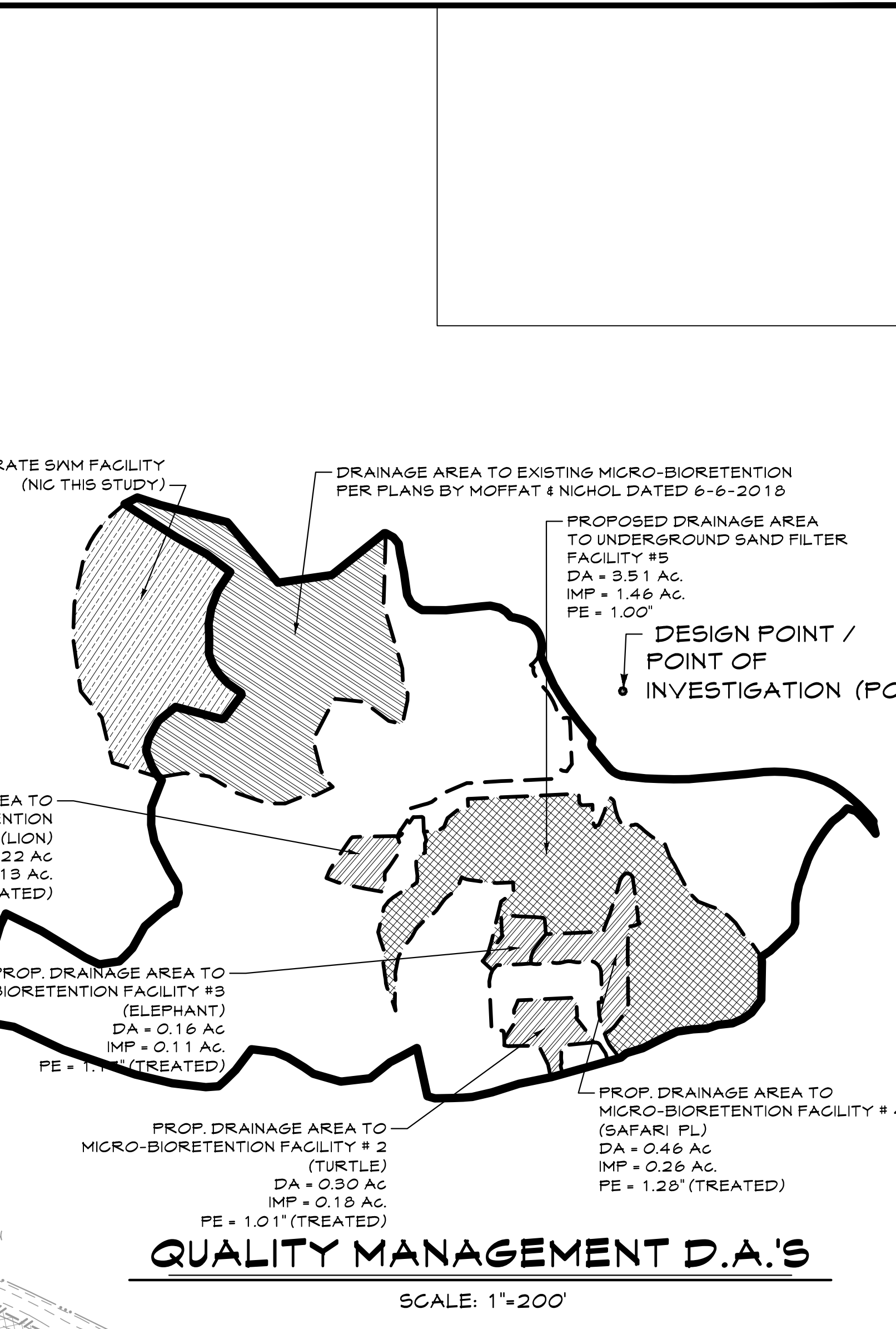
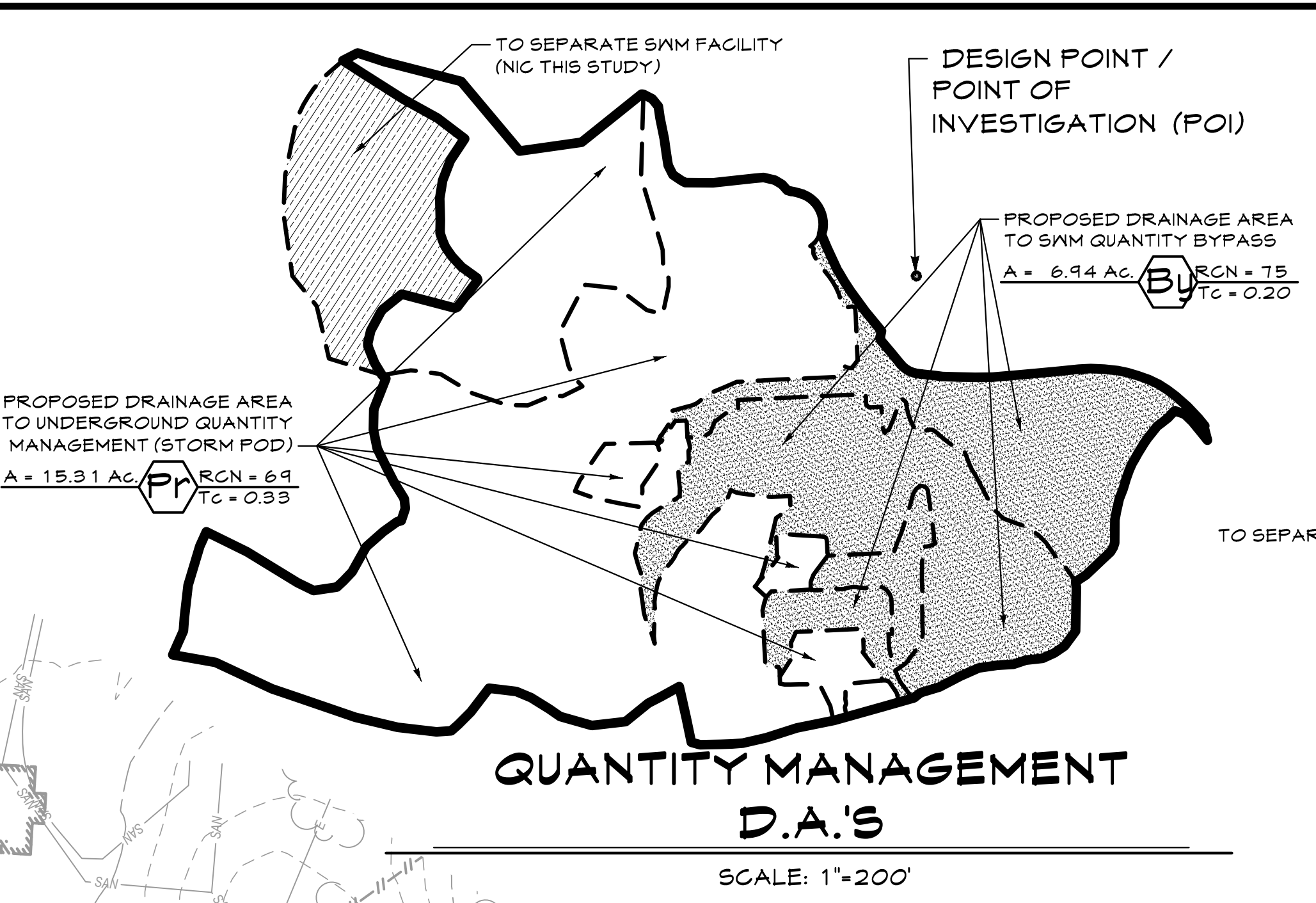


