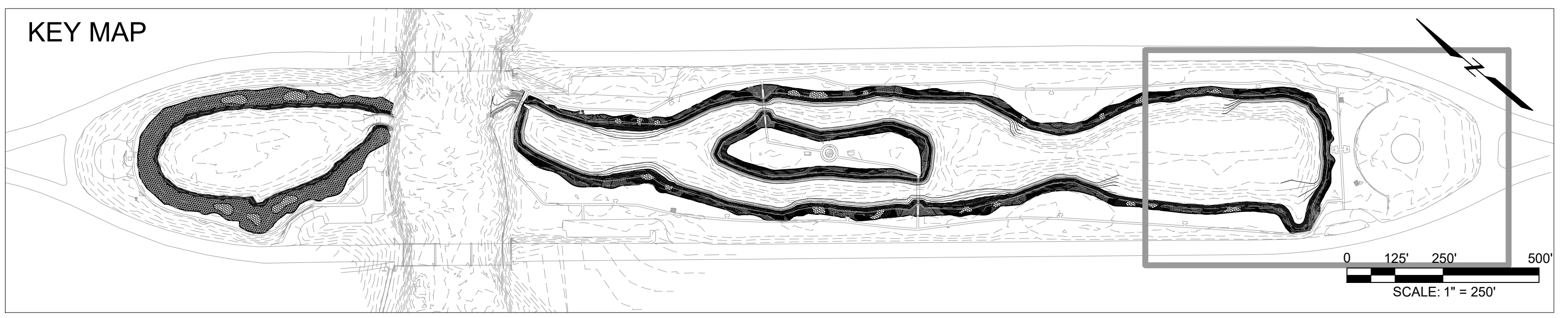


LEGEND

- PA.A - Planting zone near highly visible access points within the planting buffer. This area shall contain only plugs, and shall be top-dressed with regional leaf compost, or hardwood mulch. See details on sheet L5.
- PA.B - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
- PA.C - Perennial planting zone. This area shall be planted with plugs and seeded with a sedge seed mix. See details on sheet L5.
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- PA.H - Low-profile sedge planting area consisting entirely of Carex stricta. See details on sheet L5.

- PA.I - Low-profile sedge planting area consisting entirely of Carex vulpinoidea. See details on sheet L5.
- PA.J - North pond perennial planting zone. This area shall be planted with plugs at 3' spacing. See details on sheet L5.
- PA.K - Shrub planting zone. This area shall be planted with shrubs and seeded with a sedge seed mix. See details on sheet L5.

- PLANTING PLAN NOTES:**
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 - 2) THE BOUNDARIES OF ADJACENT PLANTING ZONES SHOULD BLEND TOGETHER SLIGHTLY TO ACHIEVE A NATURAL LOOK.
 - 3) EXISTING EMERGENT AND SUBMERGENT VEGETATION, INCLUDING NYMPHAEA ODORATA, PONTERDERIA CORDATA, AND NUPHAR ADVENA, WILL BE SALVAGED AND PLANTED IN PLANTING AREA PA.F WHERE APPROPRIATE BY OTHERS.
 - 4) THE EXACT NUMBER OF EACH SPECIES PER INDIVIDUAL PLANTING AREA CAN BE FOUND BY MULTIPLYING THE SQUARE FOOTAGE OF THE PLANTING AREA BY THE SPECIES' RELATIVE PERCENTAGE OF THE PLANTING ZONE.
 - 5) ALL TURF GRASS WITHIN PLANTING ZONES SHALL BE TREATED A MINIMUM OF THREE TIMES WITH A 2% SOLUTION OF AN AQUATIC-APPROVED GLYPHOSATE-BASED HERBICIDE PRIOR TO SEED AND PLANT INSTALLATION.



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Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK HABITAT RESTORATION	DWG. NO. L4
PLANTING PLAN 4 OF 4	REV 2

PA.A Planting Zone - 6,909 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.A	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	18"	10-15	1 gallon	10%	304
<i>Calamagrostis canadensis</i>	Blue joint grass	18"	15-25	1 gallon	15%	456
<i>Echinacea purpurea</i>	Purple coneflower	12"	20-30	1 gallon	10%	691
<i>Hibiscus moscheutos</i>	Rose mallow	2"	10-15	1 gallon	5%	86
<i>Iris virginica shrevii</i>	Blue flag iris	12"	10-15	1 gallon	10%	691
<i>Panicum virgatum</i>	Switch grass	18"	20-30	1 gallon	10%	304
<i>Penstemon digitalis</i>	Foxglove beard tongue	12"	10-15	1 gallon	15%	1,036
<i>Sporobolus heterolepis</i>	Prairie dropseed	2"	20-30	1 gallon	15%	259
<i>Rudbeckia fulgida</i>	Showy black-eyed susan	12"	10-15	1 gallon	10%	691
Total						4,518

- * PA.A to be planted with the above plant species and top-dressed with regional leaf compost, or hard wood mulch. This planting area is to be maintained in a more formal manner than the other planting areas, and shall be kept free of weeds and other opportunistic vegetation until the plants are mature.
- * PA.A contains plant material that varies in both height and moisture requirements, and should be placed within the planting area accordingly.
- * The grasses (*Panicum virgatum* and *Sporobolus heterolepis*) should be woven throughout the low-growing planting area to tie the planting zone together.
- * *Hibiscus moscheutos* shall be planted at the lowest elevations in the wettest areas within the planting zone.
- * Species in this zone shall be planted in smaller groups and balanced throughout the planting zone.

PA.B Planting Zone - 3,440 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.B	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	18"	20-30	Plug	10%	151
<i>Calamagrostis canadensis</i>	Blue joint grass	18"	30-60	Plug	10%	151
<i>Iris virginica shrevii</i>	Blue flag iris	18"	30-60	Plug	10%	151
<i>Liatris spicata</i>	Marsh blazing star	18"	20-30	Plug	15%	227
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed susan	18"	20-30	Plug	10%	151
<i>Symphotrichum novae-angliae</i>	New England aster	18"	20-30	Plug	15%	227
<i>Tradescantia ohioensis</i>	Spiderwort	18"	20-30	Plug	10%	151
<i>Veronicastrum virginicum</i>	Culver's root	18"	20-30	Plug	10%	151
<i>Zizia aurea</i>	Golden alexanders	18"	20-30	Plug	10%	151
Total						1,514

- * PA.B to be planted with the above plant species and seeded with the sedge seed mix at the specified rate.

PA.C Planting Zone - 13,950 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.C	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	18"	20-30	Plug	20%	1,228
<i>Calamagrostis canadensis</i>	Blue joint grass	18"	30-60	Plug	20%	1,228
<i>Coreopsis tripteris</i>	Tall coreopsis	18"	20-30	Plug	10%	614
<i>Iris virginica shrevii</i>	Blue flag iris	18"	30-60	Plug	10%	614
<i>Symphotrichum novae-angliae</i>	New England aster	18"	20-30	Plug	20%	1,228
<i>Veronicastrum virginicum</i>	Culver's root	18"	20-30	Plug	10%	614
<i>Zizia aurea</i>	Golden alexanders	18"	20-30	Plug	10%	614
Total						6,138

- * PA.C to be planted with the above plant species and seeded with the sedge seed mix at the specified rate.

PA.D Planting Zone - 9,856 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.D	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	18"	20-30	Plug	10%	434
<i>Calamagrostis canadensis</i>	Blue joint grass	18"	30-60	Plug	10%	434
<i>Iris virginica shrevii</i>	Blue flag iris	18"	20-30	Plug	10%	434
<i>Liatris spicata</i>	Marsh blazing star	18"	20-30	Plug	20%	867
<i>Monarda fistulosa</i>	Wild bergamot	18"	20-30	Plug	10%	434
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed susan	18"	20-30	Plug	5%	217
<i>Solidago speciosa</i>	Showy goldenrod	18"	20-30	Plug	10%	434
<i>Tradescantia ohioensis</i>	Spiderwort	18"	20-30	Plug	10%	434
<i>Zizia aurea</i>	Golden alexanders	18"	20-30	Plug	15%	650
Total						4,337

- * PA.D to be planted with the above plant species and seeded with the sedge seed mix at the specified rate.

