



Prepared for:

Anne Arundel County
Department of Public Works

Lake Waterford Dredging and Shoreline Project 30% Schematic Design Report



July 2023

Prepared by:

 **BayLand**
Consultants & Designers, Inc.

"Integrating Engineering and Environment"

7455 New Ridge Road, Suite T Phone: (410) 694-9401
Hanover, Maryland 21076 Fax: (410) 694-9405
Website: www.baylandinc.com

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1. BACKGROUND

Lake Waterford is a 12-acre unique and popular recreational asset located at the northwest corner of the Magothy River Watershed. It is part of the larger Lake Waterford Park, which encompasses 108 acres of sports fields, tennis and basketball courts, playgrounds, picnic pavilions, hiking trails, shoreline fishing and waterfowl observation, and forested areas. The Lake has experienced periodic degraded water quality, multiple fish kills, and closures in the past 12 years, including a summer-long contact closure due to the presence of toxic blue-green algae in 2019.

In March 2021 BayLand Consultants & Designers, Inc. (BayLand) completed a [Water Quality Planning Study](#) with the results and recommendations presented to the Anne Arundel County Department of Public Works (DPW), the Department of Recreation and Parks (DRP), the Magothy River Association (MRA), and various other stakeholders. The study documented the likely correlation between the long-term accumulation of sediment runoff from the 3,000-acre contributing drainage basin to degrading water quality within the Lake, including depletion of dissolved oxygen (DO) and fish kills.

The [Water Quality Planning Study](#) effort was documented and submitted to DPW in October 2021. As part of the study, [Water Quality Action Plan Items](#) were outlined to refine the scope and extent of sediment management and eventual lake dredging.

The DPW retained the services of BayLand to move ahead with Item 1 of the Action Plan – Lake Sediment Sampling and Analysis. Work items included sediment probes and identification of original lake bottom elevations, sampling of accumulated lake bottom sediments, and chemical and physical analyses for appropriate placement at either the Maryland Port Administration (MPA) Cox Creek Dredged Material Containment Facility (DMCF) or the South County Dredged Material Placement (DMP) Site. A separate analysis of sediment Carbon, Nitrogen, and Phosphorus was conducted to determine the proper extent of dredging to minimize depleted DO and fill kills. The lake sediment accumulation analysis from the Water Quality Planning Study was updated along with the estimated volume and cost of dredging. The [Sediment Characterization and Management February 2022, Revised November 2022](#) report documents methods and findings of that effort.

Lake Waterford stakeholders met on April 18, 2022 to review the [Sediment Characterization and Management](#) study. Technical study results and recommendations were presented to allow concurrence with and input to the proposed dredging plan. Stakeholders' comments were noted and it was agreed to continue to follow the Plan of Action that leads to dredging of the lake.

A Preliminary Project Plan was to be developed that not only defined the depths and extent of proposed dredging, but also inventoried and evaluated lake and shoreline features that would go hand-in-hand with significant sediment removal and fisheries habitat restoration. Dredging and seven other related shoreline, water quality, fisheries, habitat, and access features were developed by BayLand and documented in the [Lake Waterford Preliminary Project Plan Summary Report, November 2, 2022, Revised December 14, 2022](#).

Since cost was a significant consideration for inclusion of non-dredging items, a meeting was held with DPW/DRP to review the Summary Report. All eight potential project elements were presented and discussed. A draft selection matrix was developed to facilitate and document decisions to include, delay, monitor, not pursue, or pursue by other means, each project element. The decisions recorded in the Selection Matrix below represent tentative concurrence

of the DPW/DRP team, per the project review meeting on December 14, 2022. The matrix was finalized and included in the Final Report on December 14, 2022.

Selection Matrix

Decision	Project Element Description	Cost
✓	Dredging / water quality improvements (50,000 CY)	\$3M - 3.75M
✓	700 LF (25,000 SF) wetland benches	\$0
✓	5 remote fishing access stations	\$0
✓	ADA fishing access / short-term maintenance relief (50% discount – beneficial use)	\$200k
D / M	Fishway	\$250k
D / M	Aeration	\$
D / No	Circumnavigation trail	\$
O	Reef balls / Floating habitat; DNR / MRA / Outreach	\$

✓ – Include with dredging

D – Delay

M – Monitor

No – Do not pursue

O – Outreach Project

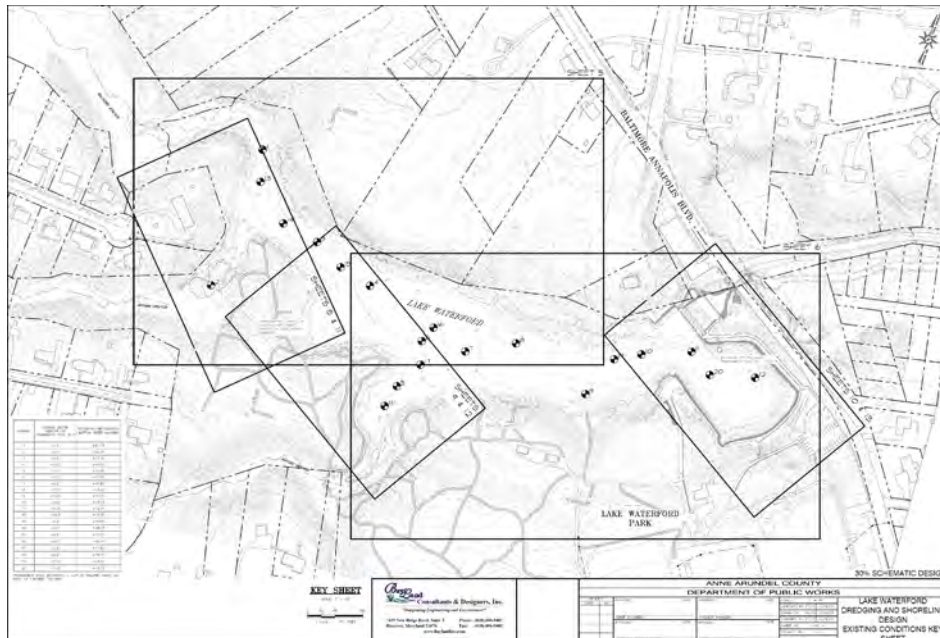
The DPW distributed the Final Report to the remaining stakeholders on December 21, 2022. The MRA replied January 11, 2023, stating that the project “would have a hugely beneficial impact on the Magothy River water quality.” MRA also requested that care be taken not to impact large tracks of existing woody vegetation surrounding the lake.

Concurrence and final approval of the report was given along with the notice to proceed to 30% schematic design on January 31, 2023.

2. DESIGN REPORT

The Lake Waterford 30% schematic design is based upon all previous studies of dredging, sedimentation, dredged material management, water quality, fisheries, habitat, shoreline enhancement, public access, and Dam Safety. This 30% schematic design report provides findings from additional sediment studies performed and their effect on the design. The report also serves to document important design findings, considerations, changes, or recommendations made for each project element that carried forward from the Lake Waterford Preliminary Project Plan Report. The 30% schematic design plans are included in [Appendix A](#). The schematic design cost estimate is in [Appendix B](#).

- a. Additional Sediment Sampling and Analysis Findings
 - i. Eight (8) additional sediment samples were obtained throughout the lake to determine if larger concentrations of sand exist that could be used beneficially.
 - ii. The additional samples were higher in overall sand and gravel content (71%) versus the original sampling (60%).
 - iii. Sample B-20 (88% sand and gravel) corroborates with the previous adjacent upstream sample B-10 (92% sand and gravel) as a potential borrow area for beneficial use.
 - iv. The uppermost Lake samples continue to show relatively high percentages of sand.
 - v. Additional analyses show that fine sand (versus medium or coarse sand) is predominant in the sandy samples.
 - vi. 8 additional sediment hand probes were conducted to refine the original bottom contours.

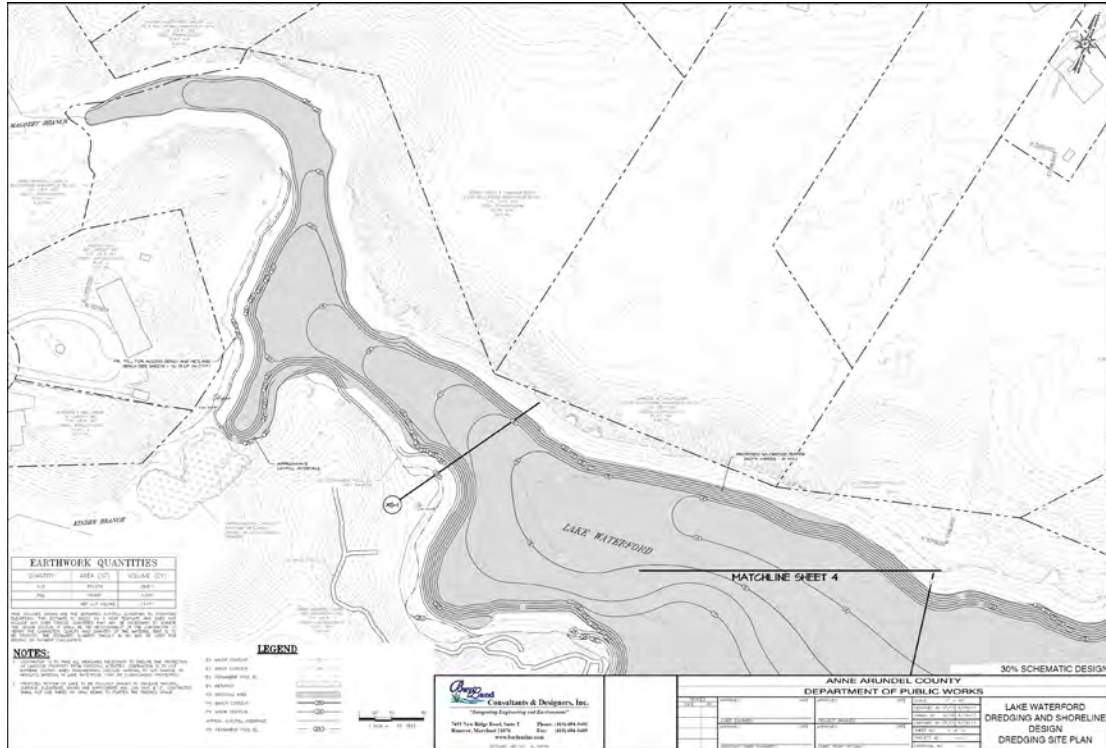


Appendix A, Sheet 2 of 14 – Click Plan for 2x3'

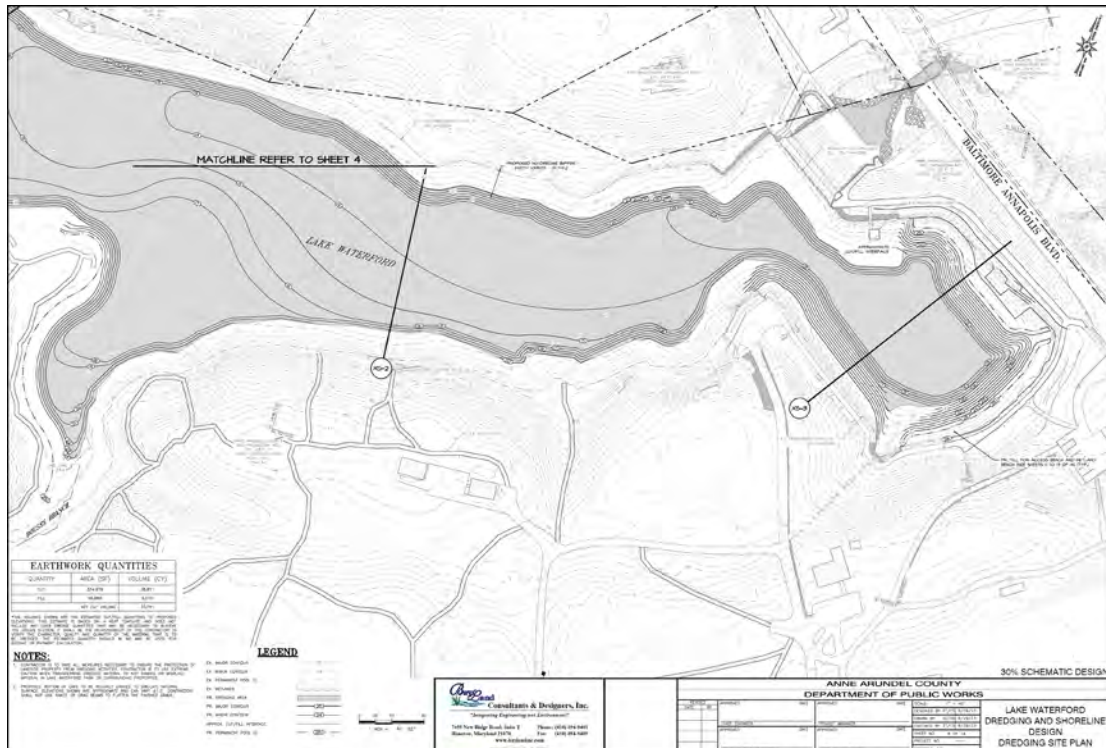
-
- b. Additional Sediment Sampling and Analysis Outcome
- i. All 20 boring logs and Particle Size Distribution Reports will be included in the 60% design submittal and the final plans to allow contractors to judge material recoverability and on-site beneficial use placement.
 - ii. Borrow areas will not be specified in the plans since recoverability is dependent on water depth, location, contractor equipment, experience, and preference. Borrow area locations would be more predictable/manageable upon commencement of dredging.
 - iii. Placement of the fine grain sand for embankment, fishing access, and wetland bench construction would likely be facilitated if the permanent pool was lowered two to three feet (2 to 3') which would allow placement in-the-dry. This could be done at the contractor's preference. Park/Lake operational impacts should be discussed with DPR prior to the 60% design.
 - iv. Stockpile areas for material dewatering should also be discussed and evaluated for the 60% design.
 - v. The sediment probes provide more detailed original bottom mapping and result in a slight decrease in volume to be excavated.

3. DREDGING PLAN

- a. The Preliminary Dredging Plan was refined and formatted into the 30% Design Dredging Site Plan.
 - i. Proposed Lake depths were not changed but were replaced by NAVD88 elevations/contours for design and construction efficiency.
 - ii. The plan incorporates original bottom soundings from the 8 additional hand probes conducted as part of this 30% schematic design.
 - iii. The 15' minimum no-dredge buffer was tied into existing lake bottom contours at a 3:1 grade resulting in an increase in the no-dredge buffer and less dredging of lake side slopes. This buffer serves to minimize shoreline erosion, reduce potential embankment sloughing, avoid trail encroachment, and preserve existing lake edge habitat. The expanded no-dredge buffer also provides additional offset and protection of the near-shore woody vegetation per MRA comment on the Preliminary Project Plan Report.
- b. Dredging at the confluence with Kinder Branch was pulled back to avoid impacts to emergent wetlands observed during field visits.
 - i. A wetland delineation should be performed at this site and at the confluence with Rouses Branch as part of the 60% design.
- c. Notes have been added to the plans to allow and encourage rough grading that simulate natural bottom surfaces to enhance fisheries habitat. Intentional over-dredging or smoothing/flattening of bottom grades will not be permitted.
- d. Revised dredging volume estimate:
 - i. 39,000 cubic yards (CY) neat (based upon 2020 hydrographic survey).
 - ii. 8,800 CY allowance for 2,200 CY/year sedimentation since the 2020 hydrographic survey.
 - iii. 2,200 CY contingent dredging.
 - iv. Total 50,000 CY
 - Offsite placement – 45,000 CY
 - On-site beneficial use – 5,000 CY
- e. A new hydrographic survey should be performed, and final excavation volume computed prior to final design.
- f. All dredging construction access will be restricted to the material transfer area.
- g. All dredging will occur on-lake with no allowance for lakeside access to minimize park, infrastructure, and environmental impacts.