Stormwater Management Summary Table			
Requirement	Volume Required (cu.ft.)	Volume Provided (cu.ft.)	Notes
Environmental Site Design (ESD)	1,716 (First 1") 3,261 (Total)	25.5	4 Micro-Bioretenation Facilities (New Development)
Water Quality Volume (WQV)	6,463 Total 5,771 (1" for redev.) +686 (remainder of ESD)	6,164	Underground Sand Filter
Recharge Volume (Rv)	712	1,054	In stone bed below Micro-Bioretenation and Quantity Management Facilities
Channel Protection Volume (Cp)	343 (Remainder from ESD)	343	In underground quantity management facility
Overbank Flood Protection Volume (Qp)	Existing Runoff (cfs)	Proposed Runoff (cfs)	
	FO 1	FO 1	
Extreme Flood Volume (Qe)	5030	4680	In underground quantity management facility
	5940	5110	



STORMWATER MANAGEMENT GENERAL NOTES

- THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL EFFORTS NECESSARY TO DELIVER A CITY-APPROVED STORMWATER MANAGEMENT SYSTEM WITHIN 60 DAYS OF APPROVAL OF FINAL SITE STABILIZATION.
- THE GENERAL CONTRACTOR SHALL KEEP ALL AS-BUILT INFORMATION CURRENT ON A RECORD SET OF DRAWINGS AS THE STORMWATER MANAGEMENT SYSTEM IS BEING CONSTRUCTED. THE GENERAL CONTRACTOR SHALL HIRE THE CIVIL ENGINEER OF RECORD TO PRODUCE A SET OF CERTIFIED AS-BUILT DRAWINGS, ONCE PREPARED, THE GENERAL CONTRACTOR SHALL OBTAIN CITY APPROVAL OF THE DOCUMENTS.
- FINAL CITY APPROVAL AND CLOSE OUT OF THE GRADING PERMIT IS REQUIRED BEFORE CONTRACT COMPLETION IS ACHIEVED.
- THE SITE IS NOT IN THE 500 YEAR FLOOD PLAIN, PER FEMA FIRM MAP.

DATA SOURCES

- Existing topography and structures shown hereon outside of the limits of field run topography are from the Baltimore City Office of Technology - GIS Lab.
- Existing topography from field run survey by Century Engineering Inc. dated Aug-Sept. 2020
- Coordinates & elevations are referred to the Baltimore City Control System and are tied to the following control stations:
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35500 N 240.140 E -9800.600 Elev. 324.640
- Public utilities shown hereon are from public drawings, field location and other sources.