PA.E Planting Zone - 11,070 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.E	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	18"	20-30	Plug	15%	731
<i>Calamagrostis canadensis</i>	Blue joint grass	18"	30-60	Plug	10%	487
<i>Coreopsis tripteris</i>	Tall coreopsis	18"	10-20	Plug	15%	731
<i>Iris virginica shrevii</i>	Blue flag iris	18"	20-30	Plug	15%	731
<i>Monarda fistulosa</i>	Wild bergamot	18"	10-20	Plug	15%	731
<i>Solidago speciosa</i>	Showy goldenrod	18"	10-20	Plug	10%	487
<i>Zizia aurea</i>	Golden alexanders	18"	10-20	Plug	20%	974
Total						4,871

- * PA.E to be planted with the above plant species and seeded with the sedge seed mix at the specified rate.

PA.F Planting Zone - 59,700 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.F	Qty.
<i>Nymphaea odorata</i>	White water lily	36"	30-60	Bare Root	25%	1,642
<i>Peltandra virginica</i>	Arrow arum	36"	30-60	Bare Root	25%	1,642
<i>Pontederia cordata</i>	Pickereel weed	36"	30-60	Bare Root	25%	1,642
<i>Schoenoplectus pungens</i>	Threesquare bulrush	36"	30-60	Bare Root	25%	1,642
Total						6,567

- * PA.F to be planted with the above plant species and as well as species salvaged from the pond.

PA.G Planting Zone - 20,280 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.G	Qty.
<i>Carex muskingumensis</i>	Palm sedge	18"	See Plan	Plug	100%	8,923

PA.H Planting Zone - 17,775 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.H	Qty.
<i>Carex stricta</i>	Tussock sedge	18"	See Plan	Plug	100%	7,821

PA.I Planting Zone - 21,950 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.I	Qty.
<i>Carex vulpinoidea</i>	Brown fox sedge	18"	See Plan	Plug	100%	9,658

PA.J Planting Zone - 52,620 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.J	Qty.
<i>Asclepias incarnata</i>	Swamp milkweed	36"	20-30	Plug	10%	579
<i>Coreopsis tripteris</i>	Tall coreopsis	36"	20-30	Plug	7%	405
<i>Iris virginica shrevii</i>	Blue flag iris	36"	30-60	Plug	13%	752
<i>Liatris spicata</i>	Marsh blazing star	36"	20-30	Plug	12%	695
<i>Monarda fistulosa</i>	Wild bergamot	36"	20-30	Plug	13%	752
<i>Rudbeckia subtomentosa</i>	Sweet black-eyed susan	36"	20-30	Plug	10%	579
<i>Solidago speciosa</i>	Showy goldenrod	36"	20-30	Plug	5%	289
<i>Symphotrichum novae-angliae</i>	New England aster	36"	20-30	Plug	13%	752
<i>Tradescantia ohioensis</i>	Spiderwort	36"	20-30	Plug	7%	405
<i>Veronicastrum virginicum</i>	Culver's root	36"	20-30	Plug	5%	289
<i>Zizia aurea</i>	Golden alexanders	36"	20-30	Plug	5%	289
Total						5,788

- * PA.J to be planted among the existing vegetation in the north pond, and shall NOT receive the sedge seed mix.

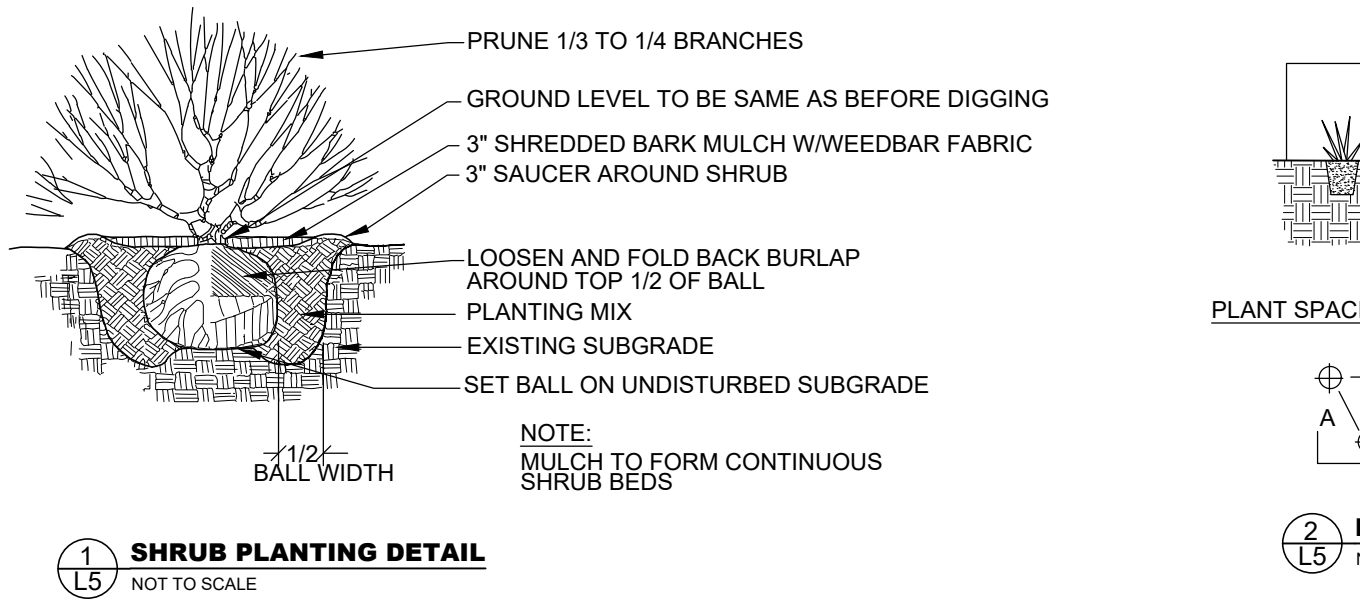
PA.K Planting Zone - 13,900 SF						
Scientific Name	Common Name	Spacing	Grouping	Stock	% of PA.K	Qty.
<i>Amelanchier arborea</i>	Serviceberry	8'	5-8	5 Gallon	33.33%	72
<i>Cornus sericea</i>	Red osier dogwood	8'	5-8	5 Gallon	33.33%	72
<i>Ilex verticillata</i>	Michigan holly	8'	5-8	5 Gallon	33.33%	72
Total						216

- * PA.K to be planted with the above plant species and seeded with the sedge seed mix at the specified rate.

Sedge Seed Mix - 75,250 SF		
Scientific Name	Common Name	PLS Oz Per Acre
<i>Avena sativa</i>	Seed oats	512
<i>Carex bebbii</i>	Bebb's oval sedge	4
<i>Carex crinita</i>	Fringed sedge	4
<i>Carex frankii</i>	Bristly cattail sedge	8
<i>Carex hystericina</i>	Porcupine sedge	8
<i>Carex lurida</i>	Bottlebrush sedge	8
<i>Carex muskingumensis</i>	Palm sedge	8
<i>Carex vulpinoidea</i>	Brown fox sedge	28
<i>Eleocharis acicularis</i>	Needle spike rush	4
<i>Eleocharis palustris</i>	Great spike rush	4
<i>Juncus effusus</i>	Common rush	6
<i>Juncus torreyi</i>	Torrey's rush	3
<i>Lolium multiflorum</i>	Annual rye	100
Total PLS Ounces		697.00
Total PLS Pounds		43.56

Muskegon Lake Nature Preserve Seed Mix		
Scientific Name	Common Name	PLS Oz Per Acre
<i>Agalinis purpurea</i>	Purple false foxglove	1
<i>Allium cernuum</i>	Nodding wild onion	1
<i>Andropogon gerardii</i>	Big bluestem grass	16
<i>Aquilegia canadensis</i>	Wild columbine	2
<i>Asclepias tuberosa</i>	Butterfly weed	2
<i>Avena sativa</i>	Seed oats	512
<i>Coreopsis lanceolata</i>	Sand coreopsis	6
<i>Coreopsis tripteris</i>	Tall coreopsis	1
<i>Elymus canadensis</i>	Canada wild rye	16
<i>Elymus hystrix</i>	Bottlebrush grass	8
<i>Elymus virginicus</i>	Virginia wild rye	16
<i>Eupatorium purpureum</i>	Purple joe-pye weed	2
<i>Lolium multiflorum</i>	Annual rye	100
<i>Monarda fistulosa</i>	Wild bergamot	2
<i>Monarda punctata</i>	Horse mint	2
<i>Panicum virgatum</i>	Switch grass	2
<i>Penstemon digitalis</i>	Foxglove beard tongue	2
<i>Penstemon hirsutus</i>	Hairy beard tongue	2
<i>Ratibida pinnata</i>	Yellow coneflower	4
<i>Rudbeckia hirta</i>	Black-eyed Susan	6
<i>Schizachyrium scoparium</i>	Little bluestem grass	16
<i>Solidago caesia</i>	Blue-stemmed goldenrod	0.25
<i>Tradescantia ohioensis</i>	Common spiderwort	2
Total PLS Ounces		721.25
Total PLS Pounds		45.08