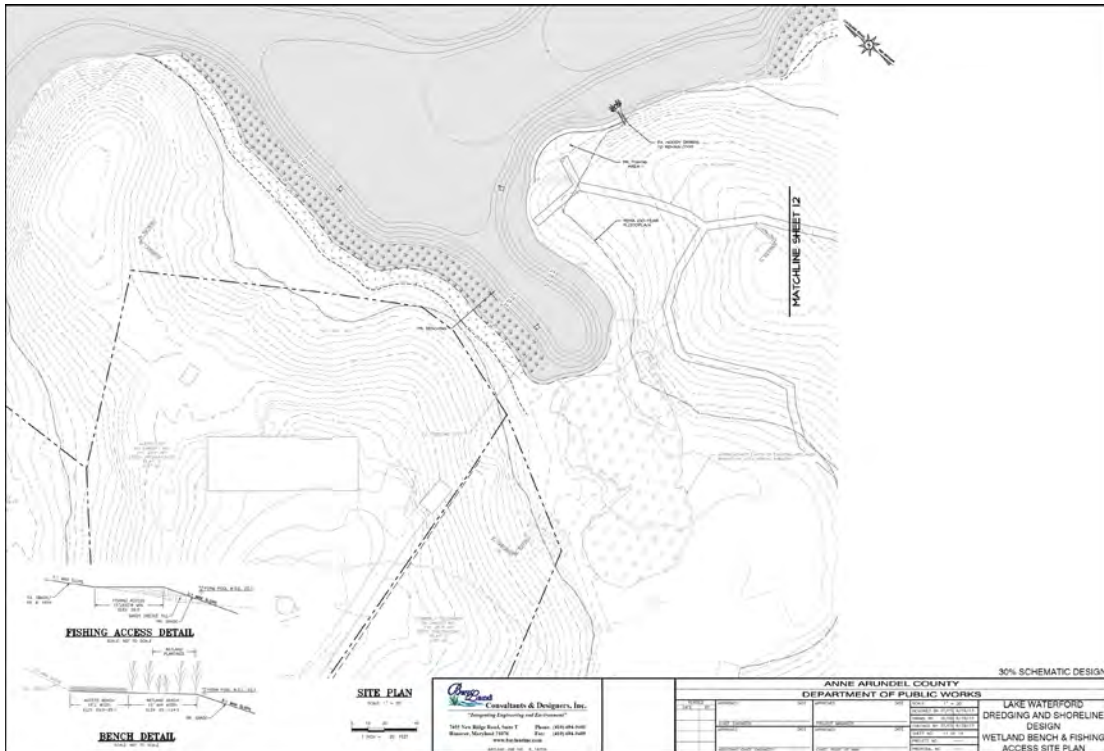
Appendix A, Sheet 5 of 14 – Click Plan for 2x3'



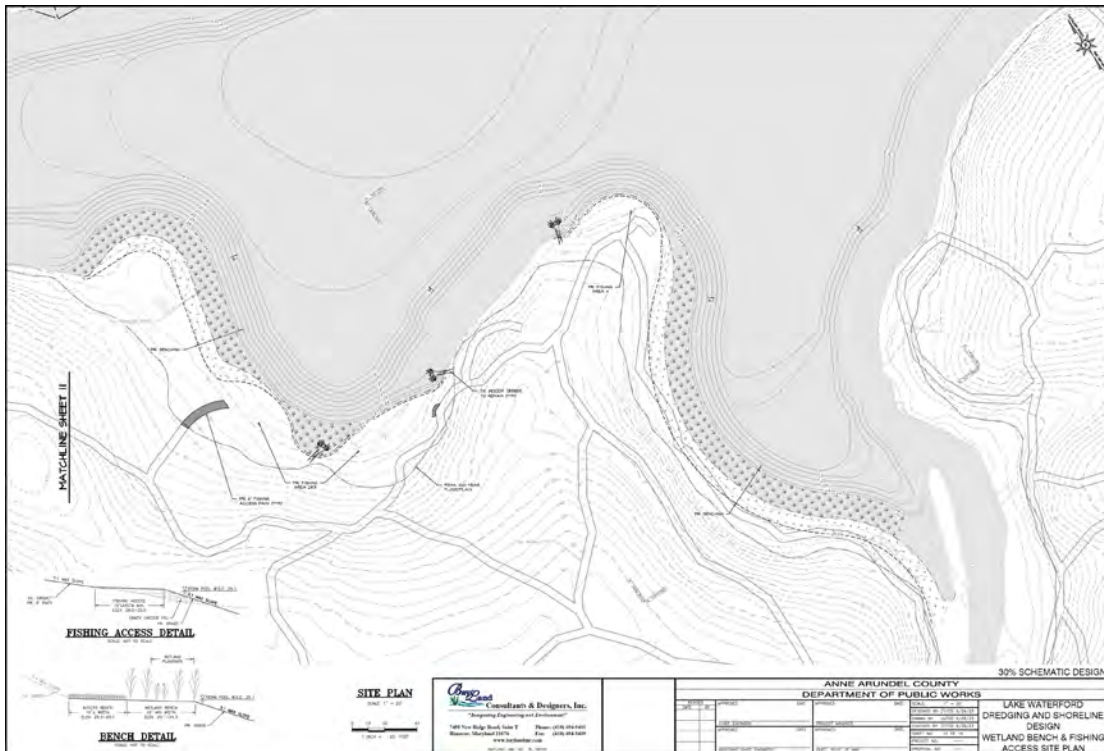
Appendix A, Sheet 6 of 14 – Click Plan for 2x3'

4. WETLAND BENCH

- a. Sandy dredged material will be used to augment shorelines to create shallow (less than six-inch (6") water depth) fringe marsh/wetland benches.
- b. These marshes will also serve as safety benches to protect hikers, waders, and anglers from sudden drops in depth at the shoreline.
 - i. Approximately 60% of the 6,512 linear feet (LF) shoreline has steep underwater slopes or drop-offs that would be impractical to fill and construct wetland benches.
 - ii. Of the 2,700 LF of flatter shallow shoreline, 800 LF has adequate southern exposure/sunlight to construct three (3) reaches of sustainable wetland benches in the mid to upper Lake.
 - iii. The 800 LF of wetland reaches will be augmented with approximately 1,000 CY of dredge material from within the Lake to create 10,300 square feet (SF) of vegetated wetland benches.
 - iv. The benches are designed to start at the edge of lake and extend at least 15' into the lake with an outboard depth of 6".
 - v. The benches will be accessed and constructed via the lakeside only to minimize impacts. Landside access will not be permitted.
 - vi. Construction of the wetland benches would likely be enhanced if the lake was lowered 2 to 3' to achieve construction in-the-dry.
- c. Access benching (grading) is shown on the plans up to 10' landward of the wetland benches to provide a smooth transition and access to the wetland benches.
 - i. Human access to wetland bench areas may not be desirable.
 - ii. This access benching could create impacts to existing wetlands and woody vegetation on the perimeter of the lake.
 - iii. If access benching is desired, a wetland and woody vegetation survey should be conducted to avoid and minimize impacts.



Appendix A, Sheet 11 of 14 – Click Plan for 2x3'



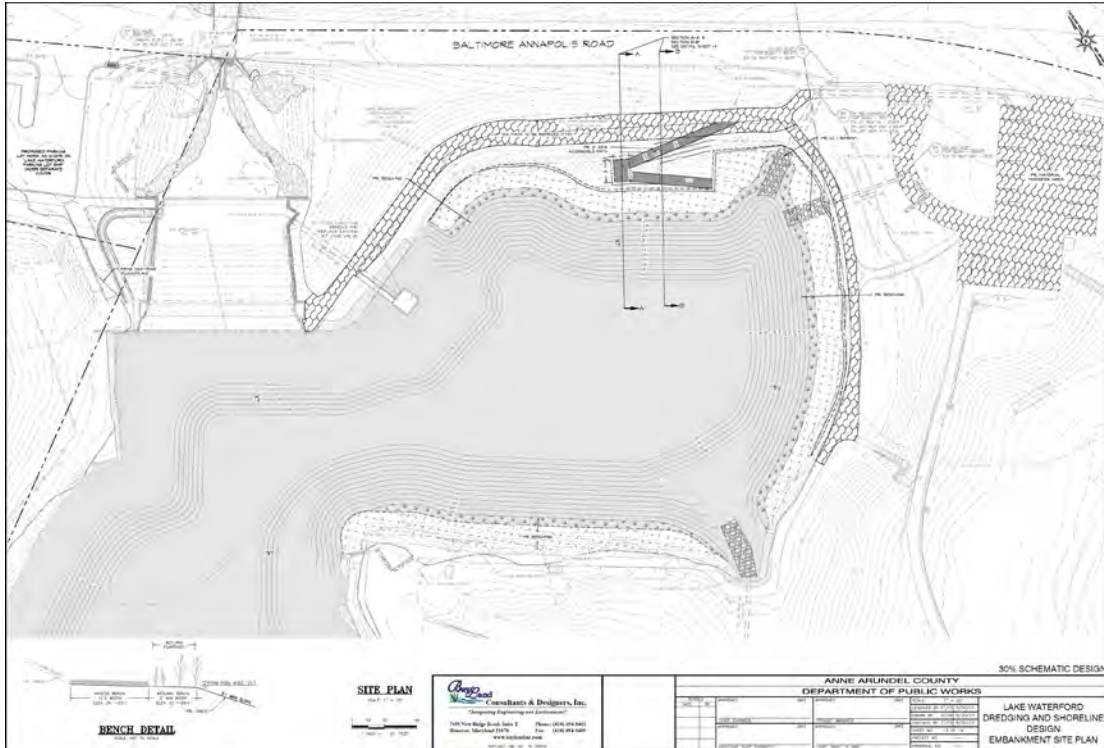
Appendix A, Sheet 12 of 14 – Click Plan for 2x3'

5. REMOTE FISHING ACCESS

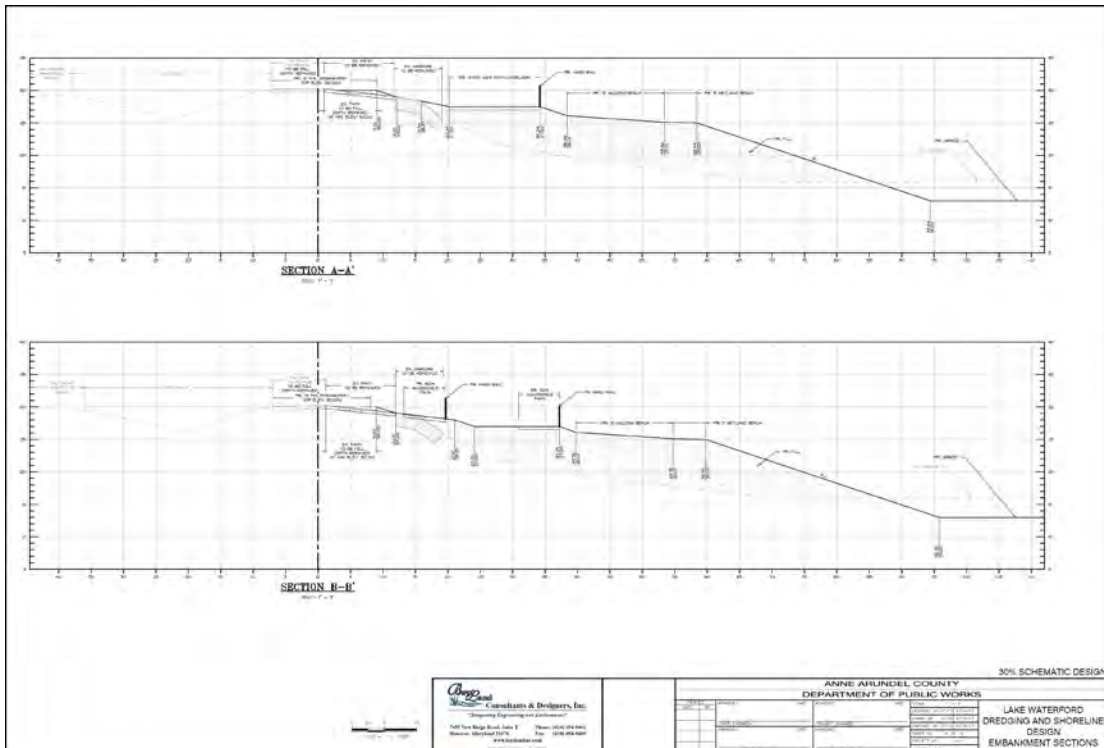
- a. Fishing access improvements were evaluated at remote locations in the mid and upper Lake region which would be accessible via existing trails.
- b. The preliminary design identified five locations that could be augmented with dredged material to construct fishing peninsulas out into the lake.
- c. A field reconnaissance was conducted for this 30% schematic design to refine site locations to ensure the peninsulas could be constructed and connected to existing trails with minimum impacts to the Lake and existing vegetation.
- d. Four locations were identified where low-profile earthen paths and short peninsulas could be constructed via waterside access using approximately 400 CY of sandy material from the lake dredging. Landside construction access will not be permitted.
- e. The peninsulas were broadened and blunted to accommodate near-shore bathymetry and fine sand fill, providing 60' to 90' of unobstructed fishable shoreline at each of the four locations.
- f. These fishing locations will provide superior access for remote angling in newly dredged deeper water (6 to 8' deep), beyond shoreline vegetation and potential snags.
- g. Lowering the lake 2 to 3' would allow placement of saturated fine grain sand in-the-dry and enhanced dewatering before grading and shaping of the peninsulas and connecting paths.