DATE	BY	REVISIONS

CENTURY ENGINEERING
A Kleinfelder Company
10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

PROPOSED CONDITIONS & STORMWATER MANAGEMENT DRAINAGE AREA MAP
THE MARYLAND ZOO IN BALTIMORE
PARKING LOT REHABILITATION
BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

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.: 32574
EXPIRATION DATE: 1/16/2024

OWNER:
Mayor & City Council of Baltimore
One Calvert Plaza
201 E Baltimore Street
Baltimore MD 21202
(410)-675-3651

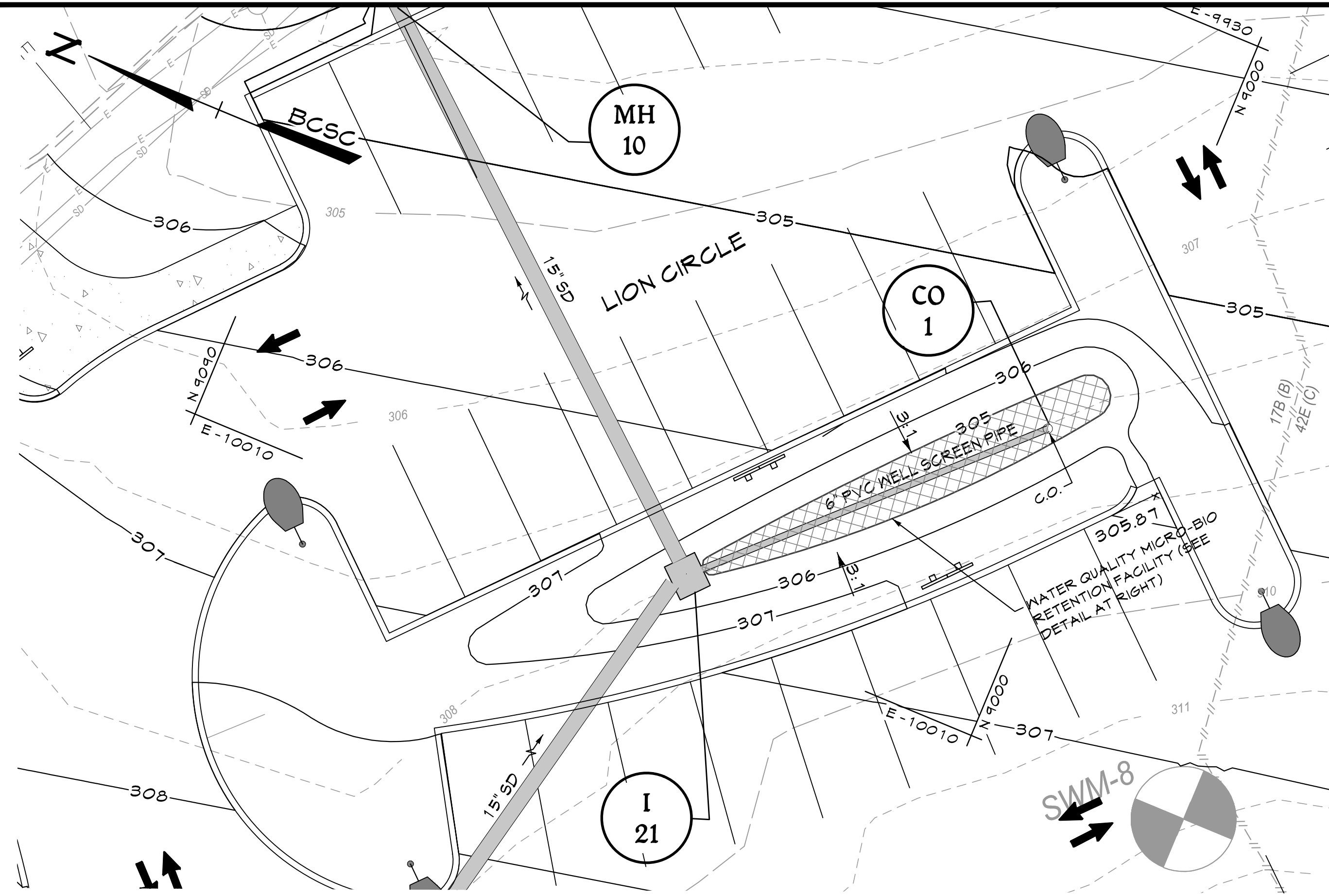
DEVELOPER:
The Maryland Zoo in Baltimore
1876 Mansion House Drive
Baltimore MD 21211
C/O Karl Krantz
(410)-346-7102

DRAWN BY: AA
DESIGNED BY: DRS/KRB
SCALE: 1"=50'
PROJECT No.: 201069.00

REVIEW BY: AJD
REVIEW DATE: 7/15/2022
DRAWING: C-061
ESD # 7969

T:\2020\Facilities\20106400 MD Zoo Parking CIVIL\CADD\Drawings\Construction\20106400 (C-06) Proposed SWM Drainage Area Map.dwg Jul 16, 2022 1:26pm dhananani