Muskegon Lake Nature Preserve Shrubs and Trees				
Scientific Name	Common Name	Spacing	Stock	Qty.
<i>Acer saccharum</i>	Sugar Maple	15' O.C.	24-36" Bare Root	18
<i>Cornus florida</i>	Flowering Dogwood	10' O.C.	24-36" Bare Root	41
<i>Lindera benzoin</i>	Spicebush	6' O.C.	24-36" Bare Root	55
<i>Physocarpus opulifolius</i>	Ninebark	10' O.C.	24-36" Bare Root	41
<i>Quercus macrocarpa</i>	Bur Oak	15' O.C.	24-36" Bare Root	18
<i>Quercus rubra</i>	Red Oak	15' O.C.	24-36" Bare Root	18
<i>Viburnum dentatum</i>	Arrowwood Viburnum	15' O.C.	24-36" Bare Root	18



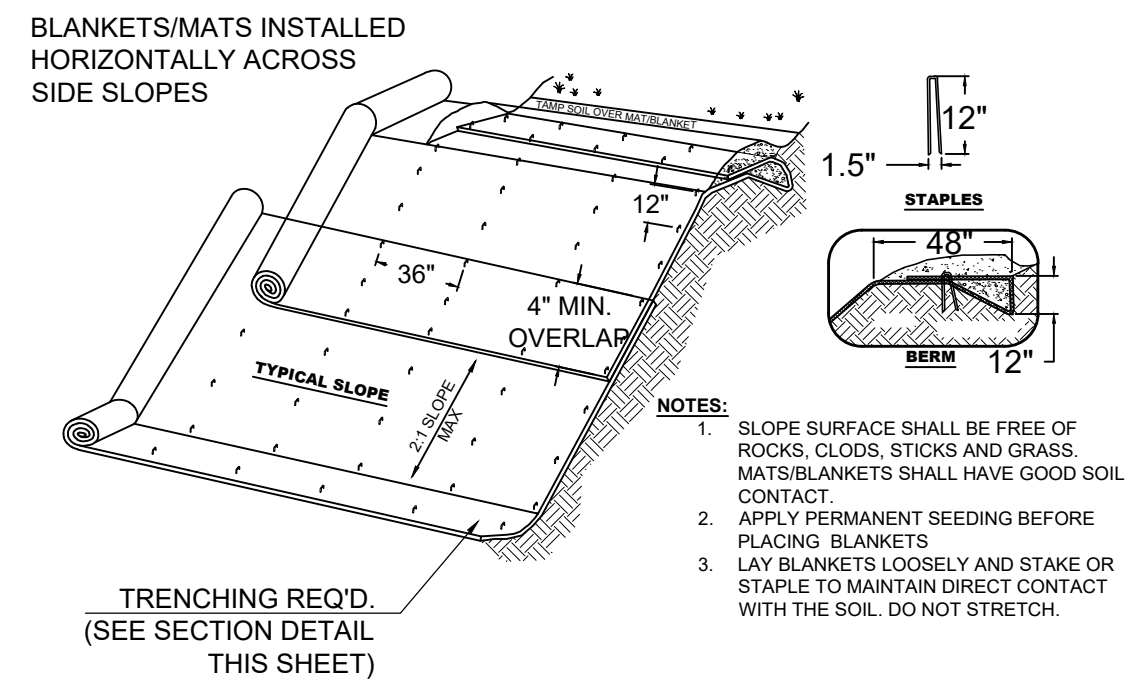
- PLANTING NOTES**
- 1) Individual species shall be planted in mass according to the grouping guidelines provided above, and repeated throughout the planting area in an organic manner so they look natural, balanced, and are spread out evenly, relative to the percentage of the planting zone they represent.
 - 2) Drier and shorter species are to be concentrated in higher elevation areas, adjacent to paths, and areas where they abut turfgrass areas, as directed by project Engineer.
 - 3) Taller, wetter species are to be concentrated in the lower elevations, and should be placed so that they will not obstruct primary views, as directed by project Engineer.
 - 4) All planting area stock (PA.A - PA.K) to be supplied by Engineer for installation by Contractor.
 - 5) All plants shall be enclosed with animal exclusion fencing. The fencing shall remain in place until the end of the 2018 growing season at the latest and shall be removed by the CONTRACTOR.