6. PRIMARY FISHING ACCESS AND EMBANKMENT RETROFIT

- a. Maryland Department of the Environment (MDE) Dam Safety Inspections advise the County to make repairs to longitudinal cracks in the asphalt path on the embankment crest, remove vegetation present all over the gabions, and repair and restore torn gabion baskets.
- b. The DNR Fisheries Program suggested retrofitting or eliminating the gabion baskets to address MDE comments while creating a more stable access to the shoreline in this popular, highly used fishing location.
- c. The preliminary design included an innovative concept to remove or bury the gabions around the entire basin and reshape the embankment to provide more gradual slopes and accessways, including ADA access.
- d. The 30% schematic design Embankment Site Plan includes removal of all gabions except offsets surrounding the 18" storm drain inflow pipe and the Lake riser structure.
 - i. The extent of the gabion removal will be discussed with DPW/DRP prior to initiating 60% design.
- e. The resultant steep gabion slopes will be covered and filled to provide a gradual transition to a 15' wide, 700' long access bench (10,300 SF), and 5' wide wetland bench (3,300 SF) surrounding the entire downstream basin.
 - i. For the 30% schematic design it is assumed the 15' wide access will be dredged sand.
- f. Additional fill and slope area will be placed at the ADA access path, which also leads to the 15' wide access bench.
- g. The plan provides maximum access to the edge of the Lake from large landings and flat areas. The wetland bench will provide a safety buffer to discourage entry into the lake.
- h. 3,600 CY of dredged material will be used beneficially for the downstream basin retrofit.
- i. Landside construction access could be extended around the basin from the material transfer area.
 - i. Basin access will be discussed with DPW/DRP prior to 60% design.
- j. It is noted that in order to achieve access and safety goals, the downstream basin water surface area will be reduced by 0.26 acres (17% reduction). This will be most apparent in the north to south direction where the lake edge to lake edge distance will decrease from 240' to 185'.
- k. Lowering the Lake 2 to 3' would likely facilitate the basin construction.
- l. Removal and replacement of the existing gate-valve is recommended to facilitate Lake drawdowns.



Appendix A, Sheet 13 of 14 – Click Plan for 2x3'



Appendix A, Sheet 14 of 14 – Click Plan for 2x3'

7. COST ESTIMATE

The Schematic Design Cost Estimate is located within [Appendix B](#). The estimate includes base bid and contingent bid items. It includes an allowance for on-going sedimentation removal and assumes off-site placement of material would occur at the South County DMP Site.

**LAKE WATERFORD
30% SCHEMATIC DESIGN REPORT
APPENDIX**

**Appendix A – Lake Waterford
Dredging and Shoreline (30%)
Design Plans**

LAKE WATERFORD DREDGING AND SHORELINE DESIGN

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

ANNE ARUNDEL COUNTY, MARYLAND

BEFORE YOU DIG CALL
1-800-257-7777 OR DIAL 811



PROJECT NO. P468700
PROPOSAL NO. P468715
JUNE 2023

GENERAL NOTES

- HYDROGRAPHIC SURVEY WAS PERFORMED BY BAYLAND CONSULTANTS & DESIGNERS, INC. ON OCTOBER 19, 2020. LAKE WATERFORD TOPOGRAPHIC SURVEY WAS PERFORMED BY BAYLAND CONSULTANTS & DESIGNERS, INC. ON APRIL 1, 4 & 5, AND JULY 18-19, 2022 AND MARCH 22-23, 2023.
 - HORIZONTAL CONTROL ESTABLISHED FROM REAL TIME KINEMATIC (RTK) GLOBAL POSITIONING SYSTEM (GPS) CONTROL POINTS. COORDINATES AND BEARINGS SHOWN HEREON ARE REFERRED TO THE MARYLAND COORDINATE SYSTEM (MAD83/1991). ELEVATIONS SHOWN HEREON REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- | POINT | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|----------|------------|--------------|-----------|--------------------|
| TPS #1 | 527,551.13 | 1,437,291.77 | 30.0170 | SURVEY SPIKE |
| TPS #2 | 527,531.14 | 1,437,521.85 | 29.4037 | MAG NAIL |
| TPS #3 | 527,182.98 | 1,436,631.70 | 26.0271 | YELLOW PLASTIC CAP |
| TPS #4 | 527,726.71 | 1,437,252.27 | 23.5814 | YELLOW PLASTIC CAP |
| TPS #5 | 527,401.55 | 1,436,136.08 | 25.8494 | YELLOW PLASTIC CAP |
| TPS #6 | 527,600.70 | 1,436,040.54 | 26.2517 | REBAR |
| TPS #7 | 527,711.54 | 1,435,884.21 | 29.0175 | REBAR |
| TPS #8 | 527,846.62 | 1,435,822.77 | 26.4229 | REBAR |
| TPS #9 | 527,709.38 | 1,435,731.20 | 30.0503 | REBAR |
| TPS #50 | 527,543.00 | 1,437,529.60 | 30.2100 | MAG DISK |
| TPS #51 | 527,331.11 | 1,437,640.62 | 35.2254 | YELLOW PLASTIC CAP |
| TPS #701 | 527,962.01 | 1,437,043.63 | 40.7231 | YELLOW PLASTIC CAP |
| TPS #702 | 527,791.40 | 1,437,019.23 | 46.8303 | YELLOW PLASTIC CAP |
| TPS #703 | 527,687.53 | 1,437,085.34 | 46.9635 | YELLOW PLASTIC CAP |
- PROPERTY LINES SHOWN ARE BASED ON ANNE ARUNDEL COUNTY CADASTRAL DATA.
 - MARYLAND NON-TIDAL WETLAND AND WATERWAY PERMIT NO. XXXXXX

GENERAL CONSTRUCTION NOTES

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS "STANDARD DETAILS & SPECIFICATIONS" UNLESS OTHERWISE NOTED.
- THE EXISTING UTILITIES AND OBSTRUCTIONS SHOWN ARE FROM THE BEST AVAILABLE RECORDS AND SHALL BE VERIFIED BY THE CONTRACTOR TO HIS SATISFACTION PRIOR TO CONSTRUCTION. NECESSARY PRECAUTIONS SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT EXISTING SERVICES AND MAINS, AND ANY DAMAGE TO THEM SHALL BE REPAIRED IMMEDIATELY AT HIS OWN EXPENSE.
- LOCATION OF OVERHEAD POWER CABLES SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY EXISTING LOCATIONS OF ALL UTILITIES AND OBSTRUCTIONS AT TIME OF CONSTRUCTION.
- THE CONTRACTOR SHALL CALL "MISS UTILITY" (1-800-257-7777) A MINIMUM OF 48 HOURS IN ADVANCE OF ANY EXCAVATION, BORING, PILE DRIVING AND/OR DIGGING FOR THE LOCATION OF GAS, ELECTRIC, TELEPHONE, WATER AND SEWER LINES.
- IT SHALL BE DISTINCTLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK WHICH WOULD NATURALLY BE REQUIRED TO COMPLETE THE PROJECT SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO COMPLETE SUCH WORK.
- THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ANY TREES, STUMPS, TIRES OR OTHER DEBRIS ENCOUNTERED WITHIN THE DREDGING TEMPLATE. THIS DEBRIS WILL NOT BE PERMITTED TO BE PLACED IN OR NEAR THE WATERWAYS OR AT THE PLACEMENT SITE WITH THE EXCEPTION OF STUMPS OR OTHER NATURAL MATERIALS AS APPROVED BY THE COUNTY.
- THE CONTRACTOR SHALL PROTECT EXISTING STRUCTURES INCLUDING BUT NOT LIMITED TO ROADS, CURBS, SIDEWALKS, BUILDINGS, BULKHEADS, BOAT RAMPS, PIERS AND MOORING PILES FROM DAMAGE. CONTRACTOR MAY NOT REMOVE ANY STRUCTURES WITHOUT PRIOR APPROVAL OF THE OWNER AND THE COUNTY.
- THE CONTRACTOR SHALL DREDGE BY MECHANICAL MEANS ONLY.
- PLACEMENT OF DREDGED MATERIAL
 - PRIMARY SELECTED PLACEMENT SITE XXXXX AS DIRECTED BY THE COUNTY.
 - SECONDARY SELECTED PLACEMENT SITE XXXXX AS DIRECTED BY THE COUNTY.



SITE LOCATION MAP
SCALE: 1"= 2,000'

SITE INFORMATION

- OWNER INFORMATION: ANNE ARUNDEL COUNTY DEPARTMENT OF REC & PARKS DEED: 2032/15 830 PASADENA RD PASADENA, MD 21122
- DEVELOPER INFORMATION: ANNE ARUNDEL COUNTY DPW 2862 RIVA ROAD - 2ND FLOOR ANNAPOLIS, MD 21401 XXX-XXX-XXXX ATTN: ---
- ENGINEER: BAYLAND CONSULTANTS AND DESIGNERS, INC.
- ENGINEER INFORMATION: 7455 NEW RIDGE ROAD, SUITE T HANOVER, MARYLAND 21076 PH: 410-694-9401
- TAX MAP: 0023
- PARCEL: 0071
- LOTS: N/A
- DEED REF: 2032/15
- DISTRICT: 03
- USE: EXEMPT COMMERCIAL
- PROPERTY AREA: 77.16 AC
- SUBWATERSHED: MAGOTHY BRANCH
- WATERSHED: MAGOTHY RIVER
- A.A. CO. GRADING PERMIT: ---

ABBREVIATIONS

- | | | |
|------|---|--|
| EX. | - | EXISTING FEATURE, STRUCTURE, OR OBJECT |
| PR. | - | PROPOSED |
| BLDG | - | BUILDING |
| TYP. | - | TYPICAL |
| LF | - | SQUARE FEET |
| SF | - | LINEAR FEET |
| CY | - | CUBIC YARDS |
| DMP | - | DREDGED MATERIAL PLACEMENT |
| WSE | - | WATER SURFACE ELEVATION |
| STA. | - | STATION |

LEGEND

- | | | | |
|------------------------------|----------|------------------------|-----------|
| SOUNDING | -3.9 | PR. STAKEOUT POINT | 1000X |
| BENCHMARK (BM) | TPS# 1A | PR. DREDGING AREA | [Pattern] |
| TRAVERSE | [Symbol] | PR. MAJOR CONTOUR | -25- |
| BORING LOCATION | [Symbol] | PR. MINOR CONTOUR | -24- |
| PERMANENT POOL EL. | [Symbol] | PR. ODD CONTOUR | -25.1- |
| EX. PROPERTY LINE | [Symbol] | EX. PATH TO BE REPAVED | [Pattern] |
| EX. PIER | [Symbol] | PR. PATH | [Pattern] |
| EX. WETLANDS/SAV | [Symbol] | PR. FISHING AREA | [Pattern] |
| EX. MAJOR CONTOUR | -25- | PR. RIPRAP | [Pattern] |
| EX. MINOR CONTOUR | -24- | PR. ACCESS BENCH | [Pattern] |
| EX. TREELINE | [Symbol] | PR. WETLAND BENCH | [Symbol] |
| EX. GABION (TO BE REMOVED) | [Symbol] | | |
| EX. PATH (TO BE REMOVED) | [Symbol] | | |
| EX. 100-YEAR FEMA FLOODPLAIN | [Symbol] | | |

CONSULTANT'S CERTIFICATION

THE DEVELOPER'S PLAN TO CONTROL SILT AND EROSION IS ADEQUATE TO CONTAIN THE SILT AND EROSION ON THE PROPERTY COVERED BY THE PLAN. I CERTIFY THAT THIS PLAN OF EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THIS SITE, AND WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASCD PLAN SUBMITTAL GUIDELINES AND THE CURRENT MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL. I HAVE REVIEWED THIS EROSION AND SEDIMENT CONTROL PLAN WITH THE OWNER / DEVELOPER.

MD P.E. LICENSE # 33146
NAME CHRISTOPHER STEPP
FIRM NAME BAYLAND CONSULTANTS & DESIGNERS, INC.
ADDRESS 7455 NEW RIDGE ROAD, SUITE T
CITY HANOVER, STATE MD, ZIP CODE 21076

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 33146, EXPIRATION DATE: 01/14/2025.

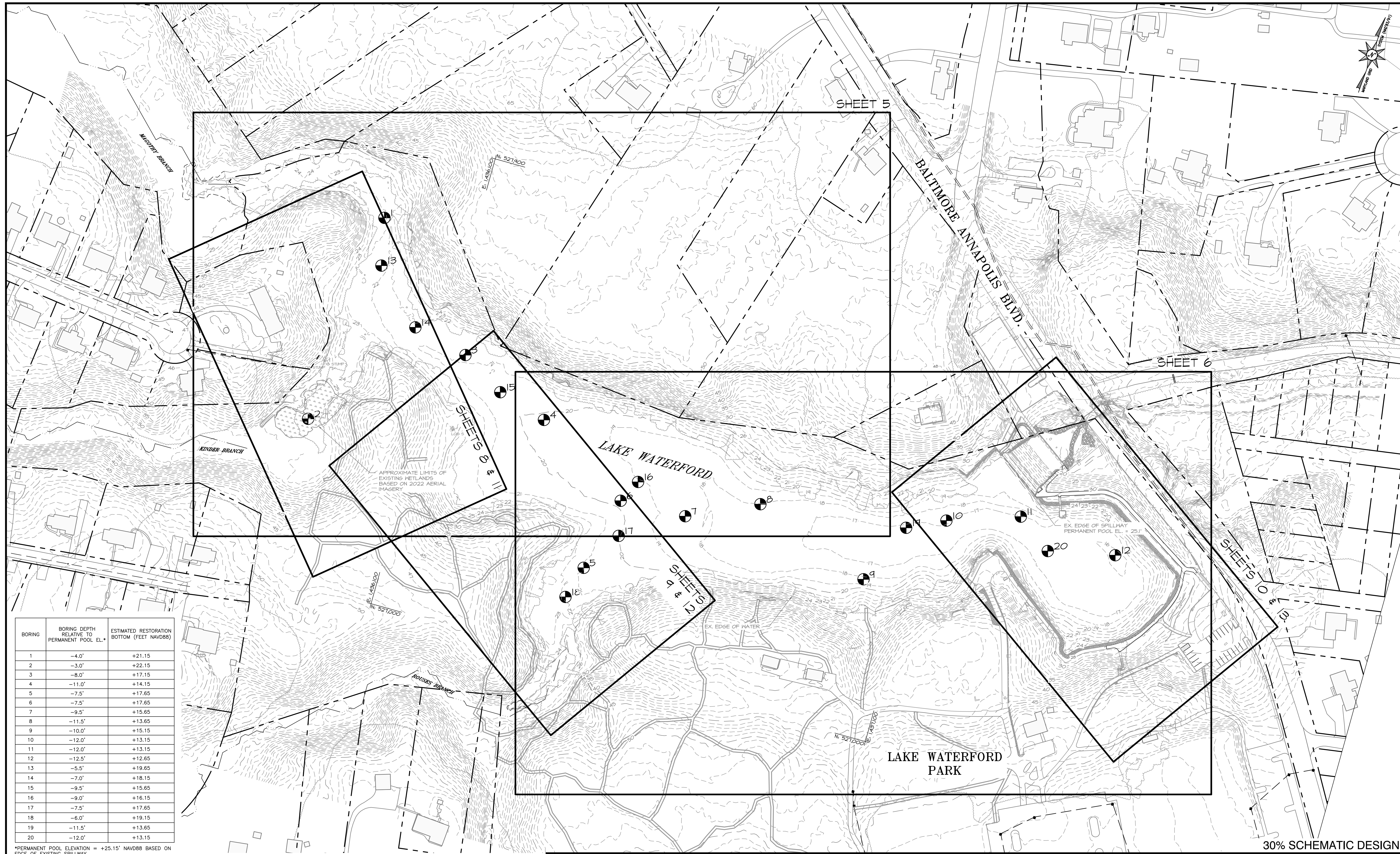
SIGNATURE OF DEVELOPER \ OWNER _____ DATE: _____
PRINT: NAME: _____
TITLE: _____
AFFILIATION: ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS
ADDRESS: 2662 RIVA ROAD, ANNAPOLIS, MARYLAND 21401
TELEPHONE NUMBER: _____
EMAIL ADDRESS: _____