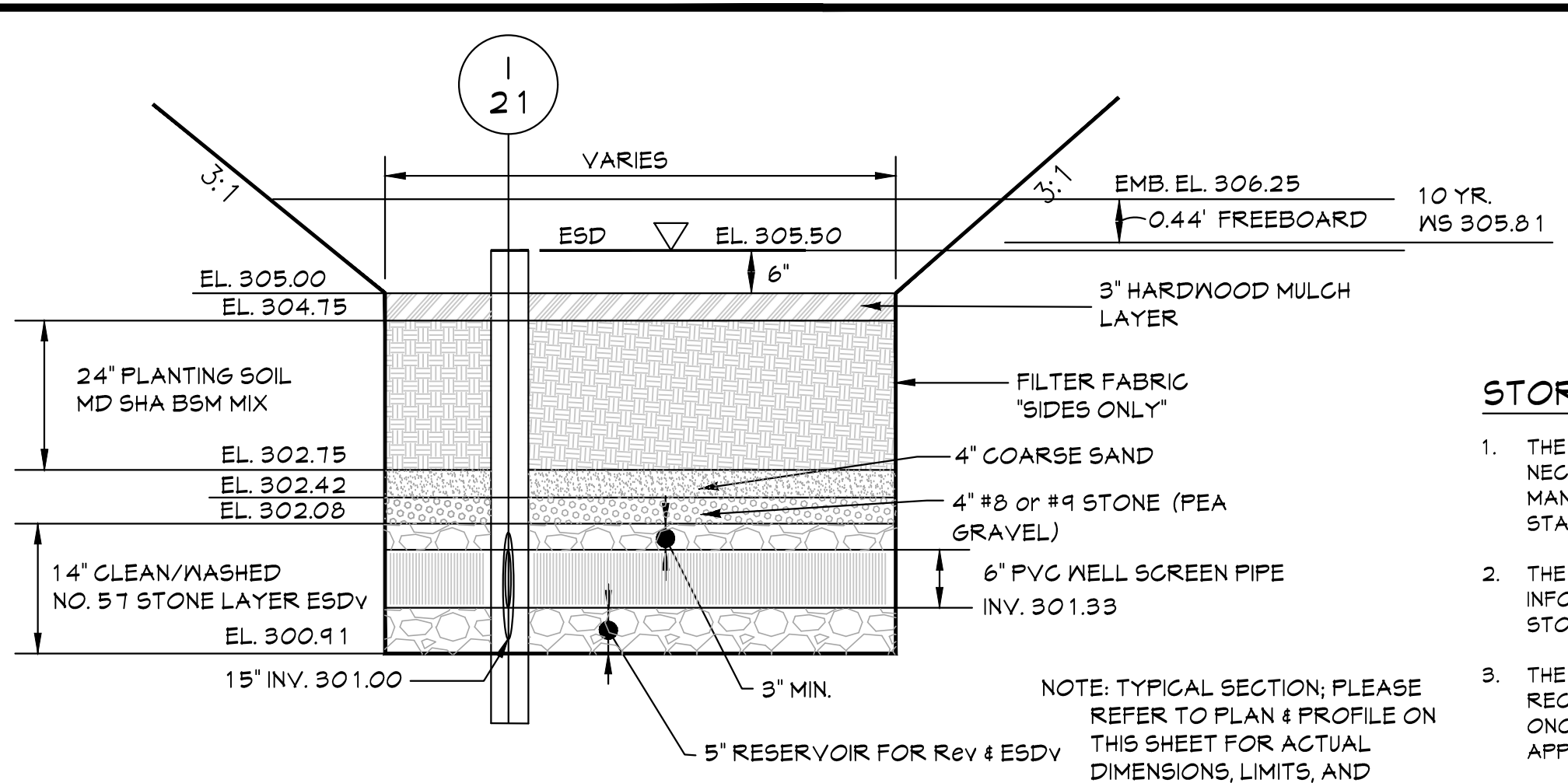
T:\2020\Facilities\20106400 MD Zoo Parking\Civil\CADD\Drawings\Construction\20106400 (C-062) SWM Plan and Profile 1.dwg Jul 18, 2022 1:26pm dhananan