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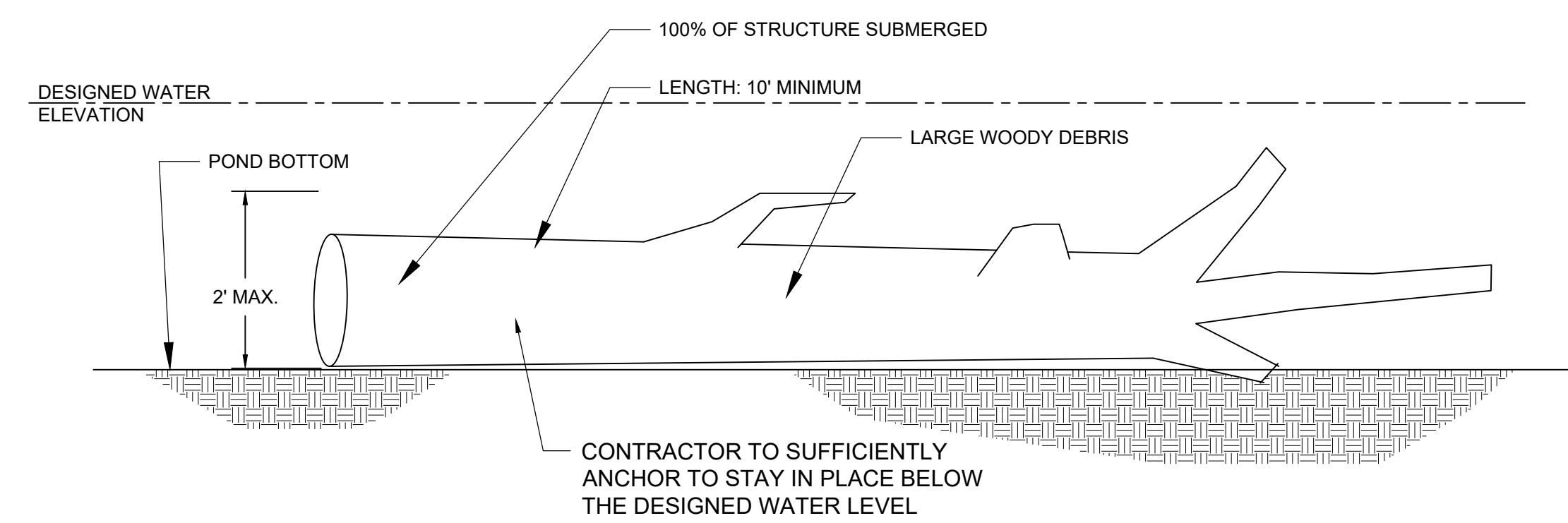
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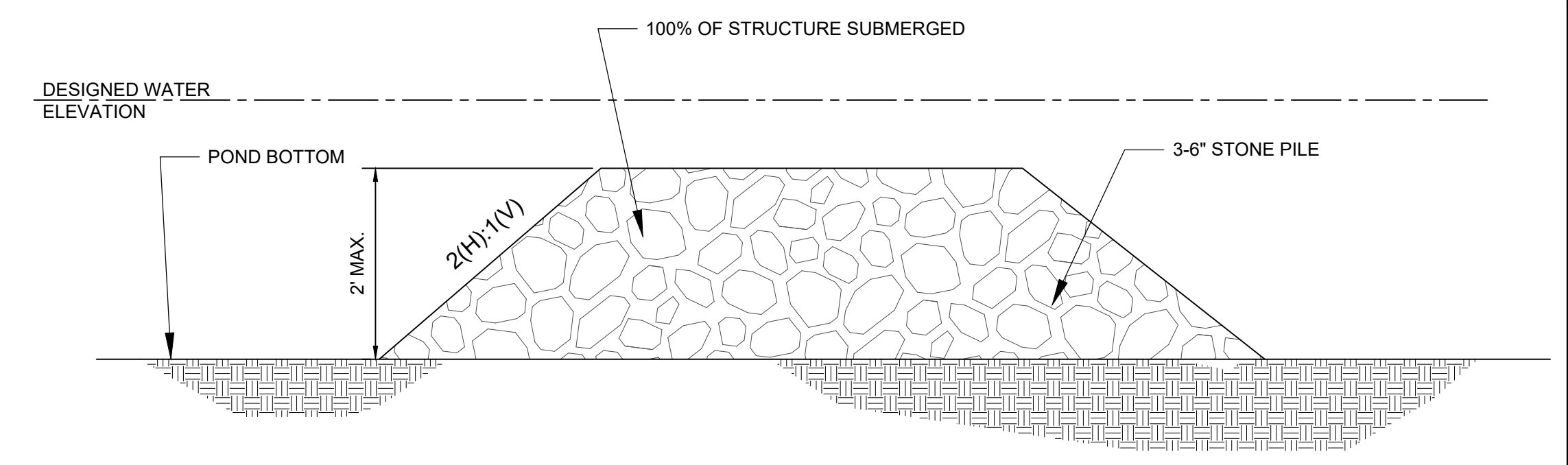
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PLANTING DETAILS		L5
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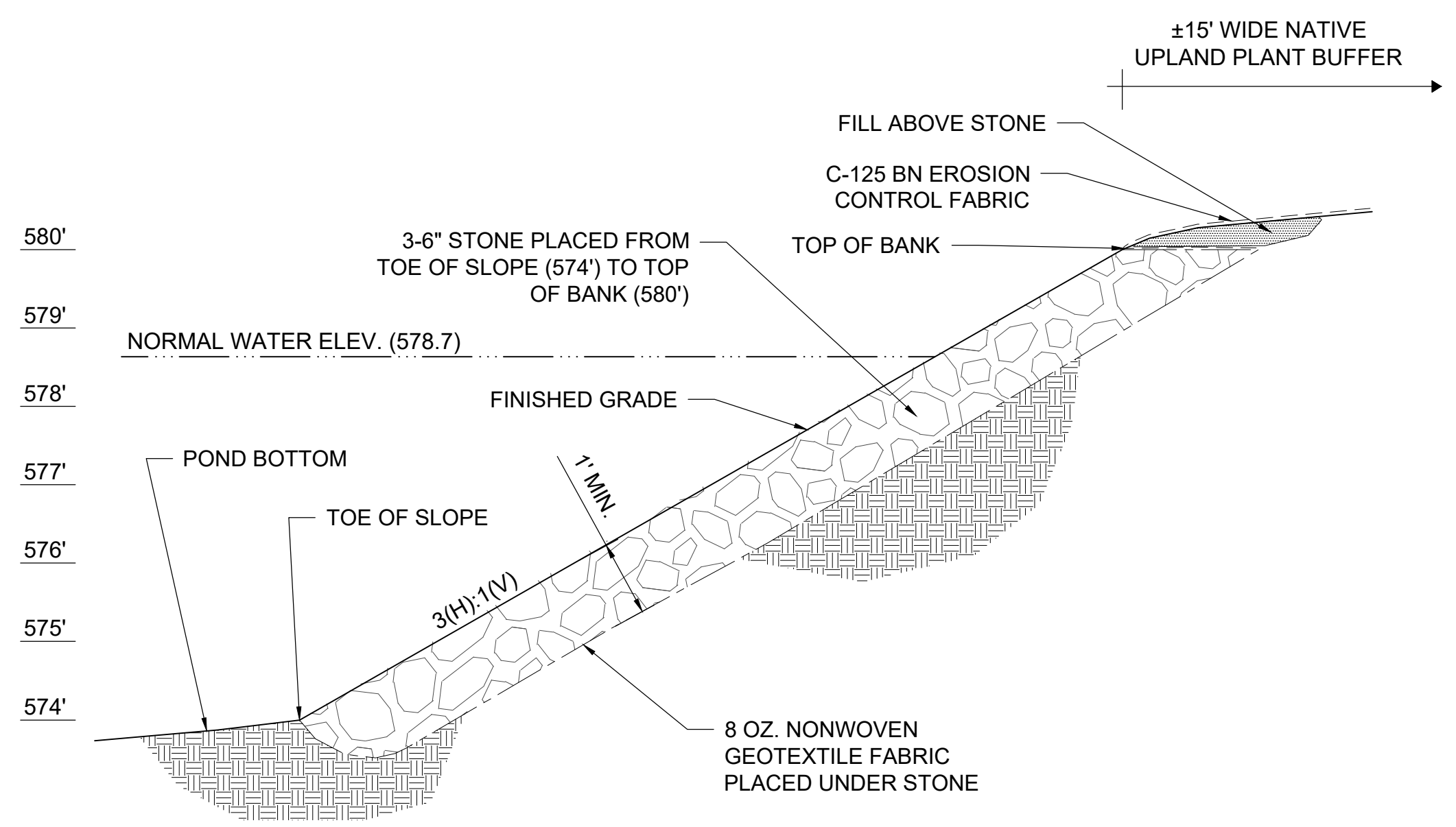
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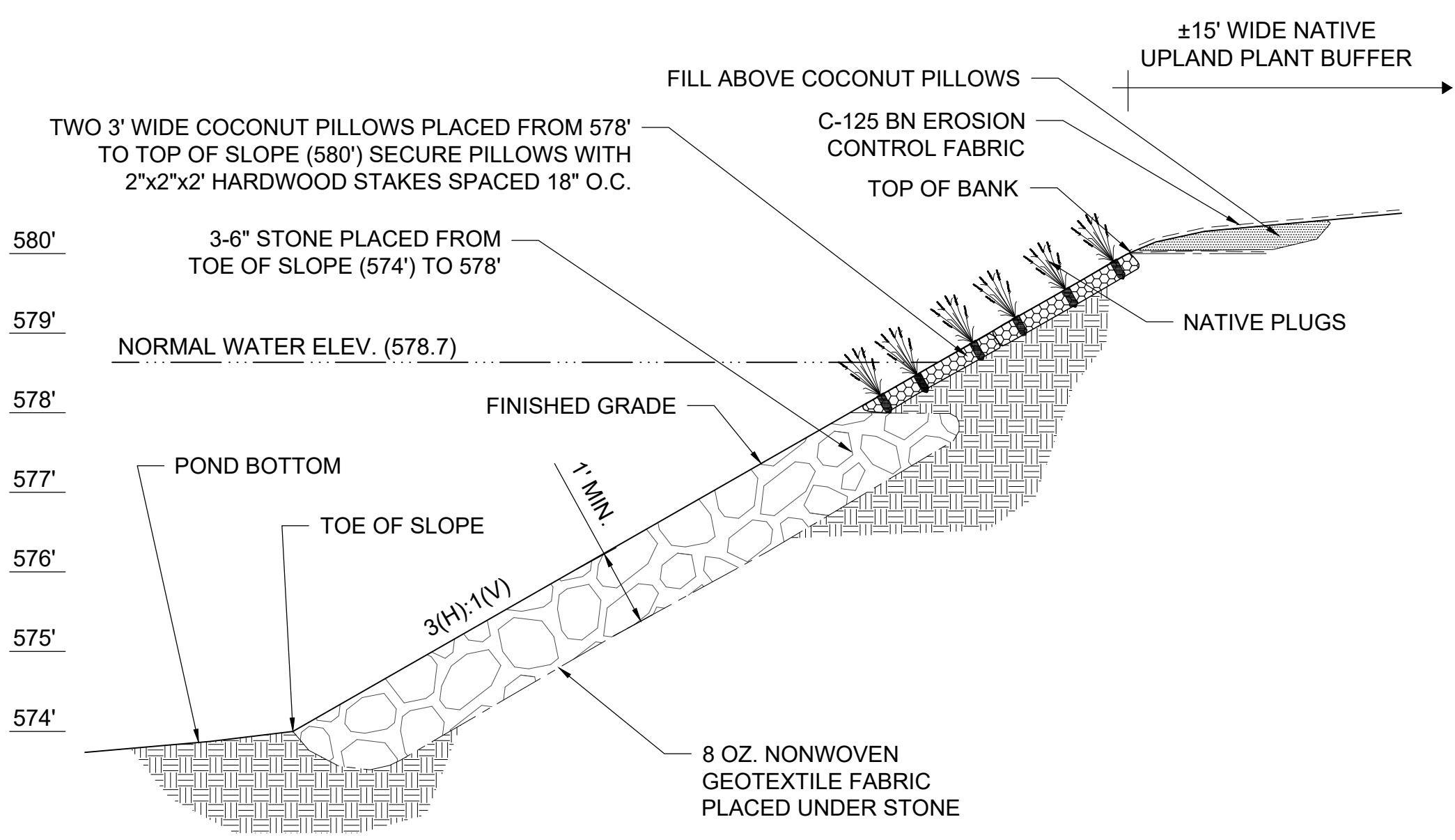