SHEET LIST TABLE

SHEET	TITLE
1	COVER SHEET
2	EXISTING CONDITIONS KEY SHEET
3	PROPOSED CONDITIONS KEY SHEET
4	EXISTING LAKE ELEVATIONS
5	DREDGING SITE PLAN
6	DREDGING SITE PLAN
7	DREDGING SECTIONS & DETAILS
8	WETLAND BENCH & FISHING ACCESS EXISTING CONDITIONS
9	WETLAND BENCH & FISHING ACCESS EXISTING CONDITIONS
10	EMBANKMENT EXISTING CONDITIONS
11	WETLAND BENCH & FISHING ACCESS SITE PLAN
12	WETLAND BENCH & FISHING ACCESS SITE PLAN
13	EMBANKMENT SITE PLAN
14	EMBANKMENT SECTIONS

30% SCHEMATIC DESIGN

 Bayland Consultants & Designers, Inc. "Integrating Engineering and Environment" 7455 New Ridge Road, Suite T Phone: (410) 694-9401 Hanover, Maryland 21076 Fax: (410) 694-9405 www.baylandinc.com BAYLAND JOB NO. 5_18305	ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS		SCALE: AS SHOWN DESIGNED BY: ZT/CS 6/29/23 DRAWN BY: JG/DG 6/29/23 CHECKED BY: ZT/CS 6/29/23 SHEET NO. 1 OF 14 PROJECT NO. --- PROPOSAL NO. ---		LAKE WATERFORD DREDGING AND SHORELINE DESIGN COVER SHEET
	REVISIONS DATE BY	APPROVED DATE CHIEF ENGINEER APPROVED DATE ASSISTANT CHIEF ENGINEER	APPROVED DATE PROJECT MANAGER APPROVED DATE CHIEF, RIGHT OF WAY	APPROVED DATE	



BORING	BORING DEPTH RELATIVE TO PERMANENT POOL EL.*	ESTIMATED RESTORATION BOTTOM (FEET NAVD88)
1	-4.0'	+21.15
2	-3.0'	+22.15
3	-8.0'	+17.15
4	-11.0'	+14.15
5	-7.5'	+17.65
6	-7.5'	+17.65
7	-9.5'	+15.65
8	-11.5'	+13.65
9	-10.0'	+15.15
10	-12.0'	+13.15
11	-12.0'	+13.15
12	-12.5'	+12.65
13	-5.5'	+19.65
14	-7.0'	+18.15
15	-9.5'	+15.65
16	-9.0'	+16.15
17	-7.5'	+17.65
18	-6.0'	+19.15
19	-11.5'	+13.65
20	-12.0'	+13.15

*PERMANENT POOL ELEVATION = +25.15' NAVD88 BASED ON EDGE OF EXISTING SPILLWAY.

KEY SHEET
SCALE: 1" = 80'
0 40 80 160
1 INCH = 80 FEET

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"Integrating Engineering and Environment"
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Hanover, Maryland 21076 Fax: (410) 694-9405
www.baylandinc.com
BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

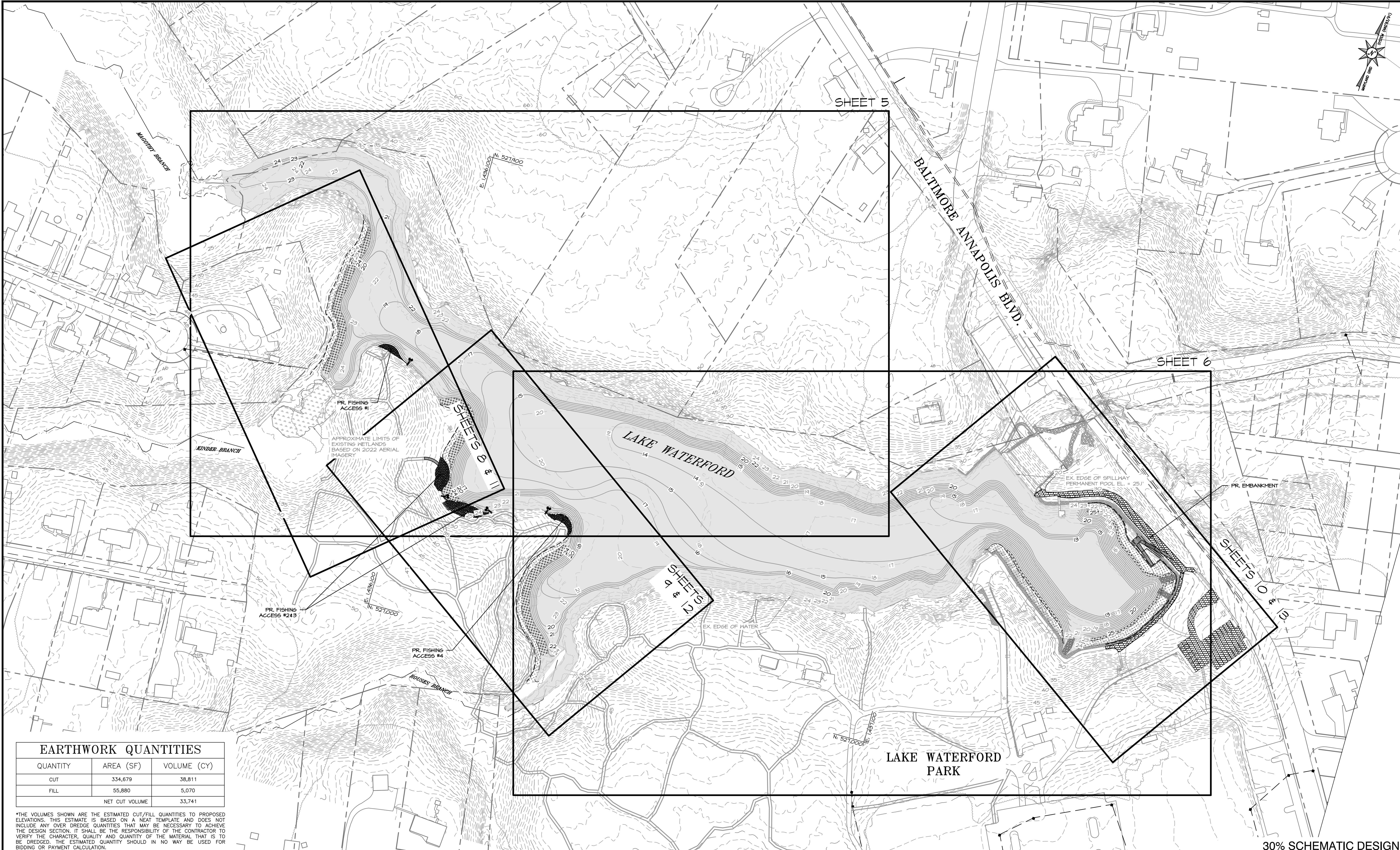
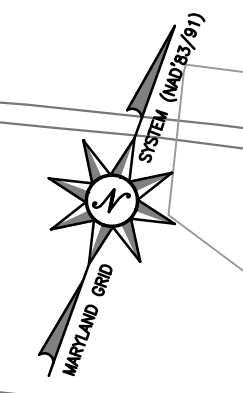
REVISED DATE	BY	APPROVED	DATE	APPROVED	DATE
		CHIEF ENGINEER		PROJECT MANAGER	
		APPROVED	DATE	APPROVED	DATE
		ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY	

SCALE: 1" = 80'
DESIGNED BY: ZT/CS 6/29/23
DRAWN BY: JG/DG 6/29/23
CHECKED BY: ZT/CS 6/29/23
SHEET NO. 2 OF 14
PROJECT NO. ---
PROPOSAL NO. ---

30% SCHEMATIC DESIGN

LAKE WATERFORD
DREDGING AND SHORELINE
DESIGN
EXISTING CONDITIONS KEY
SHEET

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SHEET 5

SHEET 6

SHEETS 8 & 11

SHEETS 9 & 12

SHEETS 10 & 13

APPROXIMATE LIMITS OF EXISTING WETLANDS BASED ON 2022 AERIAL IMAGERY

PR. FISHING ACCESS #1

PR. FISHING ACCESS #243

PR. FISHING ACCESS #4

EX. EDGE OF SPILLWAY PERMANENT POOL EL. = 25.1

PR. EMBANKMENT

LAKE WATERFORD PARK

LAKE WATERFORD

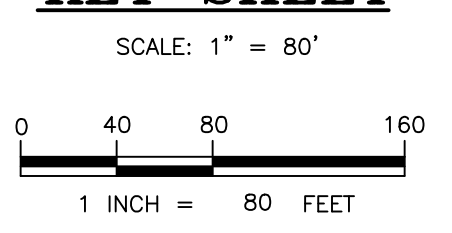
EX. EDGE OF WATER

EARTHWORK QUANTITIES

QUANTITY	AREA (SF)	VOLUME (CY)
CUT	334,679	38,811
FILL	55,880	5,070
NET CUT VOLUME		33,741

*THE VOLUMES SHOWN ARE THE ESTIMATED CUT/FILL QUANTITIES TO PROPOSED ELEVATIONS. THIS ESTIMATE IS BASED ON A NEAT TEMPLATE AND DOES NOT INCLUDE ANY OVER DREDGE QUANTITIES THAT MAY BE NECESSARY TO ACHIEVE THE DESIGN SECTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE CHARACTER, QUALITY AND QUANTITY OF THE MATERIAL THAT IS TO BE DREDGED. THE ESTIMATED QUANTITY SHOULD IN NO WAY BE USED FOR BIDDING OR PAYMENT CALCULATION.

KEY SHEET



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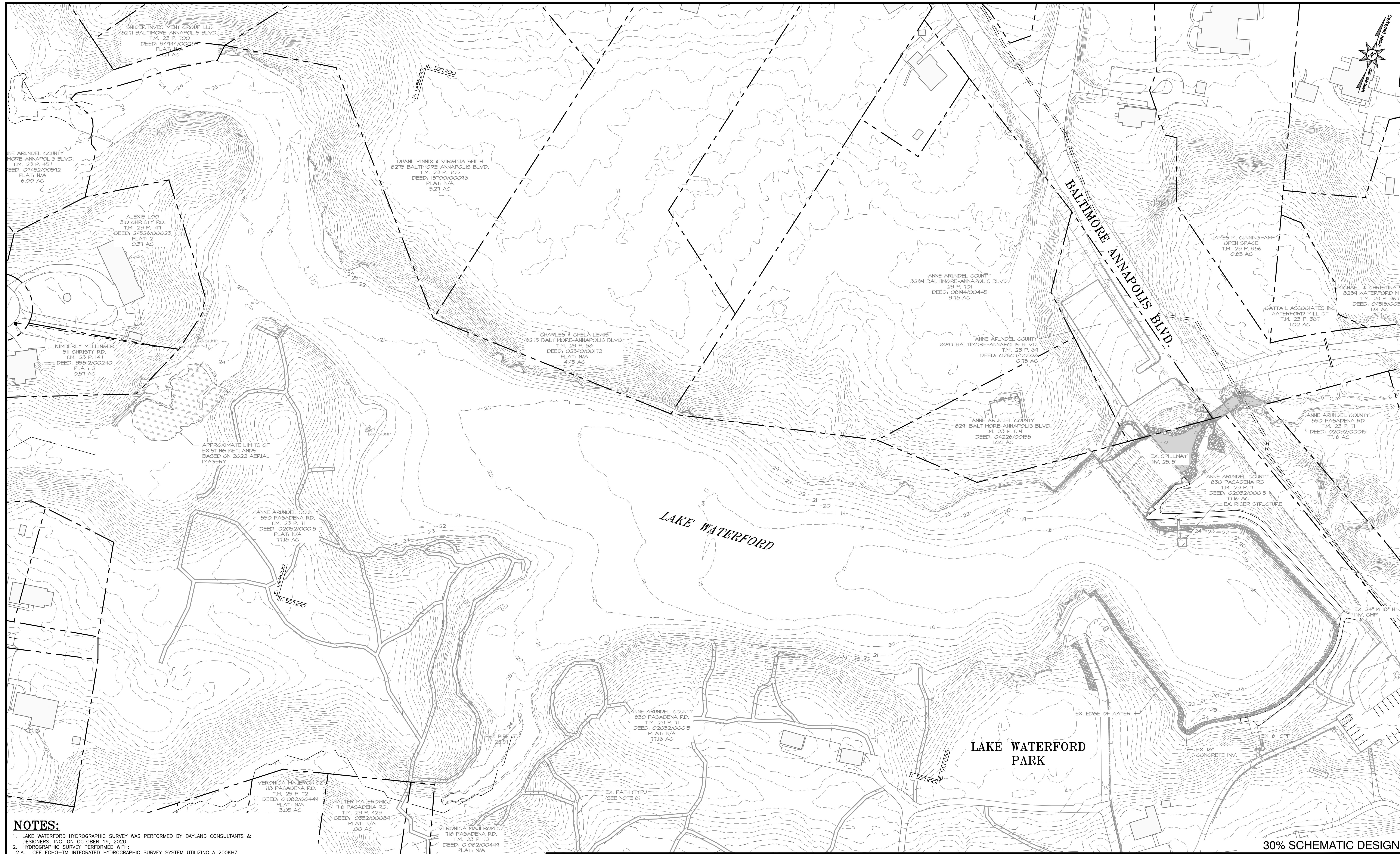
REVISED DATE	BY	APPROVED	DATE	APPROVED	DATE
		CHIEF ENGINEER		PROJECT MANAGER	
		APPROVED	DATE	APPROVED	DATE
		ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY	

SCALE: 1" = 80'
 DESIGNED BY: ZT/CS 6/29/23
 DRAWN BY: JG/DG 6/29/23
 CHECKED BY: ZT/CS 6/29/23
 SHEET NO. 3 OF 14
 PROJECT NO. ---
 PROPOSAL NO. ---