ESD FACILITY #1
LION CIRCLE PLAN

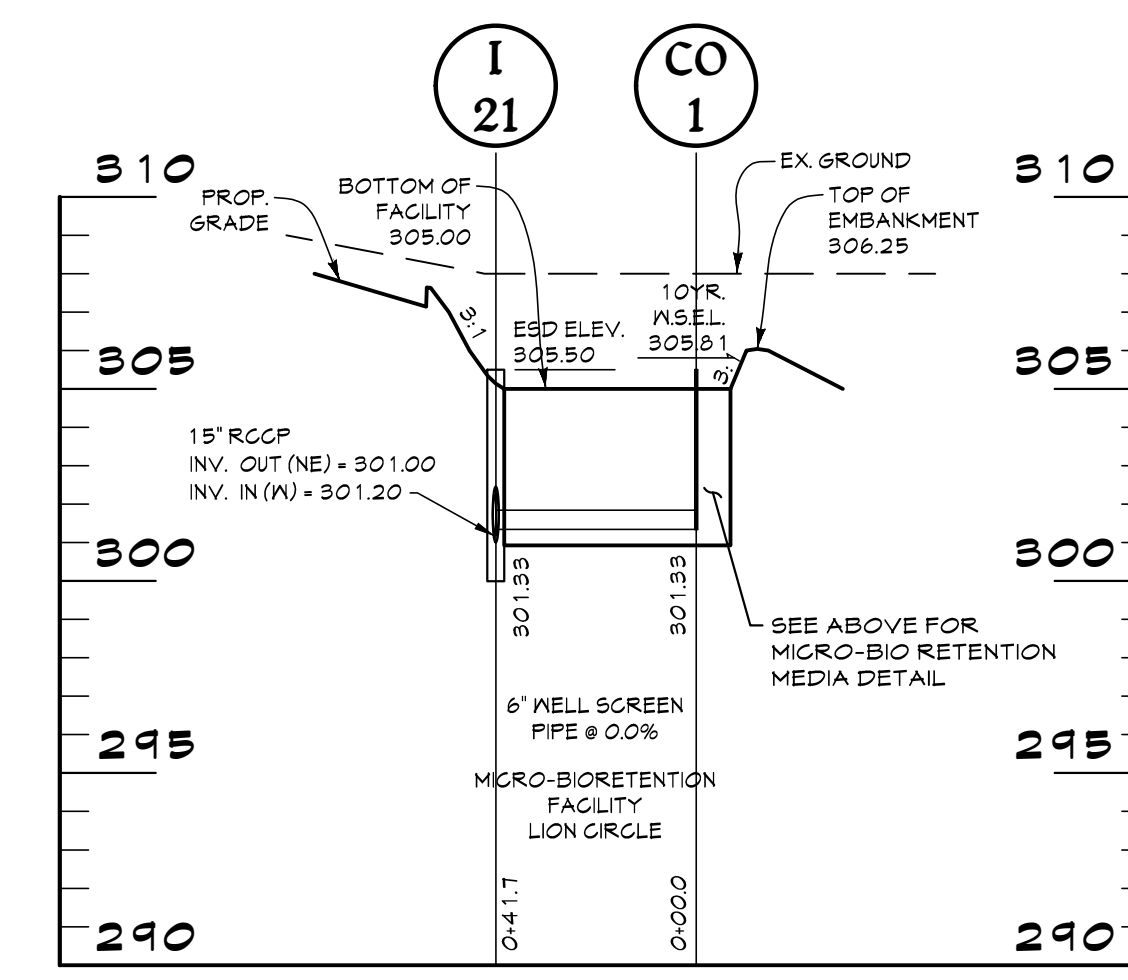
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Materials Specifications for Micro-Bioretenation			
Material	Specification	Size	Notes
Plantings	See Landscape Plan	n/a	Plantings are site-specific
Planting Soil Mix	MD SHA #20.01.03 Bioretention Soil Mix (BSM)		See Sheet C-063 for specification
Mulch	Shredded Hardwood		Aged 6 months, minimum; no pine or wood chips
Pea Gravel Diaphragm	Pea gravel: ASTM D-448	No. 8 or No. 9 (1/8" to 3/8")	
Underdrain piping	F 150, Type PS 20 or AASHTO M-210	Rigid schedule 40 PVC OR SDR 26	Slotted pipe; minimum of 3" of gravel over pipes; not necessary underneath pipes; slotted pipe shall be wrapped with 1/4-inch galvanized hardware cloth 0.020" slot width x 1.0" slot length @ 6" on center; 5 spaced radial around pipe. For 12" slotted pipe use 0.040 slot width @ rows.
Course Sand	AASHTO M-6 or ASTM C-33 MD SHA #20.01.05(a)(1)	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
Filter Fabric (sides only)	Non-woven (Mirafi 1100N) or approved equivalent	N/A	N/A



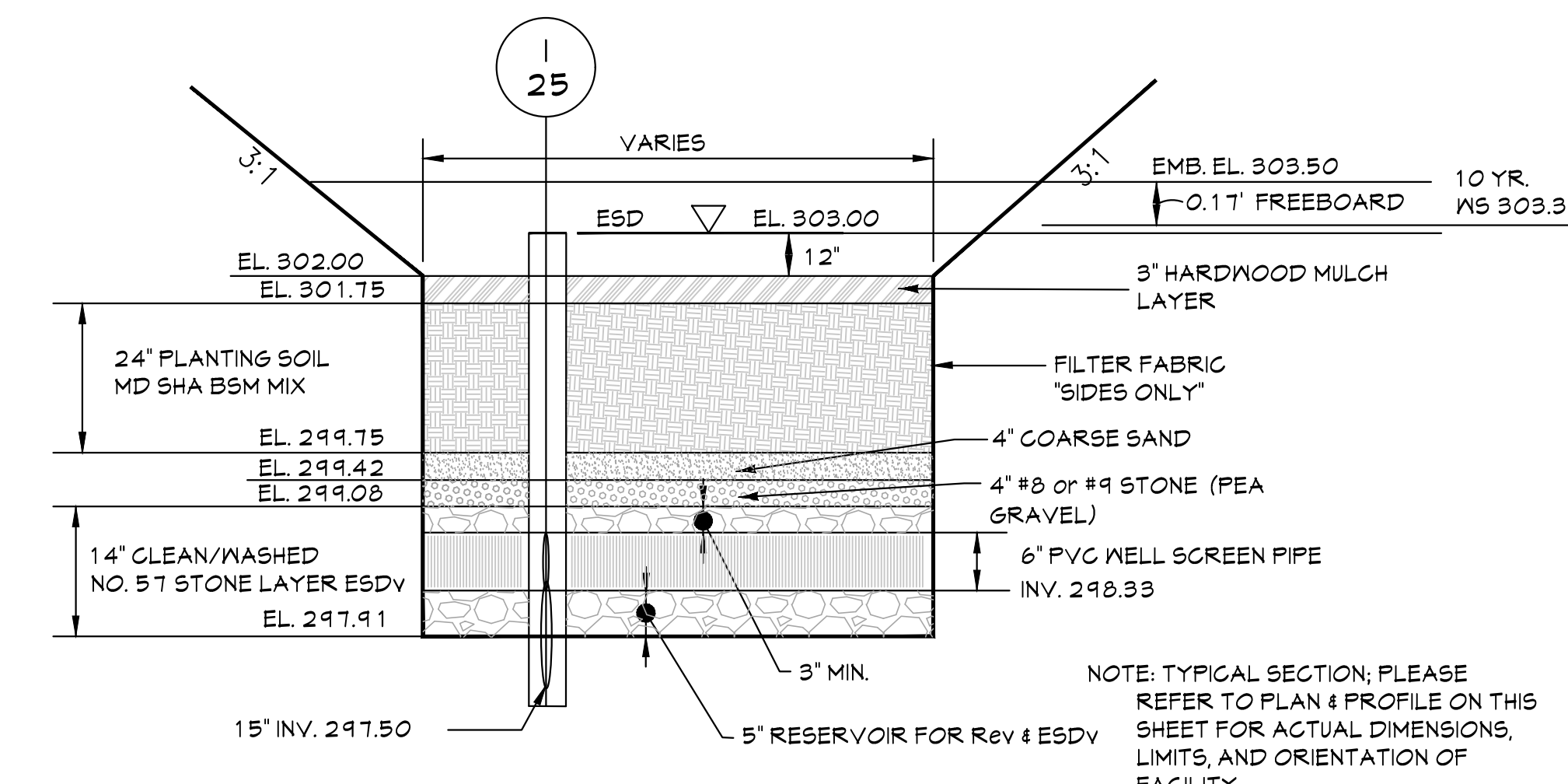
MICRO-BIO RETENTION
FACILITY #1 LION CIRCLE