2 SUNKEN LARGE WOODY DEBRIS
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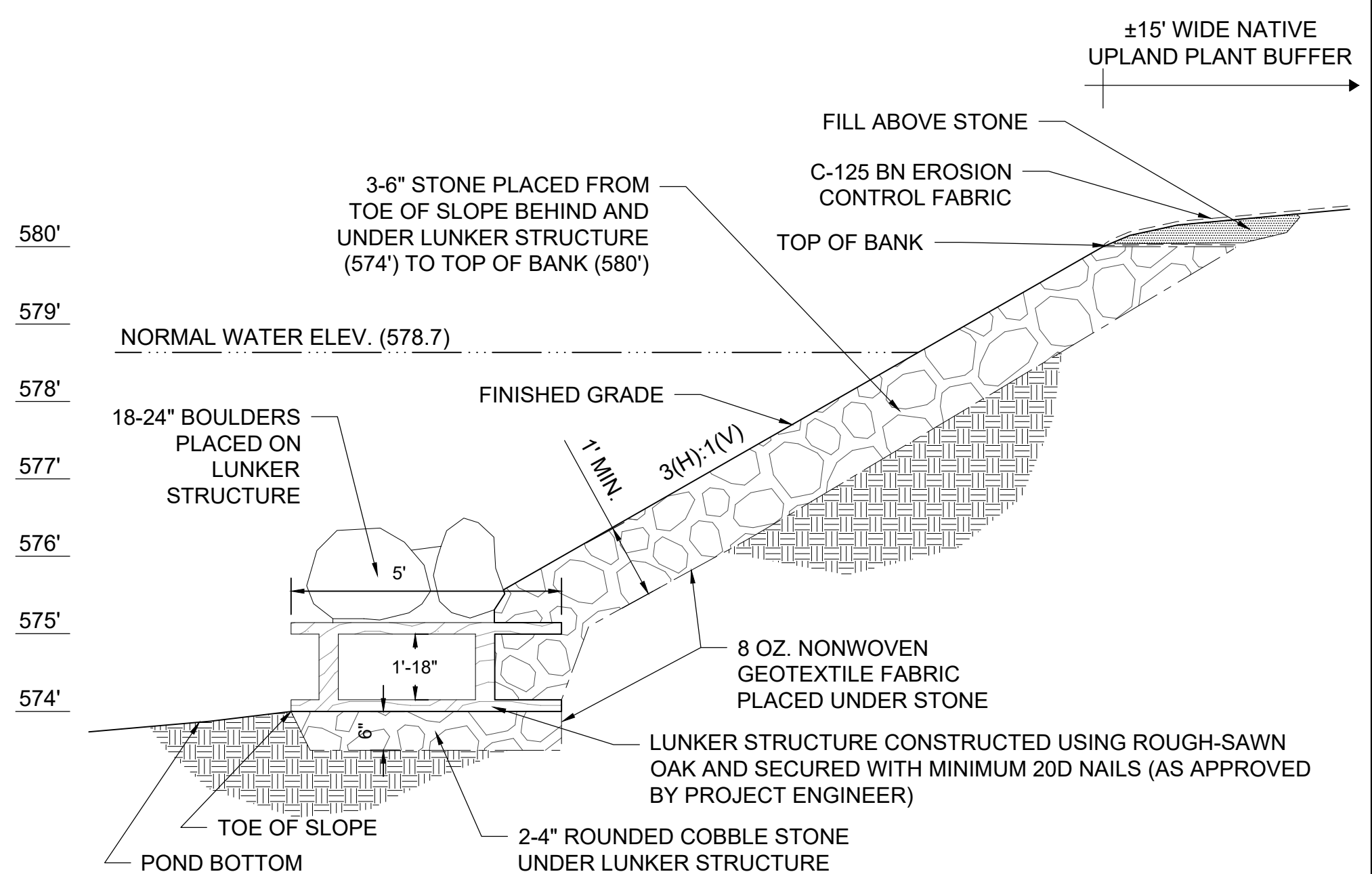
3 ROCK HABITAT STRUCTURES
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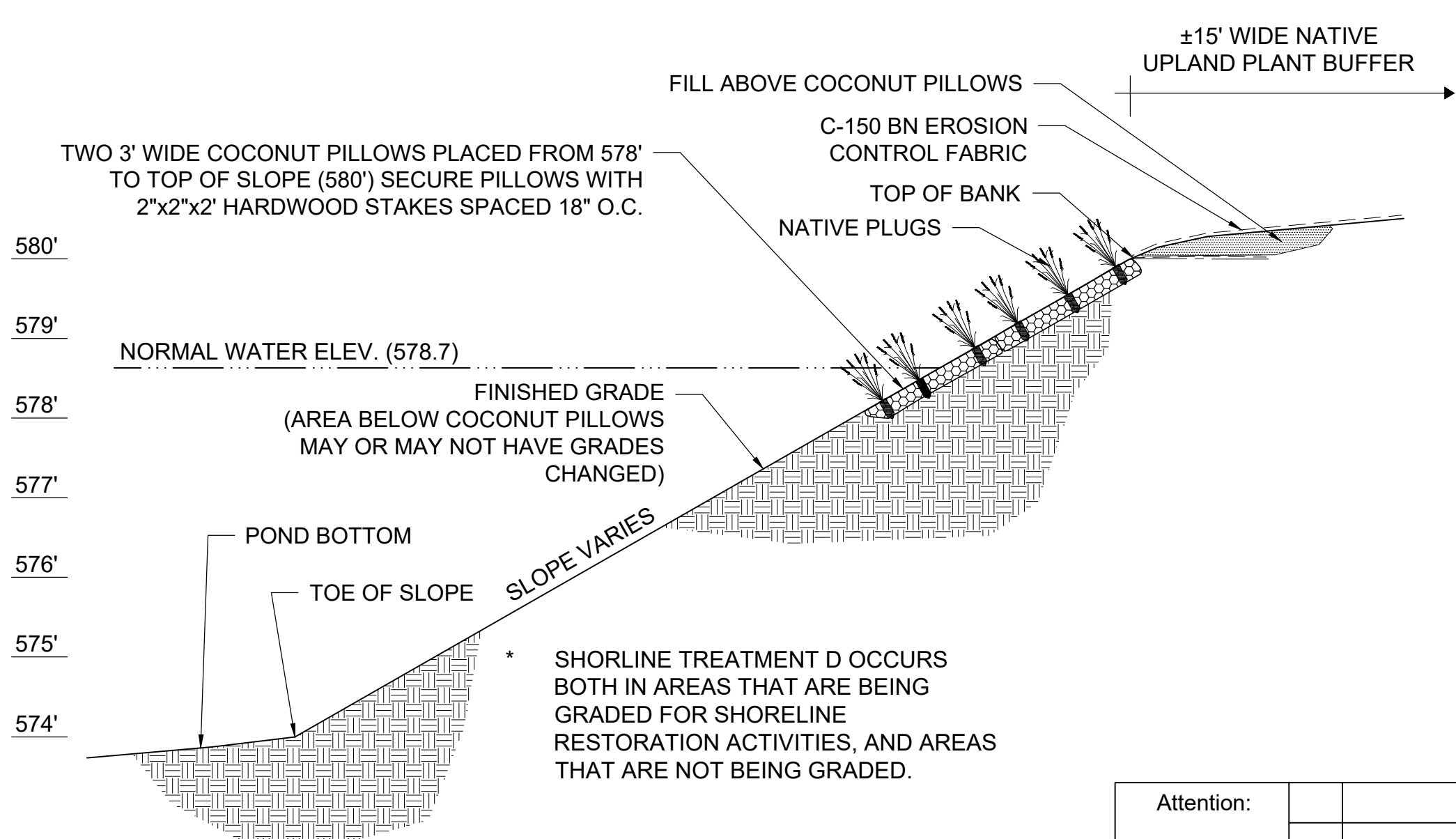
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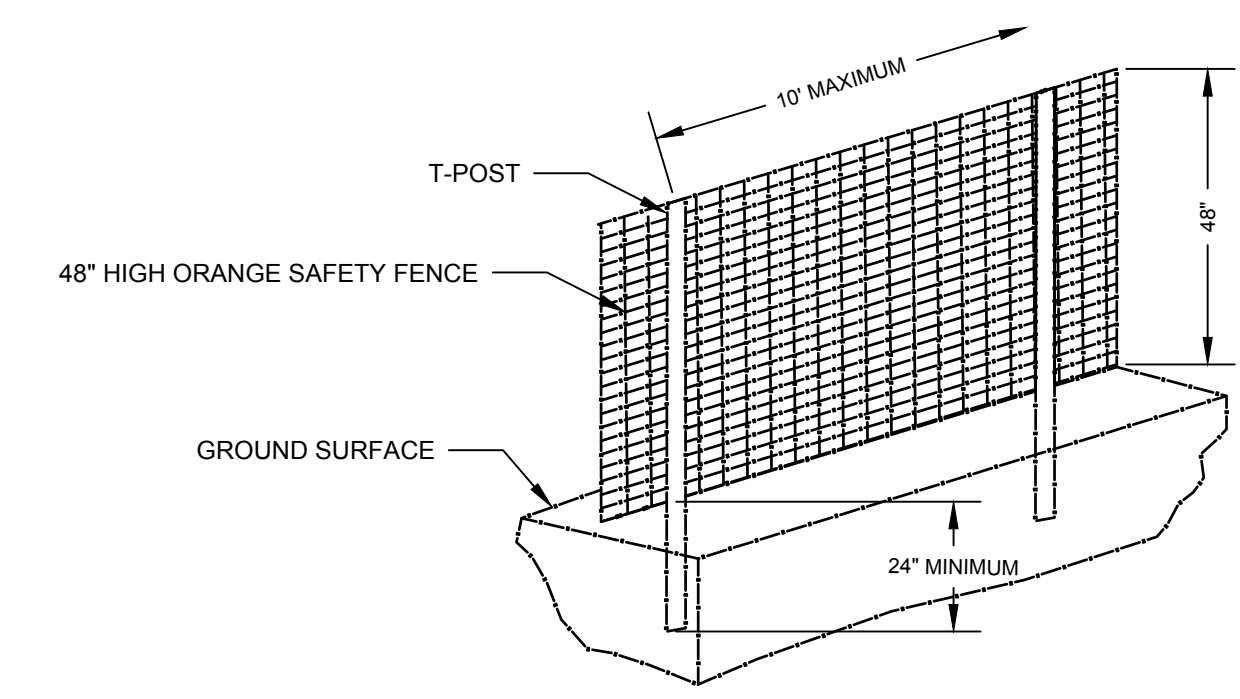
5 SHORELINE TREATMENT 'B' DETAIL
D1 NOT TO SCALE