**LAKE WATERFORD
 DREDGING AND SHORELINE
 DESIGN
 PROPOSED CONDITIONS
 KEY SHEET**

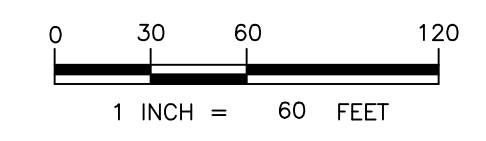
30% SCHEMATIC DESIGN

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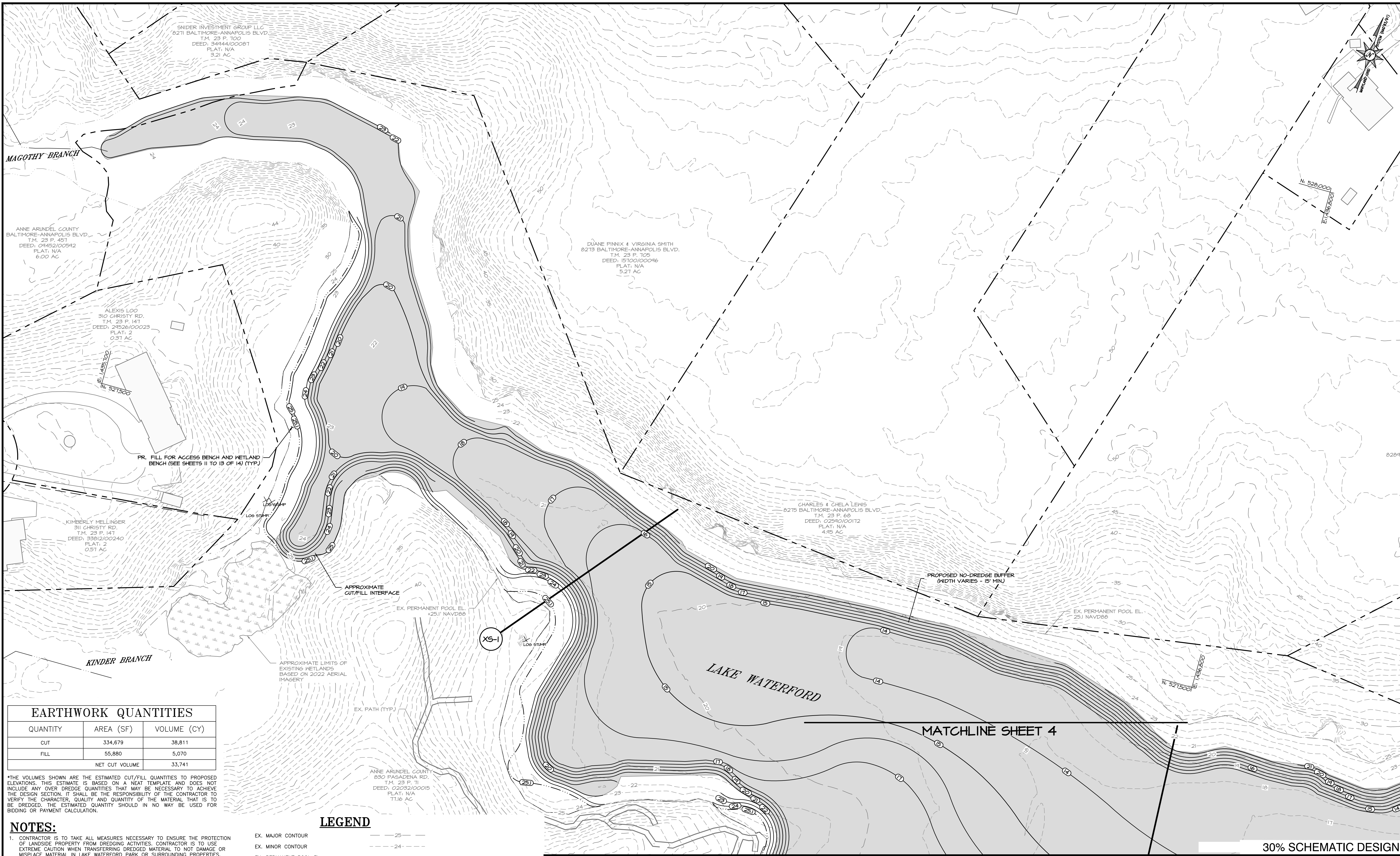
NOTES:

- LAKE WATERFORD HYDROGRAPHIC SURVEY WAS PERFORMED BY BAYLAND CONSULTANTS & DESIGNERS, INC. ON OCTOBER 19, 2020.
- HYDROGRAPHIC SURVEY PERFORMED WITH:
 - CEE ECHO-TM INTEGRATED HYDROGRAPHIC SURVEY SYSTEM UTILIZING A 200KHZ NARROW BEAM TRANSDUCER WITH AN ONBOARD TRIMBLE R-8 RTK GPS ROVER LINKED TO A TRIMBLE R-10 RTK GPS BASE STATION, SOUNDINGS AND SURVEY DATA RECORDED INTERNALLY AND TO A RUGGEDIZED LAPTOP PC UTILIZING HYPACK 2019 HYDROGRAPHIC SURVEY SOFTWARE.
 - NEARSHORE POLE SOUNDINGS USING A TRIMBLE S6 ROBOTIC TOTAL STATION AND POLE MOUNTED TRIMBLE MULT-TRACK 360 DEGREE PRISM RECORDING TO A TRIMBLE TSC3 DATALOGGER UTILIZING TRIMBLE ACCESS DATA COLLECTION SOFTWARE.
- INFORMATION DEPICTED REPRESENTS RESULTS OF THE SURVEY PERFORMED ON THE DATE INDICATED AND CAN ONLY BE CONSIDERED REPRESENTING CONDITIONS AT THAT TIME.



30% SCHEMATIC DESIGN

 <p>Bayland Consultants & Designers, Inc. "Integrating Engineering and Environment"</p>				<p>ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS</p>			
REVISED	DATE	BY	APPROVED	DATE	APPROVED		
			CHIEF ENGINEER		PROJECT MANAGER		
			APPROVED		APPROVED		
			ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY		
				SCALE: 1" = 60'			
				DESIGNED BY: ZT/CS 6/29/23			
				DRAWN BY: JG/DG 6/29/23			
				CHECKED BY: ZT/CS 6/29/23			
				SHEET NO. 4 OF 14			
				PROJECT NO. ---			
				PROPOSAL NO. ---			
<p>7455 New Ridge Road, Suite T Phone: (410) 694-9401 Hanover, Maryland 21076 Fax: (410) 694-9405 www.baylandinc.com</p>				<p>LAKE WATERFORD DREDGING AND SHORELINE DESIGN EXISTING LAKE ELEVATIONS</p>			
<p>BAYLAND JOB NO. 5_18305</p>							

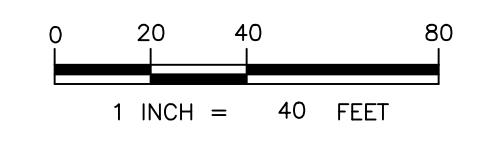


EARTHWORK QUANTITIES		
QUANTITY	AREA (SF)	VOLUME (CY)
CUT	334,679	38,811
FILL	55,880	5,070
NET CUT VOLUME		33,741

*THE VOLUMES SHOWN ARE THE ESTIMATED CUT/FILL QUANTITIES TO PROPOSED ELEVATIONS. THIS ESTIMATE IS BASED ON A NEAT TEMPLATE AND DOES NOT INCLUDE ANY OVER DREDGE QUANTITIES THAT MAY BE NECESSARY TO ACHIEVE THE DESIGN SECTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE CHARACTER, QUALITY AND QUANTITY OF THE MATERIAL THAT IS TO BE DREDGED. THE ESTIMATED QUANTITY SHOULD IN NO WAY BE USED FOR BIDDING OR PAYMENT CALCULATION.

- NOTES:**
- CONTRACTOR IS TO TAKE ALL MEASURES NECESSARY TO ENSURE THE PROTECTION OF LANDSIDE PROPERTY FROM DREDGING ACTIVITIES. CONTRACTOR IS TO USE EXTREME CAUTION WHEN TRANSFERRING DREDGED MATERIAL TO NOT DAMAGE OR MISPLACE MATERIAL IN LAKE WATERFORD PARK OR SURROUNDING PROPERTIES.
 - PROPOSED BOTTOM OF LAKE TO BE ROUGHLY GRADED TO SIMULATE NATURAL SURFACE. ELEVATIONS SHOWN ARE APPROXIMATE AND CAN VARY ±1.0'. CONTRACTOR SHALL NOT USE RAKES OR DRAG BEAMS TO FLATTEN THE FINISHED GRADE.

- LEGEND**
- EX. MAJOR CONTOUR
 - EX. MINOR CONTOUR
 - EX. PERMANENT POOL EL.
 - EX. WETLANDS
 - PR. DREDGING AREA
 - PR. MAJOR CONTOUR
 - PR. MINOR CONTOUR
 - APPROX. CUT/FILL INTERFACE
 - PR. PERMANENT POOL EL.



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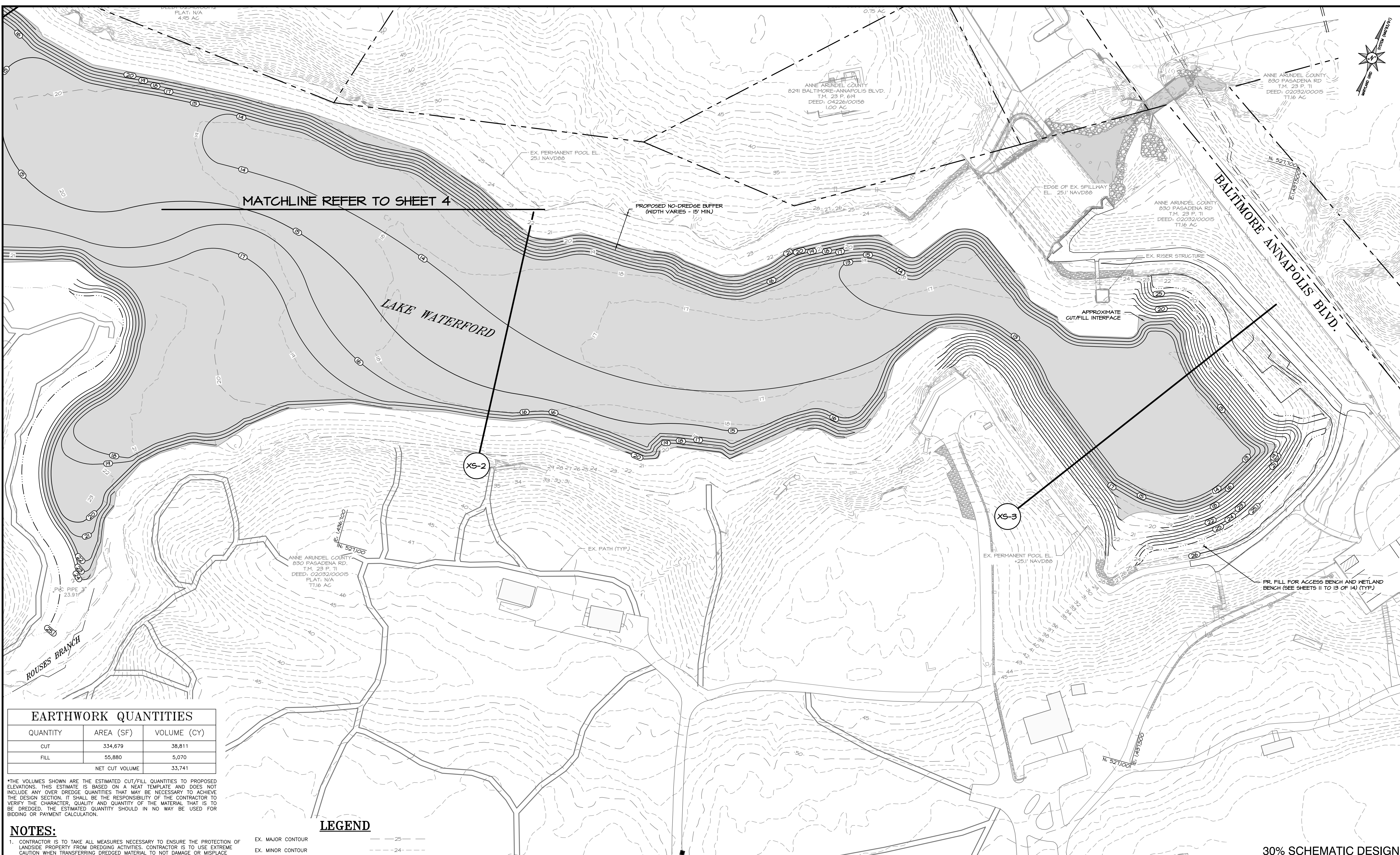
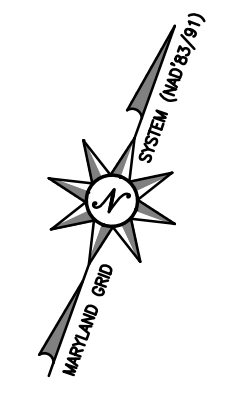
ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY	APPROVED	DATE	APPROVED	DATE
CHIEF ENGINEER		PROJECT MANAGER			
APPROVED		APPROVED			
ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY			

SCALE: 1" = 40'
 DESIGNED BY: ZT/CS 6/29/23
 DRAWN BY: JG/DG 6/29/23
 CHECKED BY: ZT/CS 6/29/23
 SHEET NO. 5 OF 14
 PROJECT NO. ---
 PROPOSAL NO. ---

30% SCHEMATIC DESIGN

**LAKE WATERFORD
 DREDGING AND SHORELINE
 DESIGN
 DREDGING SITE PLAN**



MATCHLINE REFER TO SHEET 4

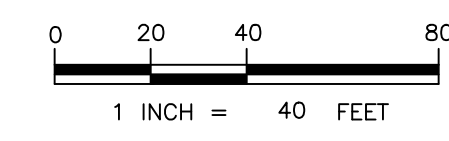
EARTHWORK QUANTITIES		
QUANTITY	AREA (SF)	VOLUME (CY)
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- NOTES:**
- CONTRACTOR IS TO TAKE ALL MEASURES NECESSARY TO ENSURE THE PROTECTION OF LANDSIDE PROPERTY FROM DREDGING ACTIVITIES. CONTRACTOR IS TO USE EXTREME CAUTION WHEN TRANSFERRING DREDGED MATERIAL TO NOT DAMAGE OR MISPLACE MATERIAL IN LAKE WATERFORD PARK OR SURROUNDING PROPERTIES.
 - PROPOSED BOTTOM OF LAKE TO BE ROUGHLY GRADED TO SIMULATE NATURAL SURFACE. ELEVATIONS SHOWN ARE APPROXIMATE AND CAN VARY ±1.0'. CONTRACTOR SHALL NOT USE RAKES OR DRAG BEAMS TO FLATTEN THE FINISHED GRADE.