NOT TO SCALE



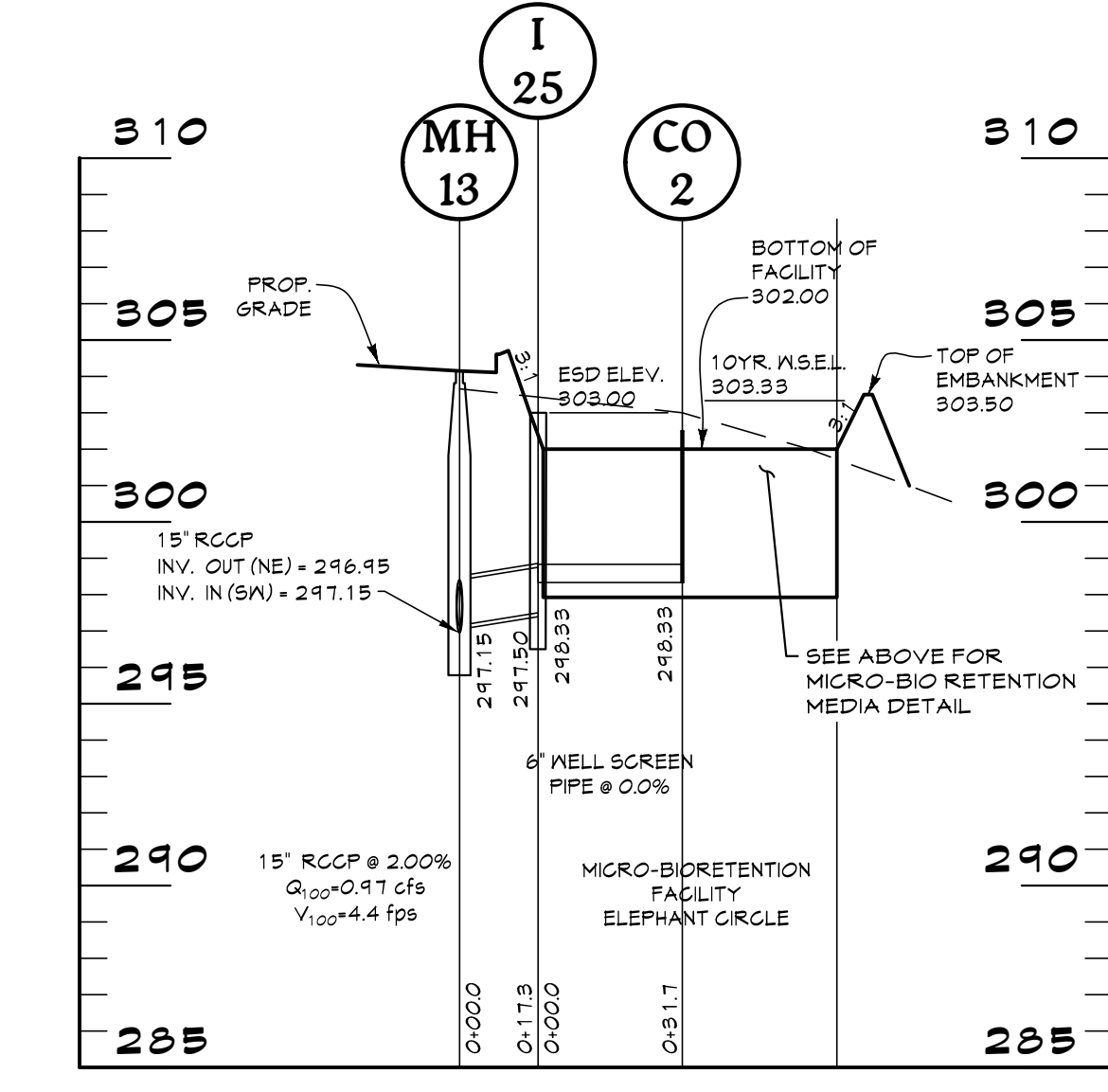
PROFILE

SCALE: HORIZ: 1"=40'
VERT: 1"=5'



MICRO-BIO RETENTION
FACILITY #3 ELEPHANT CIRCLE

NOT TO SCALE



PROFILE

SCALE: HORIZ: 1"=40'
VERT: 1"=5'

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4. FINAL CITY APPROVAL AND CLOSE OUT OF THE GRADING PERMIT IS REQUIRED BEFORE CONTRACT COMPLETION IS ACHIEVED.