6 SHORELINE TREATMENT 'C' DETAIL
D1 NOT TO SCALE



7 SHORELINE TREATMENT 'D' DETAIL
D1 NOT TO SCALE



ANIMAL EXCLUSION FENCING - DETAIL
NOT TO SCALE

* SHORLINE TREATMENT D OCCURS BOTH IN AREAS THAT ARE BEING GRADED FOR SHORELINE RESTORATION ACTIVITIES, AND AREAS THAT ARE NOT BEING GRADED.

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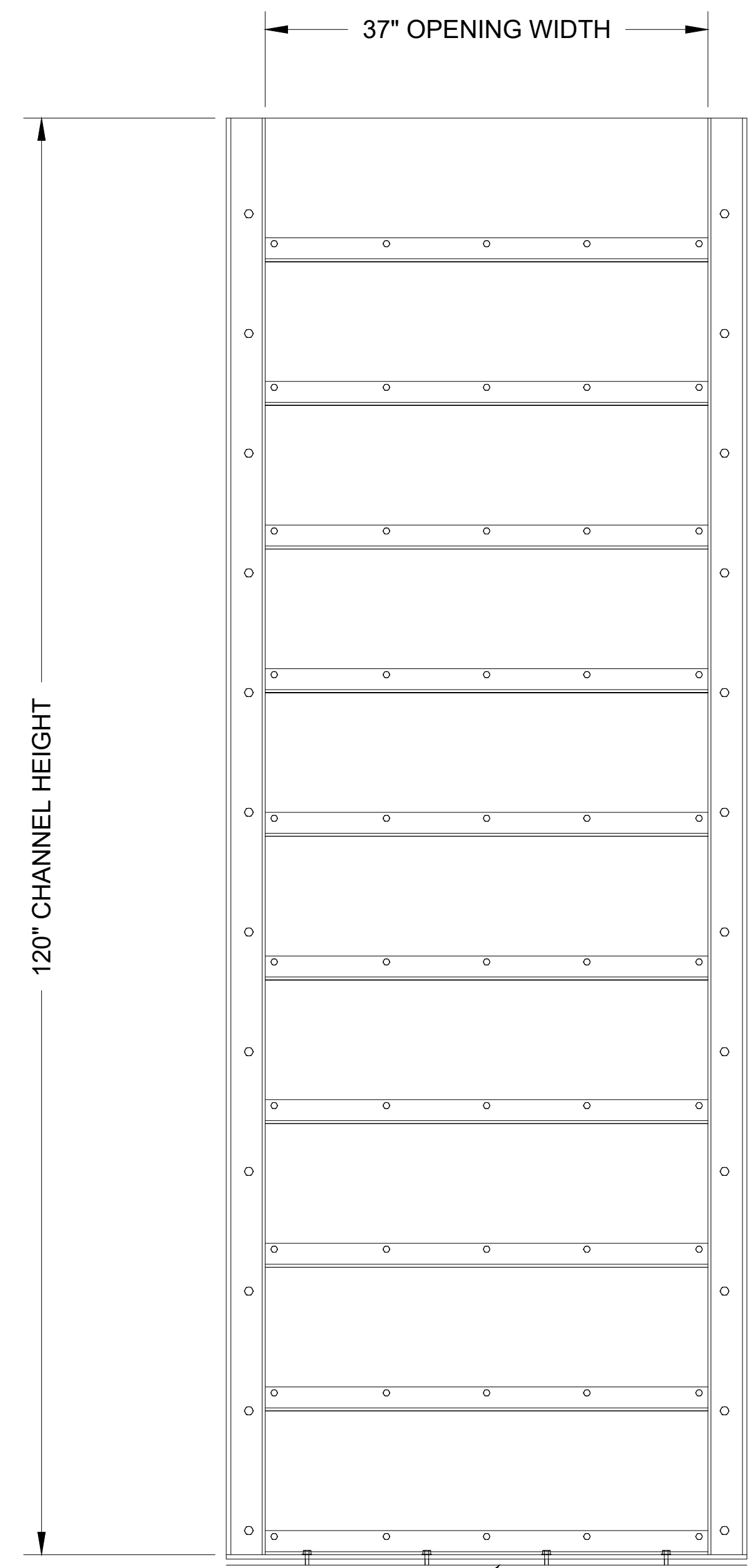
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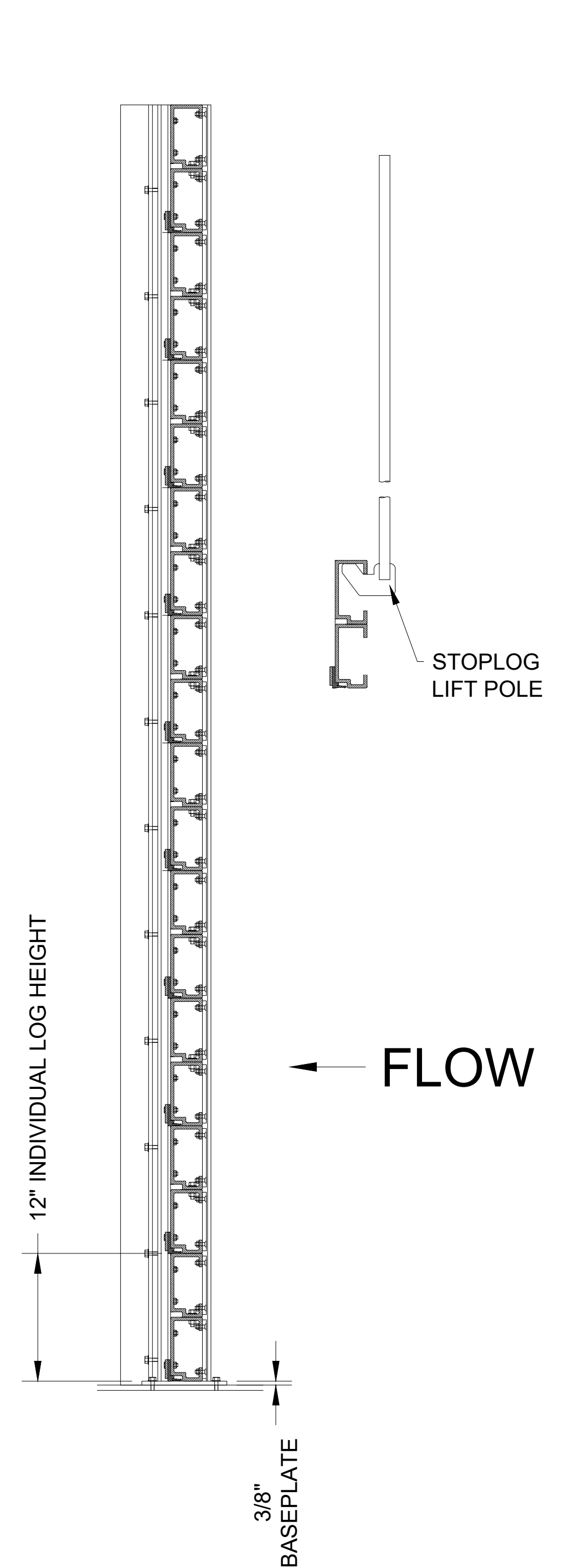
VETERANS MEMORIAL PARK HABITAT RESTORATION