LEGEND

- EX. MAJOR CONTOUR 25
- EX. MINOR CONTOUR 24
- EX. PERMANENT POOL EL.
- EX. WETLANDS
- PR. DREDGING AREA
- PR. MAJOR CONTOUR 25
- PR. MINOR CONTOUR 24
- APPROX. CUT/FILL INTERFACE
- PR. PERMANENT POOL EL. 25



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BAYLAND JOB NO. 5_18305

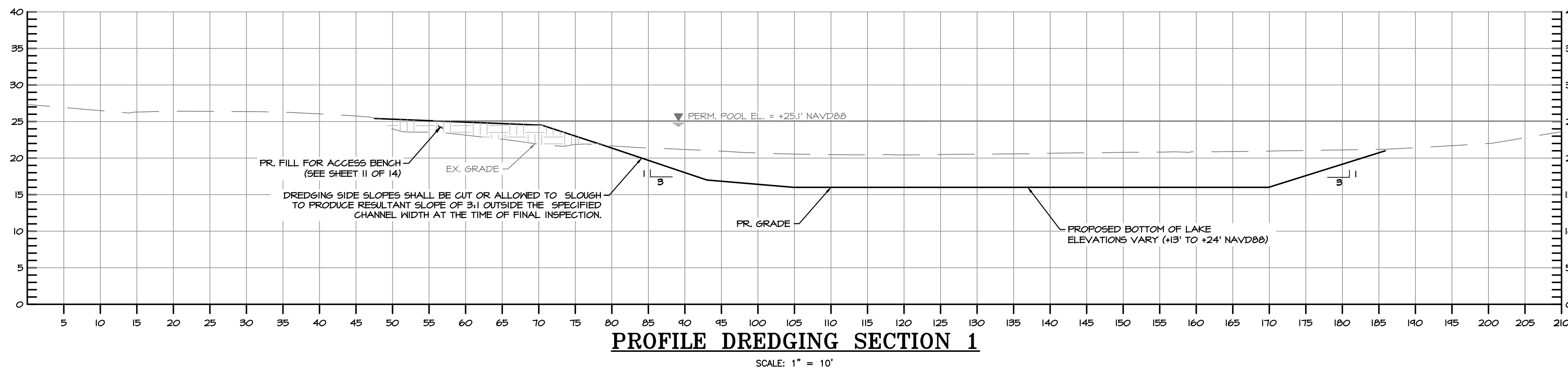
ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

REVISED DATE	BY	APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 40'
						DESIGNED BY: ZT/CS 6/29/23
						DRAWN BY: JG/DG 6/29/23
						CHECKED BY: ZT/CS 6/29/23
						SHEET NO. 6 OF 14
						PROJECT NO. ---
						PROPOSAL NO. ---

30% SCHEMATIC DESIGN

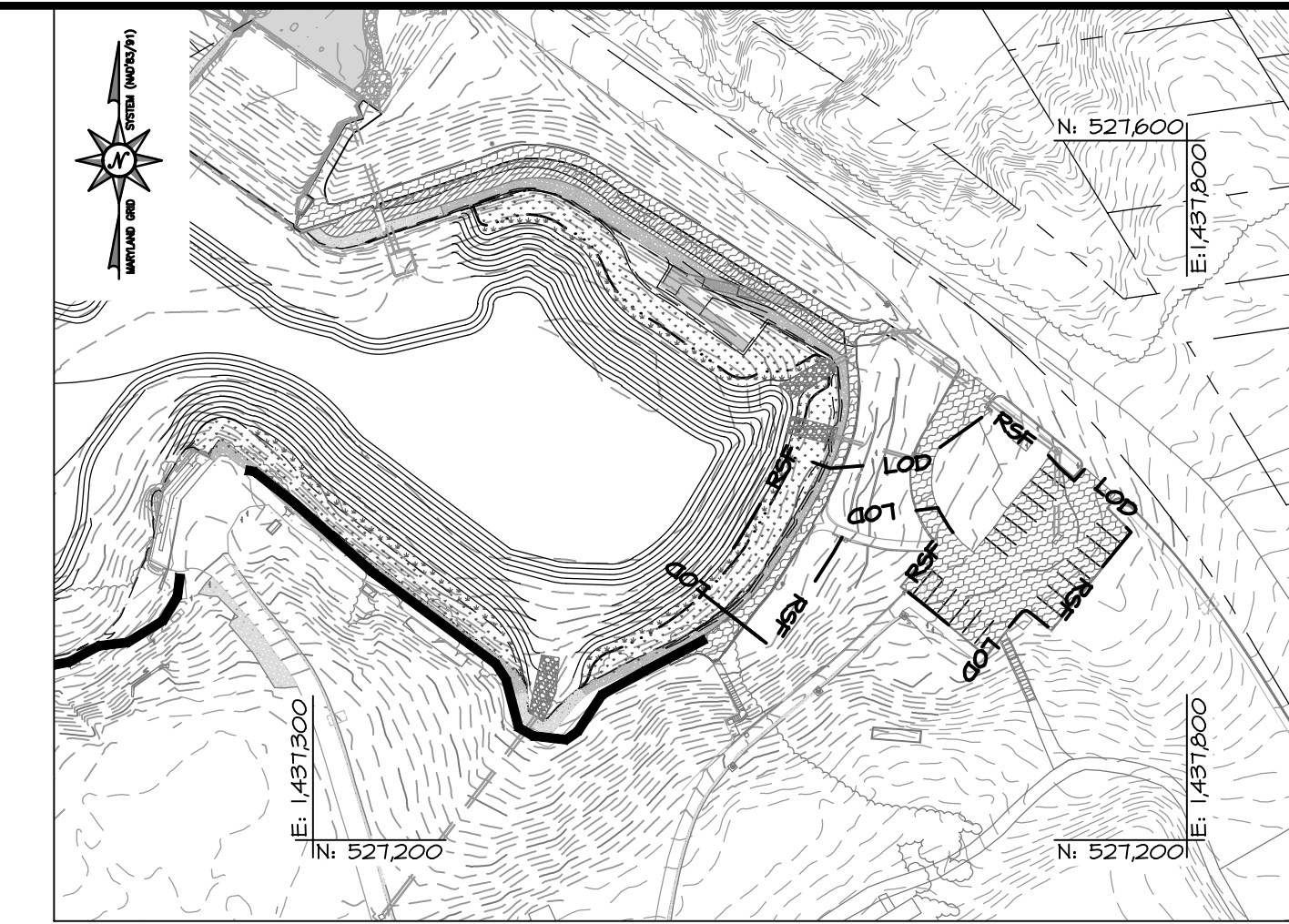
**LAKE WATERFORD
DREDGING AND SHORELINE
DESIGN
DREDGING SITE PLAN**

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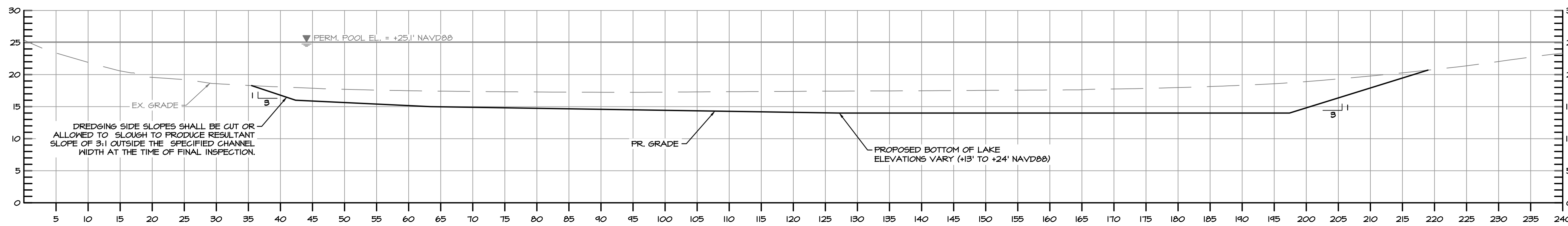
PROFILE DREDGING SECTION 1

SCALE: 1" = 10'



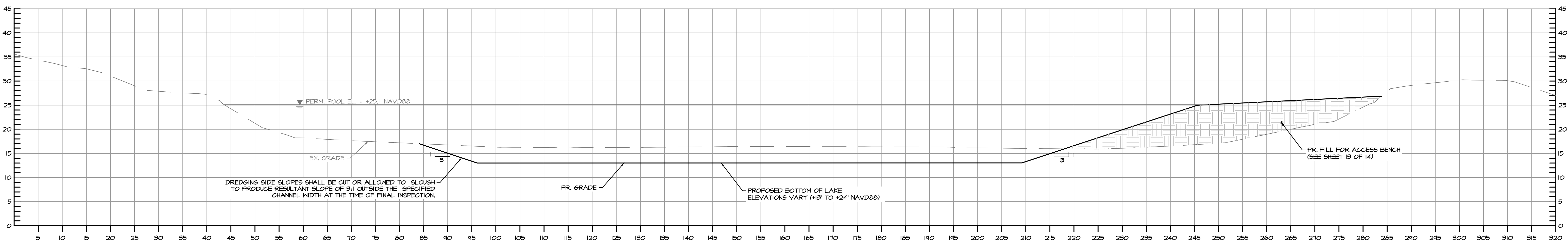
TRANSFER SITE LOCATION MAP

SCALE: 1" = 100'



PROFILE DREDGING SECTION 2

SCALE: 1" = 10'



PROFILE DREDGING SECTION 3

SCALE: 1" = 10'

NOTES:

1. PROPOSED BOTTOM OF LAKE TO BE ROUGHLY GRADED TO SIMULATE NATURAL SURFACE. ELEVATIONS SHOWN ARE APPROXIMATE AND CAN VARY ±1.0'. CONTRACTOR SHALL NOT USE RAKES OR DRAG BEAMS TO FLATTEN THE FINISHED GRADE.

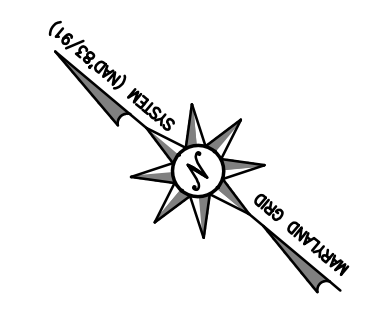
30% SCHEMATIC DESIGN

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 BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS			
REVISED DATE	BY	APPROVED DATE	APPROVED DATE
		CHIEF ENGINEER	PROJECT MANAGER
		APPROVED DATE	APPROVED DATE
		ASSISTANT CHIEF ENGINEER	CHIEF, RIGHT OF WAY
SCALE: 1" = 10'		DESIGNED BY: ZT/CS 6/29/23	
		DRAWN BY: JG/DG 6/29/23	
		CHECKED BY: ZT/CS 6/29/23	
		SHEET NO. 7 OF 14	
		PROJECT NO. ---	
		PROPOSAL NO. ---	

**LAKE WATERFORD
 DREDGING AND SHORELINE
 DESIGN
 DREDGING SECTIONS &
 DETAILS**

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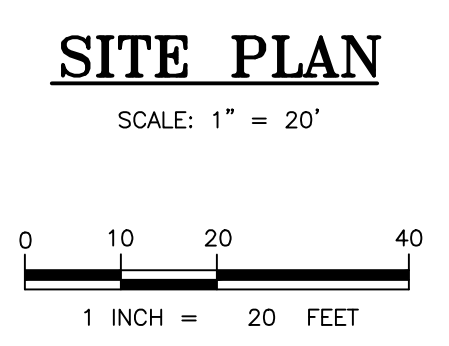


MATCHLINE SHEET 9

ALEXIS LOO
310 CHRISTY RD.
T.M. 23 P. 147
DEED: 24826/00023
PLAT. 2
0.31 AC

KIMBERLY MELLINGER
311 CHRISTY RD.
T.M. 23 P. 147
DEED: 33812/00240
PLAT. 2
0.51 AC

30% SCHEMATIC DESIGN



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BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY				DEPARTMENT OF PUBLIC WORKS			
REVISED	DATE	BY	APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 20'
							DESIGNED BY: ZT/CS 6/29/23
							DRAWN BY: JG/DG 6/29/23
							CHECKED BY: ZT/CS 6/29/23
							SHEET NO. 8 OF 14
							PROJECT NO. ---
							PROPOSAL NO. ---
			CHIEF ENGINEER		PROJECT MANAGER		LAKE WATERFORD DREDGING AND SHORELINE DESIGN WETLAND BENCH & FISHING ACCESS EXISTING CONDITIONS
			APPROVED		APPROVED		
			ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY		

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MATCHLINE SHEET 8

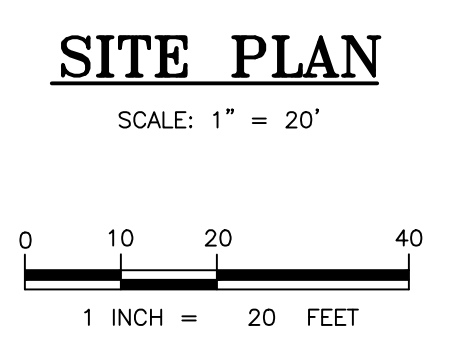
ANNE ARUNDEL COUNTY
 850 PASADENA RD,
 T.M. 28-P. 71
 DEED: 02032/00015
 PLAT: N/A
 111.6 AC

AL 521280
 E 1368300

E 1368300
 W 521280

E 1368300
 W 521280

30% SCHEMATIC DESIGN

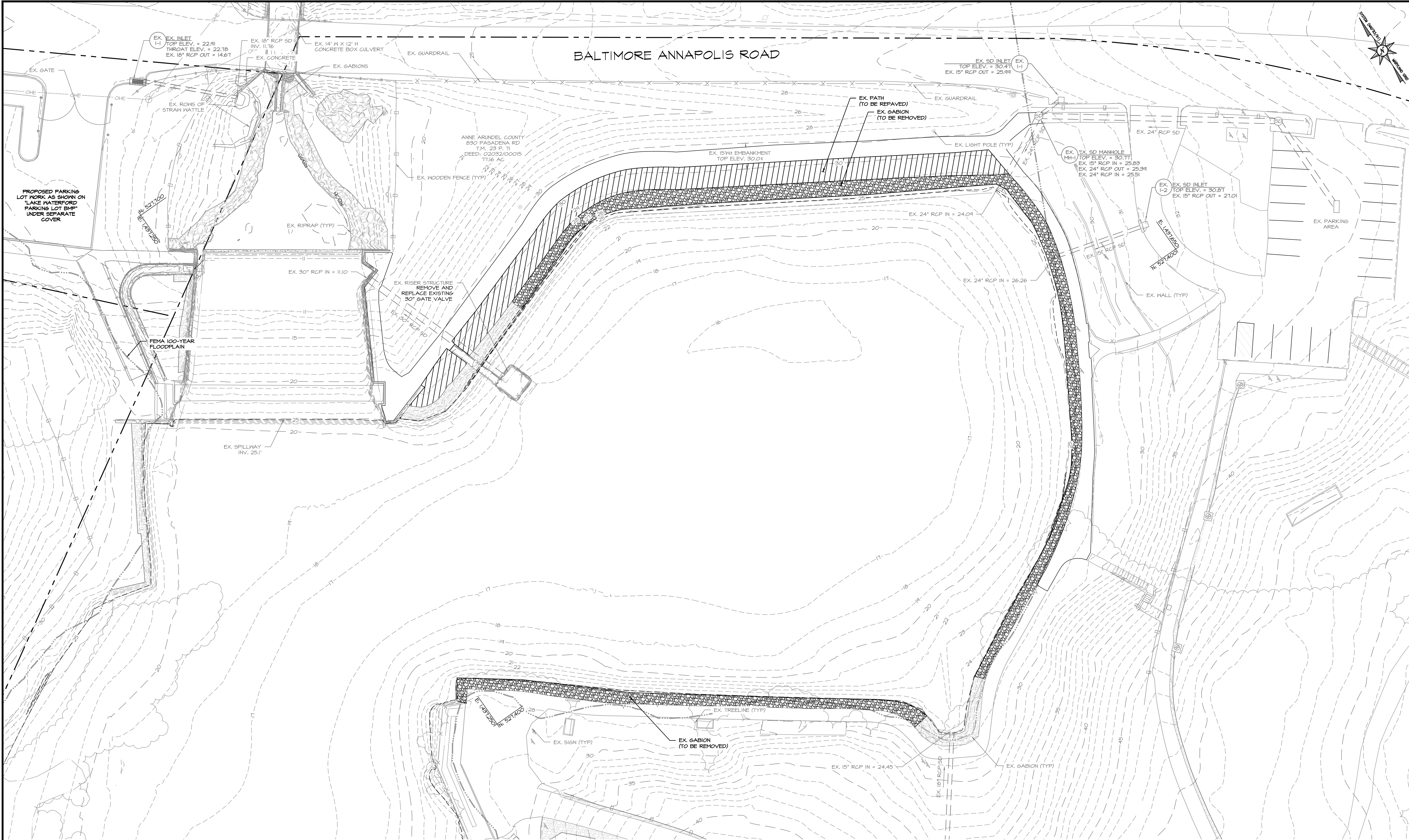
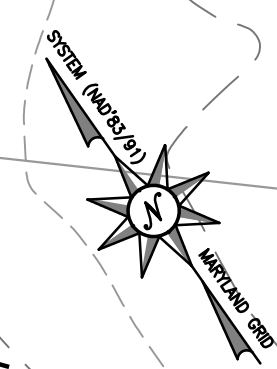