OPERATION & MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION (M-6) ESD BMP'S #1 & #3

1. DURING THE FIRST YEAR OF OPERATION, INSPECTIONS SHOULD BE CONDUCTED AFTER EVERY MAJOR STORM AND POORLY ESTABLISHED AREAS VEGETATED.
2. SEDIMENT ACCUMULATION IN THE PRETREATMENT AREAS SHOULD BE REMOVED AS NECESSARY.
3. SIGNS OF UNEVEN FLOW WITHIN THE WETLAND MAY MEAN THAT THE GRAVEL OR UNDERDRAIN IS CLOGGED. THE GRAVEL AND/OR UNDERDRAIN SHALL BE REMOVED, CLEANED, AND REPLACED, AS NEEDED.
4. A DENSE STAND OF WETLAND VEGETATION SHOULD BE MAINTAINED THROUGHOUT THE LIFE OF THE FACILITY AND VEGETATION REPLACED AS NEEDED. VEGETATION SHALL BE CUT BACK TO APPROXIMATELY GROUND LEVEL AND DEBRIS REMOVED EVERY FOUR (4) YEARS TO REMOVE TOXINS & CONTAMINANTS CAPTURED BY THE VEGETATION.
5. ALL STRUCTURES WITHIN THE FACILITY AS WELL AS FLOW SPLITTERS SHOULD BE INSPECTED AFTER EVERY SIGNIFICANT RAINFALL EVENT TO MAKE SURE THEY ARE FREE FROM DEBRIS AND FUNCTIONAL.
6. EROSION AT INFLOW POINTS SHOULD BE REPAIRED.

CONSTRUCTION INSPECTION SCHEDULE FOR MICRO-BIORETENTION FACILITIES

MILESTONE	BMP#1 DATE	BMP#16 DATE
1. DURING EXCAVATION TO SUBGRADE AND PLACEMENT AND BACKFILL OF UNDERDRAIN SYSTEMS		
2. DURING PLACEMENT OF FILTER MEDIA		
3. DURING PLACEMENT OF APPURTENANT CONVEYANCE		
4. UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT VEGETATIVE STABILIZATION		

ENGINEER'S CERTIFICATION STORMWATER MANAGEMENT

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE BALTIMORE CITY DEPARTMENT OF PUBLIC WORKS REQUIREMENTS AND SPECIFICATIONS.

CENTURY ENGINEERING, INC.
10710 GILROY ROAD
HUNT VALLEY, MD 21031

ANTHONY J. DIETZ P.E.
ADDRESS
443-589-2400
PHONE NUMBER

SIGNATURE
DATE
12-06-2021
LICENSE #
32514

AS-BUILT CERTIFICATION STORMWATER MANAGEMENT

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE AS-BUILT PLANS AND COMPLIES WITH THE APPROVED PLANS AND SPECIFICATIONS.

PRINT NAME ADDRESS PHONE NUMBER

SIGNATURE DATE LICENSE #

MAINTENANCE AND LIABILITY STORMWATER MANAGEMENT

MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITY AND APPURTENANT DRAINAGE STRUCTURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE PROPERTY OWNER SHALL ALSO BE FULLY LIABLE FOR ALL DAMAGES, INJURIES THAT MAY BE SUSTAINED BY ANY PERSON OR PROPERTY AS A RESULT OF ANY FAILURE OR MALFUNCTION OF THE STORMWATER MANAGEMENT FACILITY OR APPURTENANCES.

KARL KRANZ V.P.
CHIEF OPERATING OFFICER
OWNER / DEVELOPER

MARYLAND ZOO IN BALTIMORE
1876 MANSION HOUSE DRIVE
BALTIMORE, MD 21211

410-346-7102
PHONE NUMBER

SIGNATURE DATE

DEVELOPER'S/LANDOWNERS CERTIFICATION - STORMWATER MANAGEMENT

I HEREBY CERTIFY THAT ALL PROPOSED WORK SHOWN ON THESE CONSTRUCTION DRAWINGS(S) AND/OR THE APPROVED SEDIMENT CONTROL DRAWINGS(S) WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/WE ALSO UNDERSTAND THAT IT IS MY/OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED INCLUDING THE SUBMITTAL OF "AS-BUILT" PLANS WITHIN THIRTY (30) DAYS OF COMPLETION BY A REGISTERED PROFESSIONAL ENGINEER.