MISC. DETAILS

DWG. NO. D1
REV 2

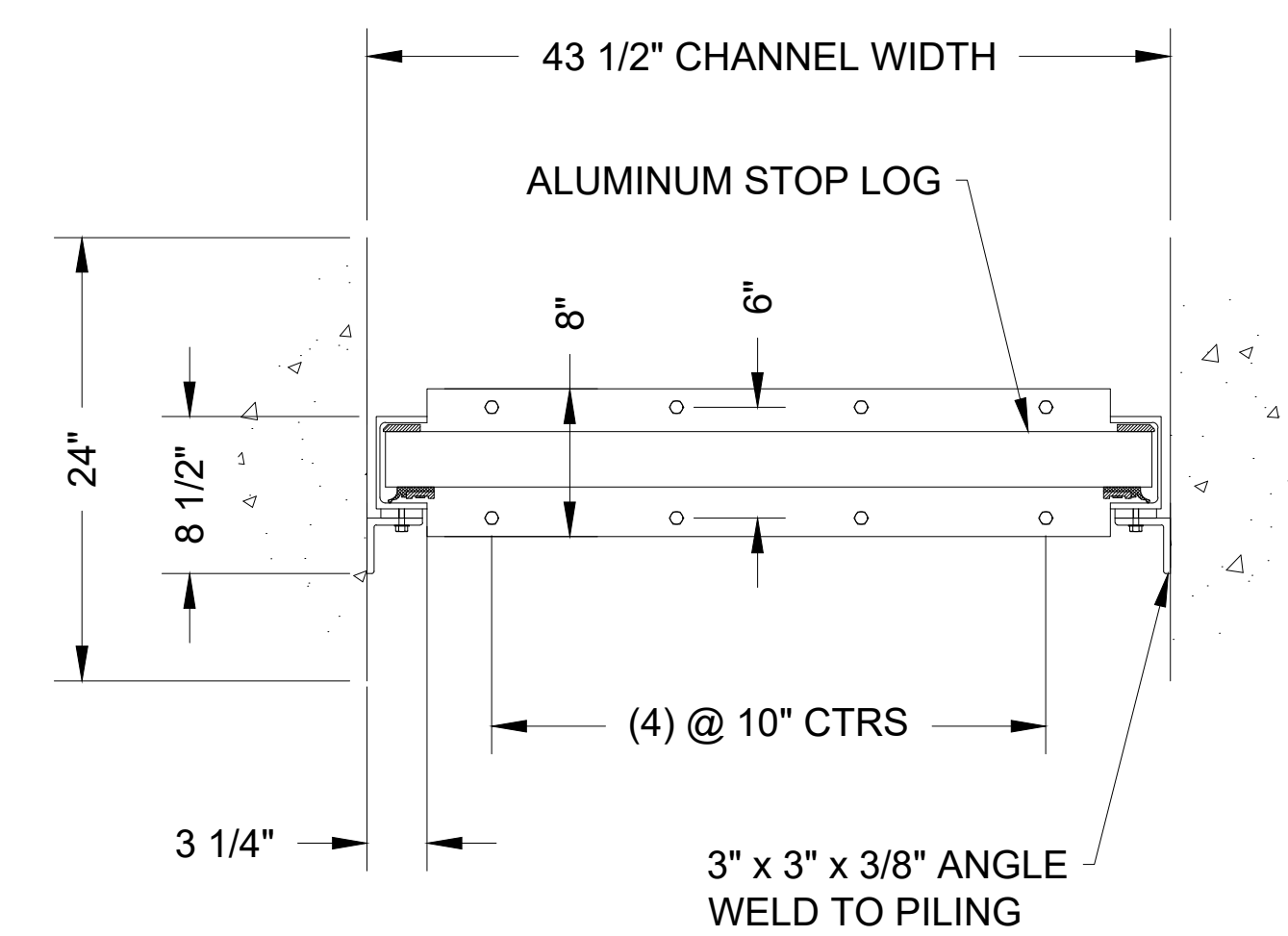


CUSTOM PLATE WELDED TO CHANNEL INVERT AT TOP OF CUT EXISTING SHEET WALL. ELEVATION 573.5'

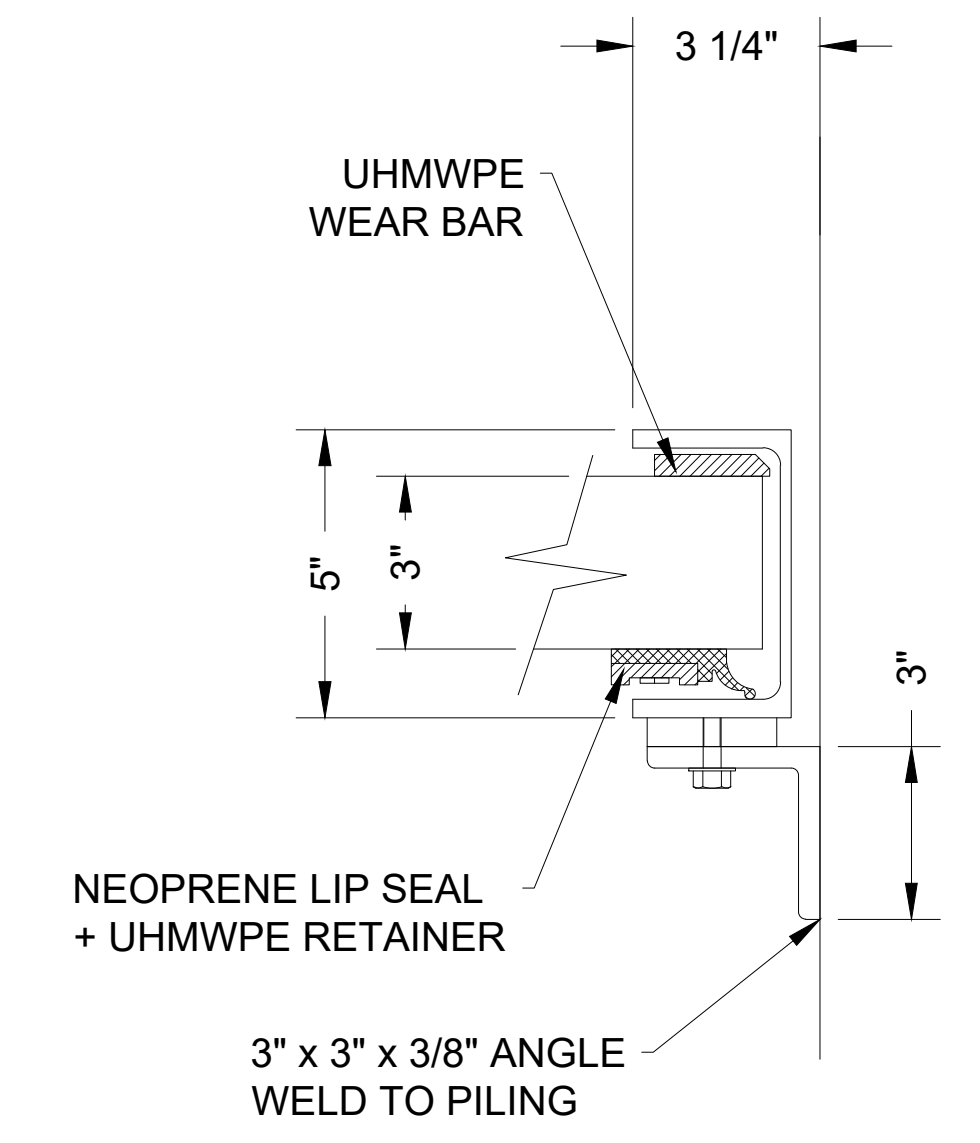


FLOW

FLOW



* EXISTING GUIDE RAILS MUST BE REMOVED BEFORE INSTALLATION OF THE REPLACEMENT GUARDRAILS. THE UNDERLYING MOUNTING PLATE MUST BE REPAIRED OR REPLACED SHOULD IT BE DAMAGED WHILE REMOVING THE EXISTING GUIDE RAILS.