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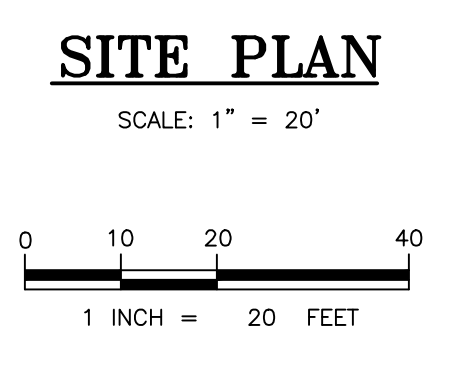
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS											
REVISED	DATE	BY	APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 20'				
			CHIEF ENGINEER		PROJECT MANAGER		DESIGNED BY: ZT/CS 6/29/23	LAKE WATERFORD DREDGING AND SHORELINE DESIGN WETLAND BENCH & FISHING ACCESS EXISTING CONDITIONS			
			APPROVED		APPROVED		DRAWN BY: JG/DG 6/29/23				
							CHECKED BY: ZT/CS 6/29/23				
							SHEET NO. 9 OF 14				
			ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY		PROJECT NO. ---				
							PROPOSAL NO. ---				

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BALTIMORE ANNAPOLIS ROAD



30% SCHEMATIC DESIGN

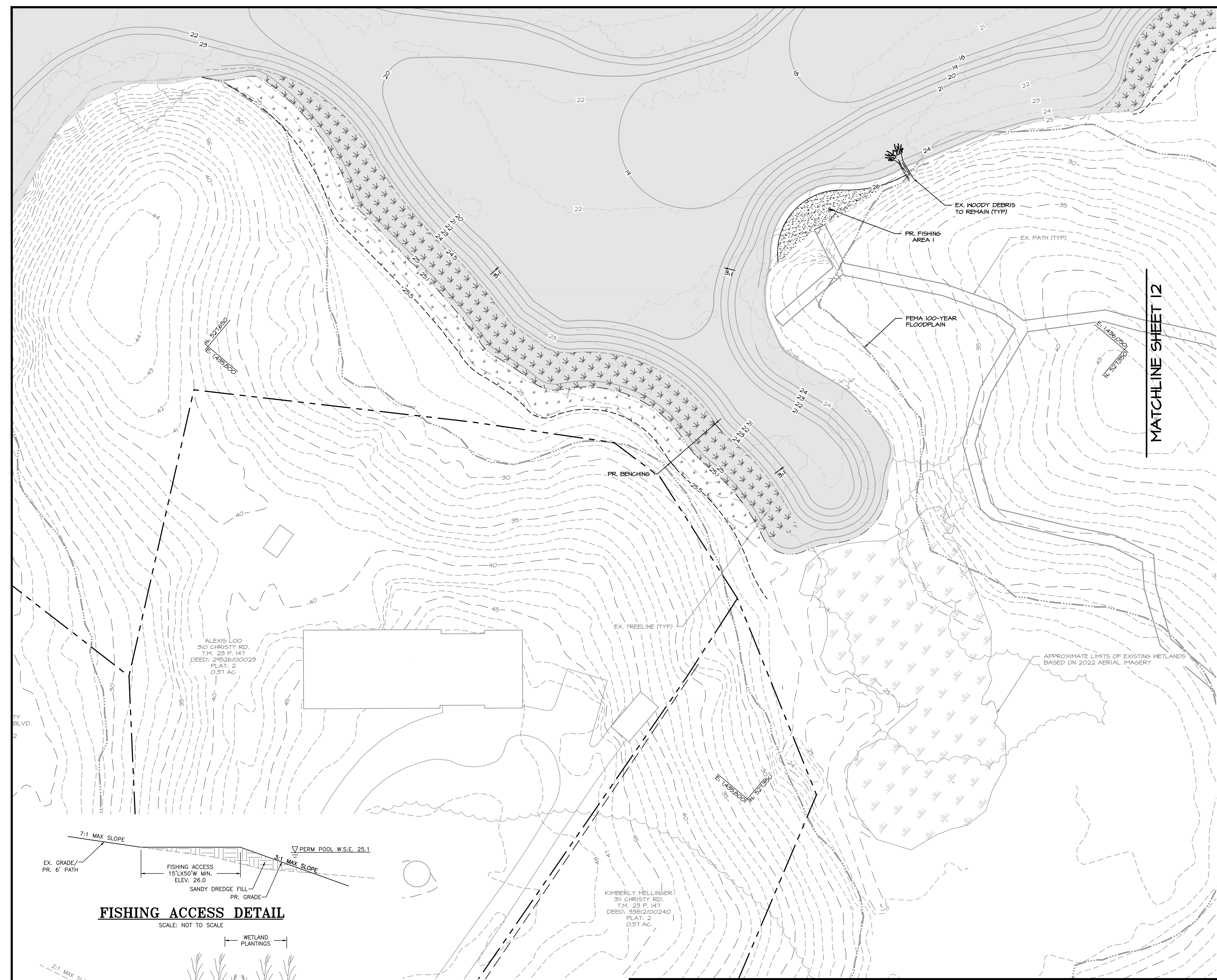
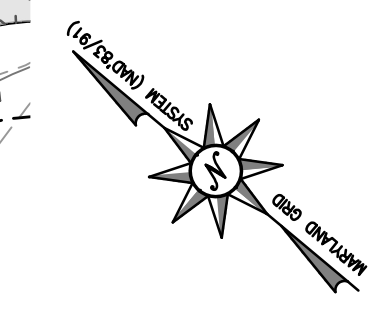


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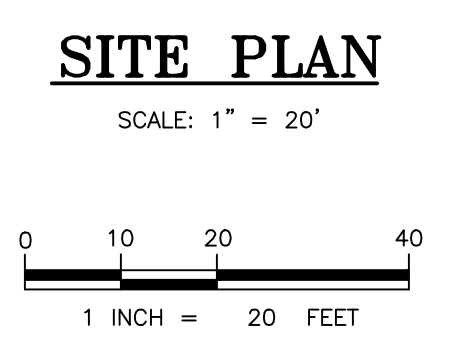
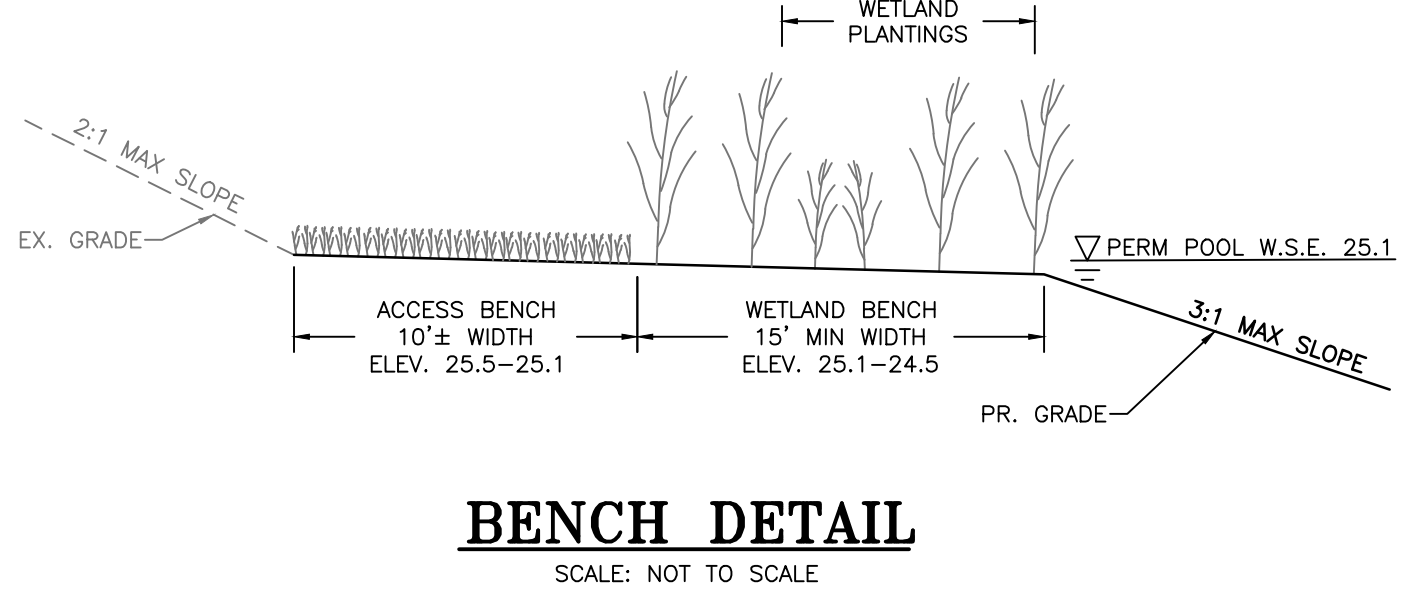
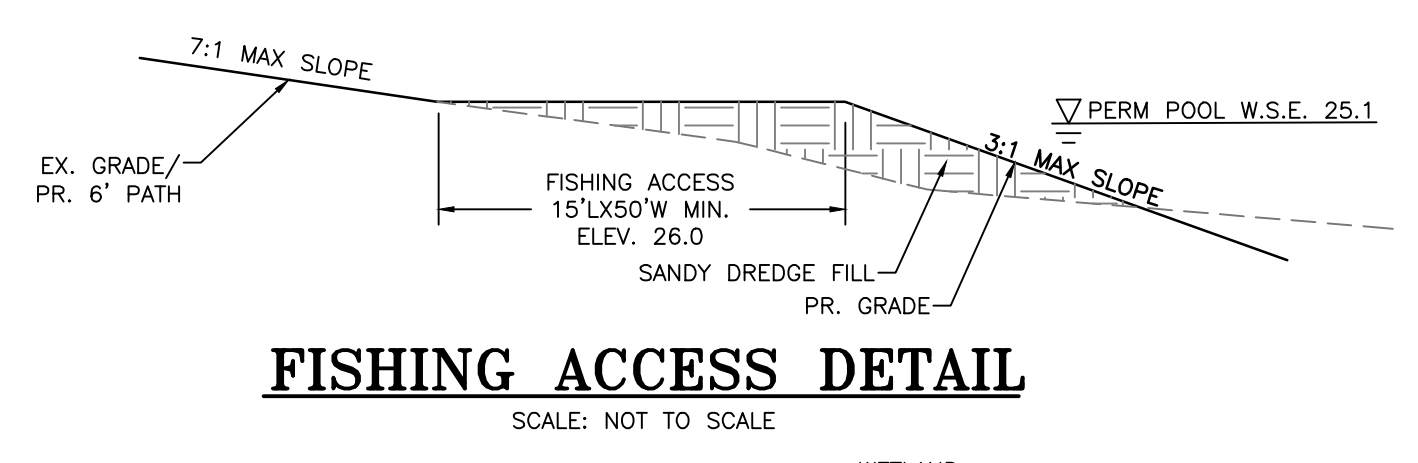
7455 New Ridge Road, Suite T Phone: (410) 694-9401
Hanover, Maryland 21076 Fax: (410) 694-9405
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BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY				DEPARTMENT OF PUBLIC WORKS			
REVISD	BY	APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 20'	LAKE WATERFORD DREDGING AND SHORELINE DESIGN EMBANKMENT EXISTING CONDITIONS
DATE						DESIGNED BY: ZT/CS 6/29/23	
		CHIEF ENGINEER		PROJECT MANAGER		DRAWN BY: JG/DG 6/29/23	
		APPROVED	DATE	APPROVED	DATE	CHECKED BY: ZT/CS 6/29/23	
		ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY		SHEET NO. 10 OF 14	
						PROJECT NO. ---	
						PROPOSAL NO. ---	



MATCHLINE SHEET 12



30% SCHEMATIC DESIGN

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BAYLAND JOB NO. 5_18305

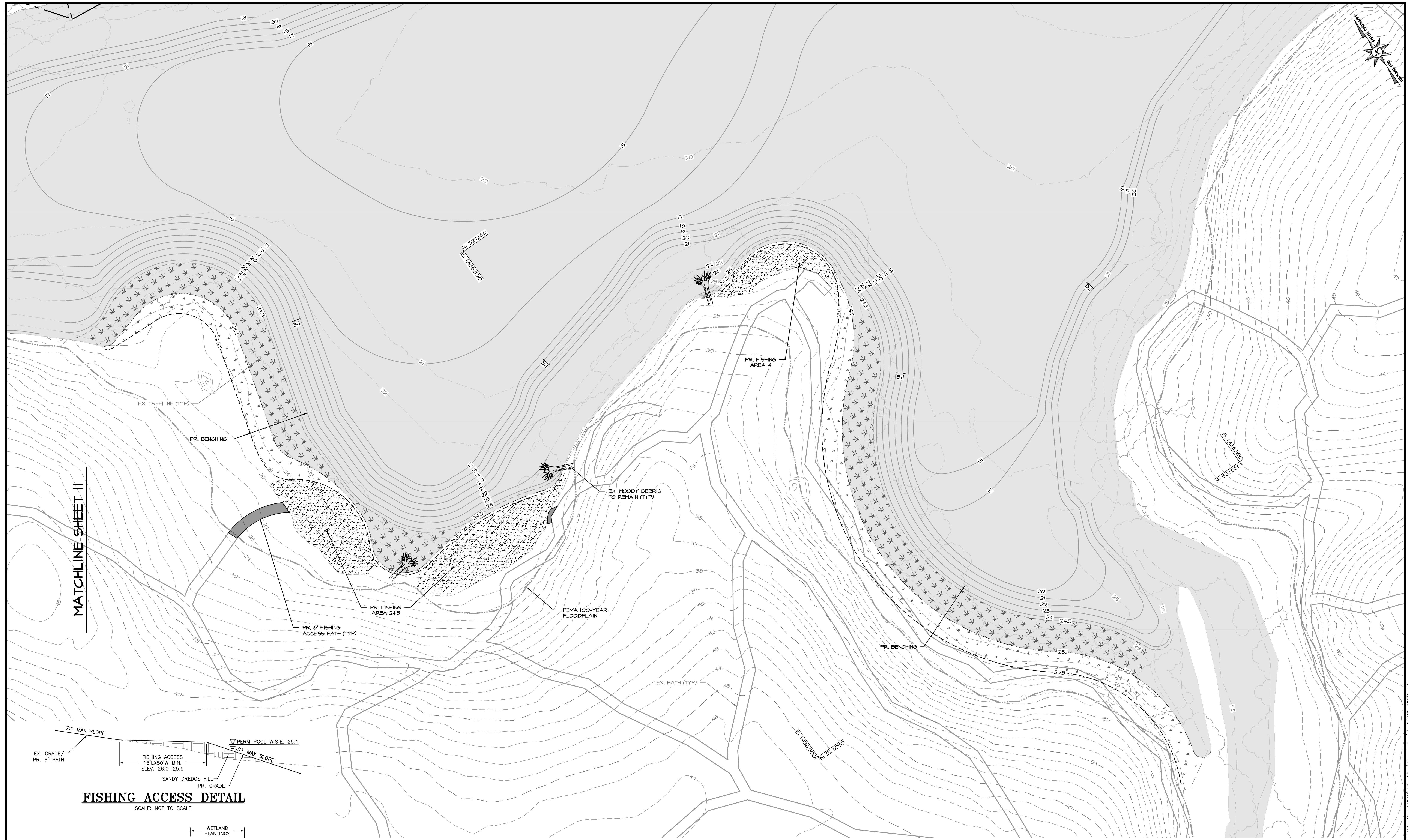
REVISED		APPROVED		APPROVED		APPROVED	
DATE	BY	DATE	BY	DATE	BY	DATE	BY

SCALE:	1" = 20'
DESIGNED BY:	ZT/CS 6/29/23
DRAWN BY:	JG/DG 6/29/23
CHECKED BY:	ZT/CS 6/29/23
SHEET NO.:	11 OF 14
PROJECT NO.:	---
PROPOSAL NO.:	---

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

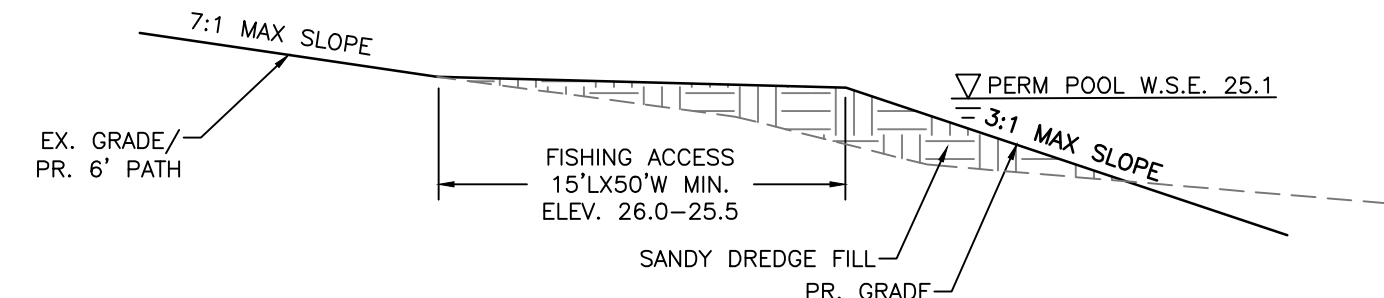
LAKE WATERFORD
DREDGING AND SHORELINE
DESIGN
WETLAND BENCH & FISHING
ACCESS SITE PLAN

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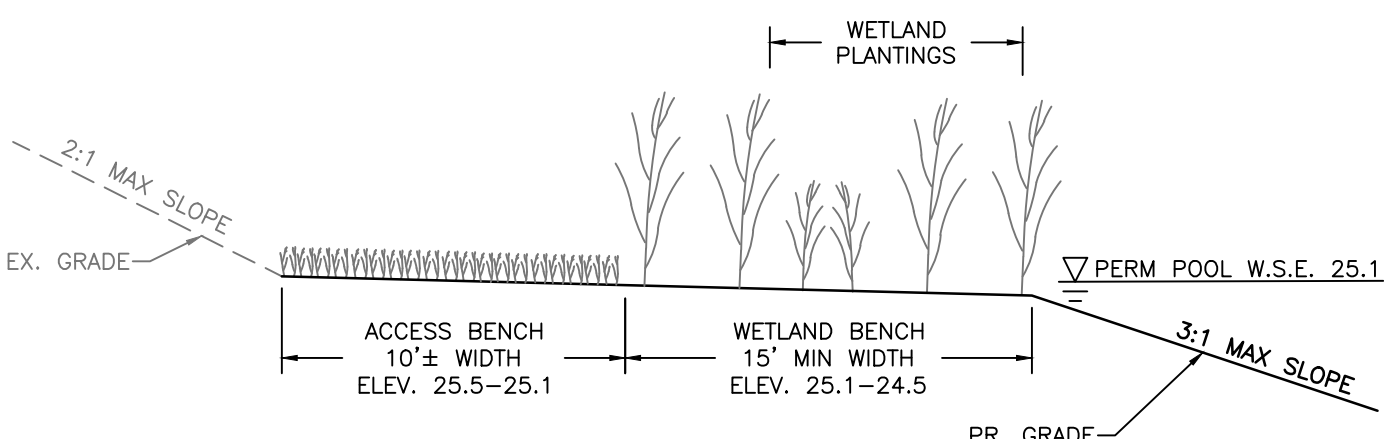
30% SCHEMATIC DESIGN

FISHING ACCESS DETAIL



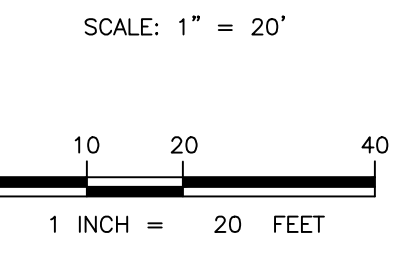
SCALE: NOT TO SCALE

BENCH DETAIL



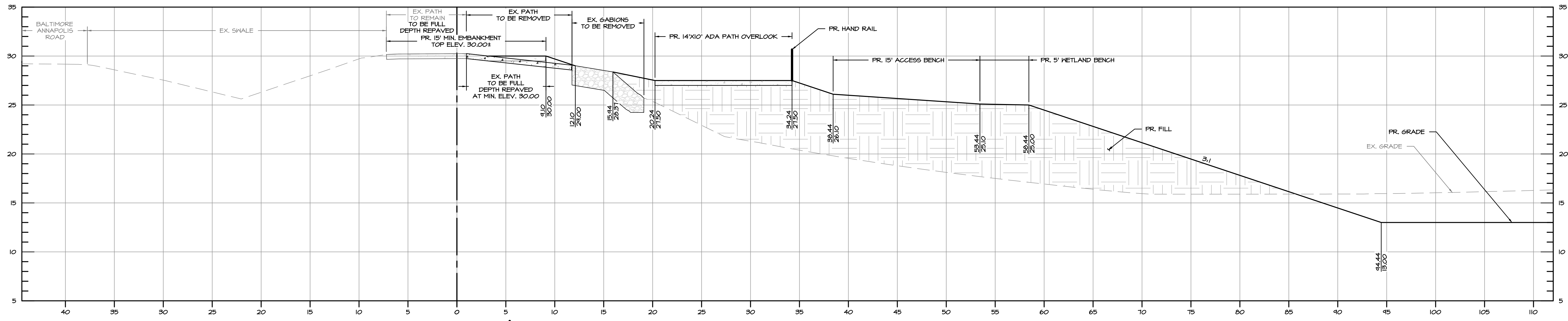
SCALE: NOT TO SCALE

SITE PLAN

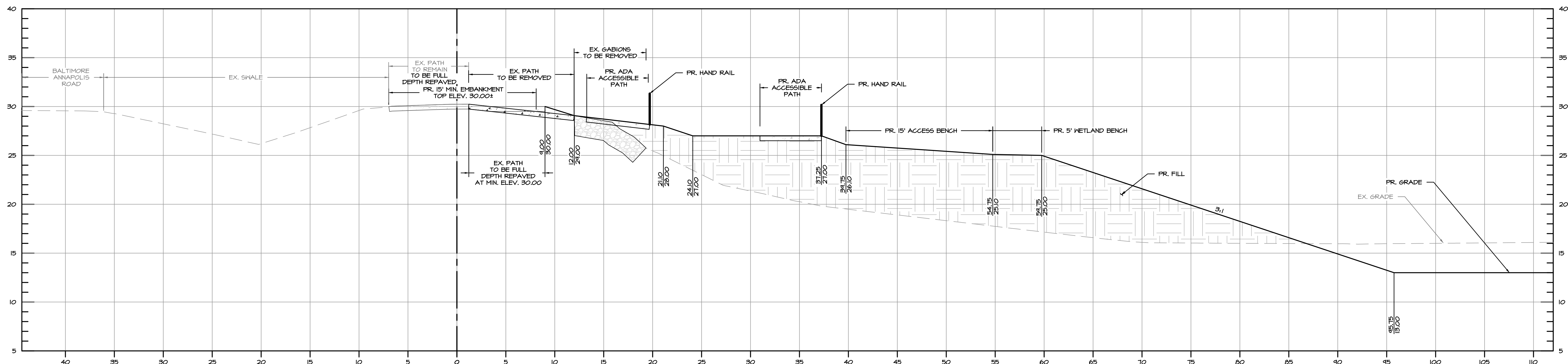


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 7455 New Ridge Road, Suite T Phone: (410) 694-9401
 Hanover, Maryland 21076 Fax: (410) 694-9405
 www.baylandinc.com
 BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY				DEPARTMENT OF PUBLIC WORKS			
REVISED	APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 20'	LAKE WATERFORD	
DATE	BY		DATE		DESIGNED BY: ZT/CS 6/29/23	DREDGING AND SHORELINE	
					DRAWN BY: JG/DG 6/29/23	DESIGN	
	CHIEF ENGINEER		PROJECT MANAGER		CHECKED BY: ZT/CS 6/29/23	WETLAND BENCH & FISHING	
	APPROVED	DATE	APPROVED	DATE	SHEET NO. 12 OF 14	ACCESS SITE PLAN	
					PROJECT NO. ---		
	ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY		PROPOSAL NO. ---		

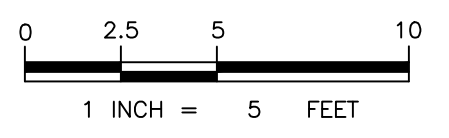


SECTION A-A'
SCALE: 1" = 5'



SECTION B-B'
SCALE: 1" = 5'

30% SCHEMATIC DESIGN



Bayland
Consultants & Designers, Inc.
"Integrating Engineering and Environment"

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BAYLAND JOB NO. 5_18305

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS			
REVISED DATE	BY	APPROVED DATE	APPROVED DATE
CHIEF ENGINEER		PROJECT MANAGER	
APPROVED DATE		APPROVED DATE	
ASSISTANT CHIEF ENGINEER		CHIEF, RIGHT OF WAY	
SCALE: 1" = 5'		DESIGNED BY: ZT/CS 6/29/23	
		DRAWN BY: JG/DG 6/29/23	
		CHECKED BY: ZT/CS 6/29/23	
		SHEET NO. 14 OF 14	
		PROJECT NO. ---	
		PROPOSAL NO. ---	

**LAKE WATERFORD
DREDGING AND SHORELINE
DESIGN
EMBANKMENT SECTIONS**

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**LAKE WATERFORD
30% SCHEMATIC DESIGN REPORT
APPENDIX**

**Appendix B – Schematic Design
Cost Estimate**

LAKE WATERFORD DREDGING AND SHORELINE DESIGN
30% SCHEMATIC DESIGN
PROBABLE COST ESTIMATE WORKSHEET

Project	Lake Waterford Dredging & Shoreline Design	Project # -----	Contract # -----
Developer	Anne Arundel County Dept. Public Works	Engineer	BayLand Consultants & Designers, Inc
Address	2662 Riva Road, 3rd Floor Annapolis, MD 21401	Address	7455 New Ridge, Suite T Hanover, Maryland 21076
Phone	(410) 222-7575	Phone	(410) 694-9401
Fax	(410) 222-7589	Fax	(410) 694-9405

BASE BID

Item	Description	Estimated Quantity	Unit	Unit Price	Total Price
Project Initiation					
1	Mobilization/Demobilization	1	LS	\$300,000.00	\$300,000.00
2	Tree Removal	5	EA	\$1,750.00	\$8,750.00
3	Clearing and Grubbing	1.7	AC	\$8,000.00	\$13,600.00
4	Temporary Construction Access Road	1	LS	\$20,000.00	\$20,000.00
Erosion and Sediment Control					
5	Erosion and Sediment Control	1	LS	\$50,000.00	\$50,000.00
Embankment & Landscaping					
6	Existing Gabion to be Removed	495	SY	\$60.00	\$29,700.00
7	Furnish and Install Class I Riprap	110	SY	\$130.00	\$14,300.00
8	Existing Path to be Removed	400	SY	\$20.00	\$8,000.00
9	Existing Path to be Full Depth Repaved	705	SY	\$40.00	\$28,200.00
10	Proposed Path	131	SY	\$60.00	\$7,860.00
11	Proposed Hand Rail	150	LF	\$30.00	\$4,500.00
12	Remove and Disposal of Existing 30" Gate Valve	1	LS	\$2,500.00	\$2,500.00
13	Furnish and Install Proposed 30" Gate Valve	1	LS	\$15,000.00	\$15,000.00
14	Wetland Plantings	0.34	AC	\$60,000.00	\$20,400.00
15	Temporary Seed and Stabilization Matting	1,380	SY	\$3.00	\$4,140.00
16	Permanent Seed and Stabilization Matting	2,760	SY	\$5.00	\$13,800.00
Dredging					
17	Mechanical Dredging of Lake Waterford, Transport, and On-site Beneficial Placement of Material at Lake Waterford Park	5,070	CY	\$60.00	\$304,200.00
18	Mechanical Dredging of Lake Waterford, Transport and Off-site Placement at South County DMP Site	38,811	CY	\$80.00	\$3,104,880.00
19	Mechanical Dredging of Lake Waterford, Transport, and Off-site Placement of Material at South County DMP Site - 4 Year Sedimentation Allowance	8,800	CY	\$80.00	\$704,000.00

TOTAL BASE BID:

\$4,653,830.00

CONTINGENT BID

Item	Description	Estimated Quantity	Unit	Unit Price	Total Price
1	Stone (#2) for Gravel Access Road Maintenance	100	CY	\$70.00	\$7,000.00
2	Imported Suitable Fill for Embankment	2,020	CY	\$120.00	\$242,400.00
3	Full Depth Repaving of Parking Lot Used as Staging Area	1,150	SY	\$90.00	\$103,500.00
4	Seed, Mulch, Fertilizer and Lime for Permanent Stabilization	1,000	SY	\$1.50	\$1,500.00
5	Additional Dredging, Transport, and Placement of Dredged Material at Lake Waterford Park	500	CY	\$80.00	\$40,000.00
6	Additional Dredging, Transport, and Placement of Dredged Material Off-site	2,200	CY	\$80.00	\$176,000.00

TOTAL CONTINGENT BID:

\$570,400.00

TOTAL BASE BID AND CONTINGENT BID:

\$5,224,230.00

TOTAL BASE BID AND CONTINGENT BID:

\$5,224,230.00

Estimate Prepared by:		6/29/2023	
Joshua Gozum			
Print Name	Signature	Date	