ENLARGED GUIDE SECTION
NOT TO SCALE



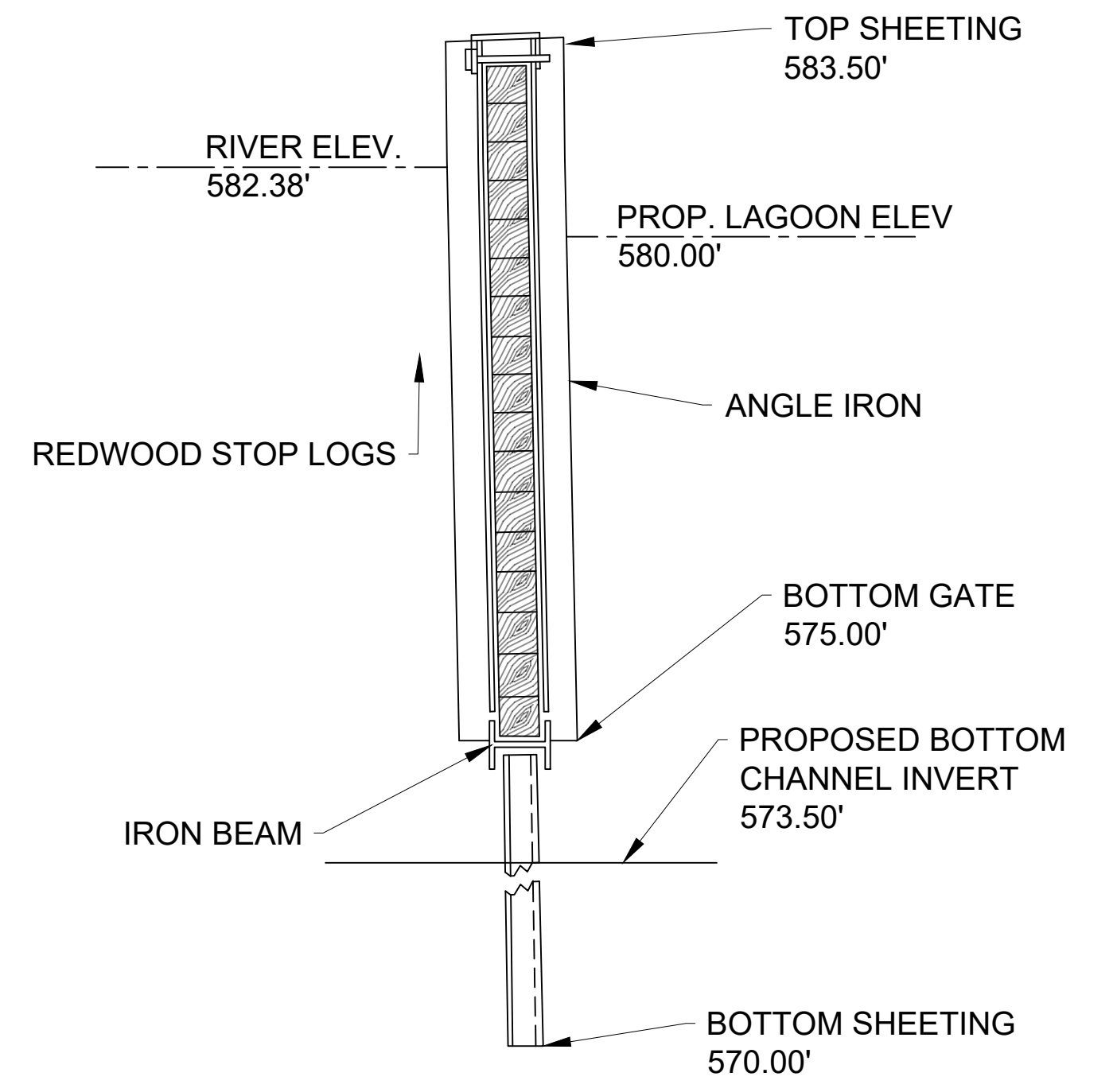
ABOVE: PHOTO OF EXISTING STOP LOG GATE TO BE REMOVED AND REPLACED.

RIGHT: PHOTO OF THE HISTORIC PLAN SET OF THE ORIGINAL GATE SYSTEM. THE IMAGE INDICATES THE PRESENCE OF A SECTION OF SHEET PILE WALL BENEATH THE EXISTING STOP LOG GATE. THE EXISTING WALL WILL BE CUT DOWN TO THE ELEVATION OF THE PROPOSED CHANNEL BED.

A METAL INVERT PLATE WHICH IS BOTH FLAT AND LEVEL MUST BE ATTACHED TO THE TOP OF THE RECENTLY CUT EXISTING SHEETING. THIS INVERT PLATE WILL PROVIDE THE LOWER ANCHORING POINT FOR THE STOP LOG GATE GUIDE RAILS.

DUE TO THE FACT THAT THE EXISTING SHEETING IS CURRENTLY BURIED WE CANNOT CONFIRM THE CONDITION OF THE STRUCTURE OR PROVIDE ADDITIONAL GUIDANCE FOR THE SPECIFICS OF ATTACHING THE INVERT PLATE TO THE WALL.

THE CONTRACTOR MUST FABRICATE AN ACCEPTABLE INVERT PLATE AND ATTACHMENT STRATEGY BASED ON CONDITIONS ENCOUNTERED IN THE FIELD. POTENTIAL ATTACHMENT STRATEGIES SHALL BE DEVELOPED IN SHOP DRAWINGS BETWEEN THE CONTRACTOR AND THE GATE MANUFACTURER, AND SHALL BE APPROVED BY THE PROJECT ENGINEER.



HISTORIC STOP LOG GATE DAM DETAIL
NOT TO SCALE

	QUANTITY:	1	SEATING		UNSEATING		TOLERANCES	TITLE			
	DESIGN HEAD (FT)	10.0'	10.0'				UNLESS OTHERWISE SPECIFIED	MUSKEGON, MI			
	ALLOWABLE LEAKAGE RATE (GPM / FT)	0.1	0.1				FRACTIONAL	±1/8	DATE:	2/3/2017	
							DECIMAL	±0.005	TITLE	36 1/2" x 12" SERIES RW3000A STOP LOGS	
							ANGULAR	±2°	SCALE:	1:15	
								MATERIAL:	SEE TEXT	DWG. NO.	17-BQ-1032-010
										REV.	B

THIS PRINT CONTAINS CONFIDENTIAL INFORMATION WHICH IS THE PROPERTY OF RW GATE COMPANY. BY ACCEPTING THIS INFORMATION THE BORROWER AGREES THAT IT WILL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT WHICH IT IS LOANED.

Attention:				
0 1"				
If this scale bar does not measure 1" then drawing is not original scale.				
NO.	DATE	ISSUE/REVISION	APP	
2	04/26/17	CONSTRUCTION DOCUMENTS	WL	
1	02/13/17	PERMIT FIGURES	WL	

Designed:	- KR
Checked:	- BM
Drawn:	- WL / KP
Submitted By:	- KR
P.E. Number:	- - 44371
Submittal Date:	04/26/17



VETERANS MEMORIAL PARK HABITAT RESTORATION
WATER CONTROL STRUCTURE DETAILS

DWG. NO. D2
REV 2