KARL KRANZ V.P.
CHIEF OPERATING OFFICER
OWNER / DEVELOPER

MARYLAND ZOO IN BALTIMORE
1876 MANSION HOUSE DRIVE
BALTIMORE, MD 21211

410-346-7102
PHONE NUMBER

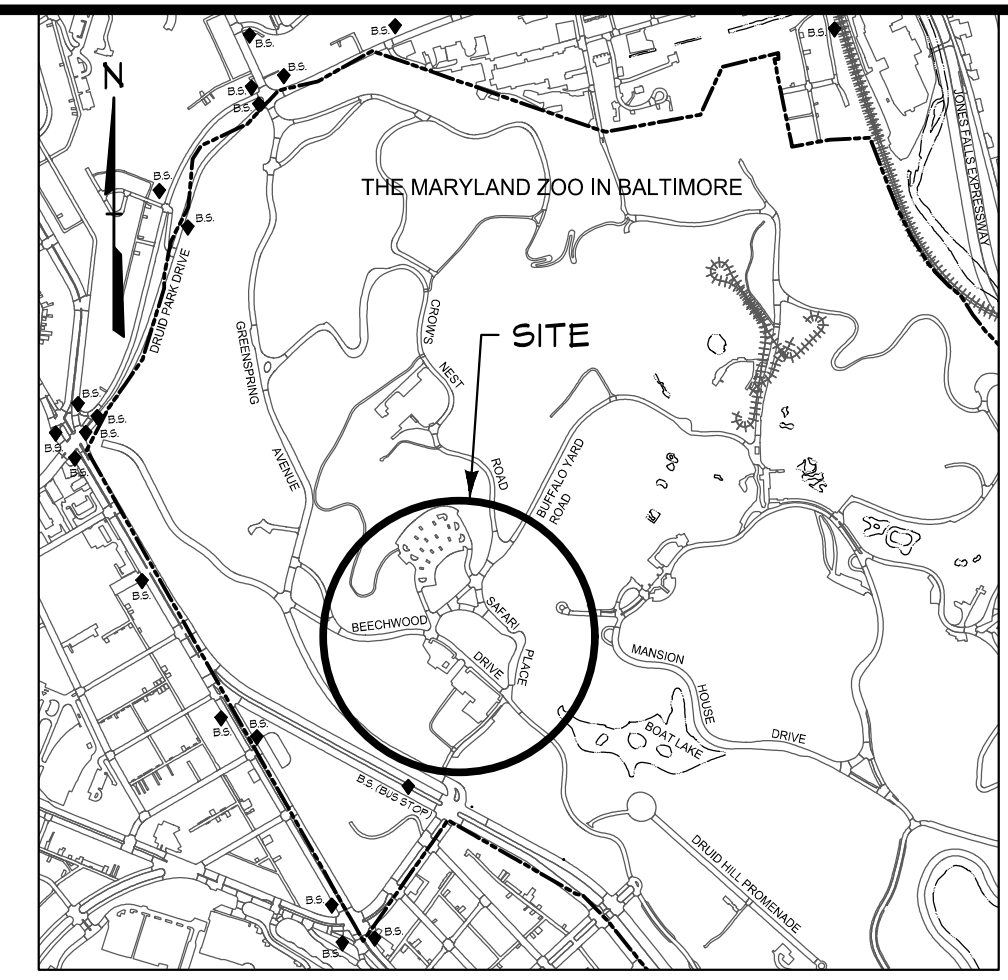
SIGNATURE DATE

OWNER:

Mayor & City Council of Baltimore
One Calvert Plaza
201 E. Baltimore Street
Baltimore, MD 21202
(410)-675-3651

DEVELOPER:

The Maryland Zoo in Baltimore
1876 Mansion House Drive
Baltimore, MD 21211
C/O Karl Kranz
(410)-346-7102



VICINITY MAP

SCALE: 1"=1000'

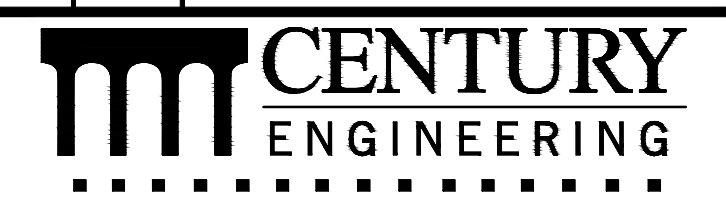
LEGEND

- Existing Minor Contour
- Existing Major Contour
- Existing Edge of Road
- Existing Soils
- Existing Storm Drain
- Existing Water
- Existing Sewer
- Existing Gas Line
- Existing Underground Electric Line
- Existing Curb and Gutter
- Existing Retaining Wall
- Existing Edge of Paving
- Existing Sidewalk
- Existing Tree Line
- Existing Building/Structure
- Water Edge or Stream Centerline
- Existing Fence
- Existing Pavement
- Existing Sign
- Existing Light
- Existing Bollard
- Proposed Major Contour
- Proposed Minor Contour
- Proposed Storm Drain Line
- Proposed Manhole
- Proposed Inlet
- Proposed Tee
- Proposed Curb and Gutter
- Proposed Retaining Wall
- Proposed Edge of Pavement
- Proposed Guardrail
- Proposed Concrete Sidewalk
- Proposed Fence
- Proposed Tree Line
- Tree Protection Fence
- Proposed ADA Parking Sign
- Proposed ADA Parking Space
- Proposed Bollards
- Proposed Guard Shack
- Proposed Pedestrian 'Acorn' Type Light
- Proposed Parking Lot 'Cobra' Type Light

DATA SOURCES

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35301 N 8240.140 E -8000.600 Elev. 324.640
4. Public utilities shown hereon are from public drawings, field location and other sources.

DATE	BY	REVISIONS



A Kleinfelder Company

10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

STORMWATER MANAGEMENT PLAN AND PROFILE 1

THE MARYLAND ZOO IN BALTIMORE PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

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.



DRAWN BY: AA

DESIGN BY: DRS/KRB

SCALE: AS SHOWN

REVIEW BY: AJD

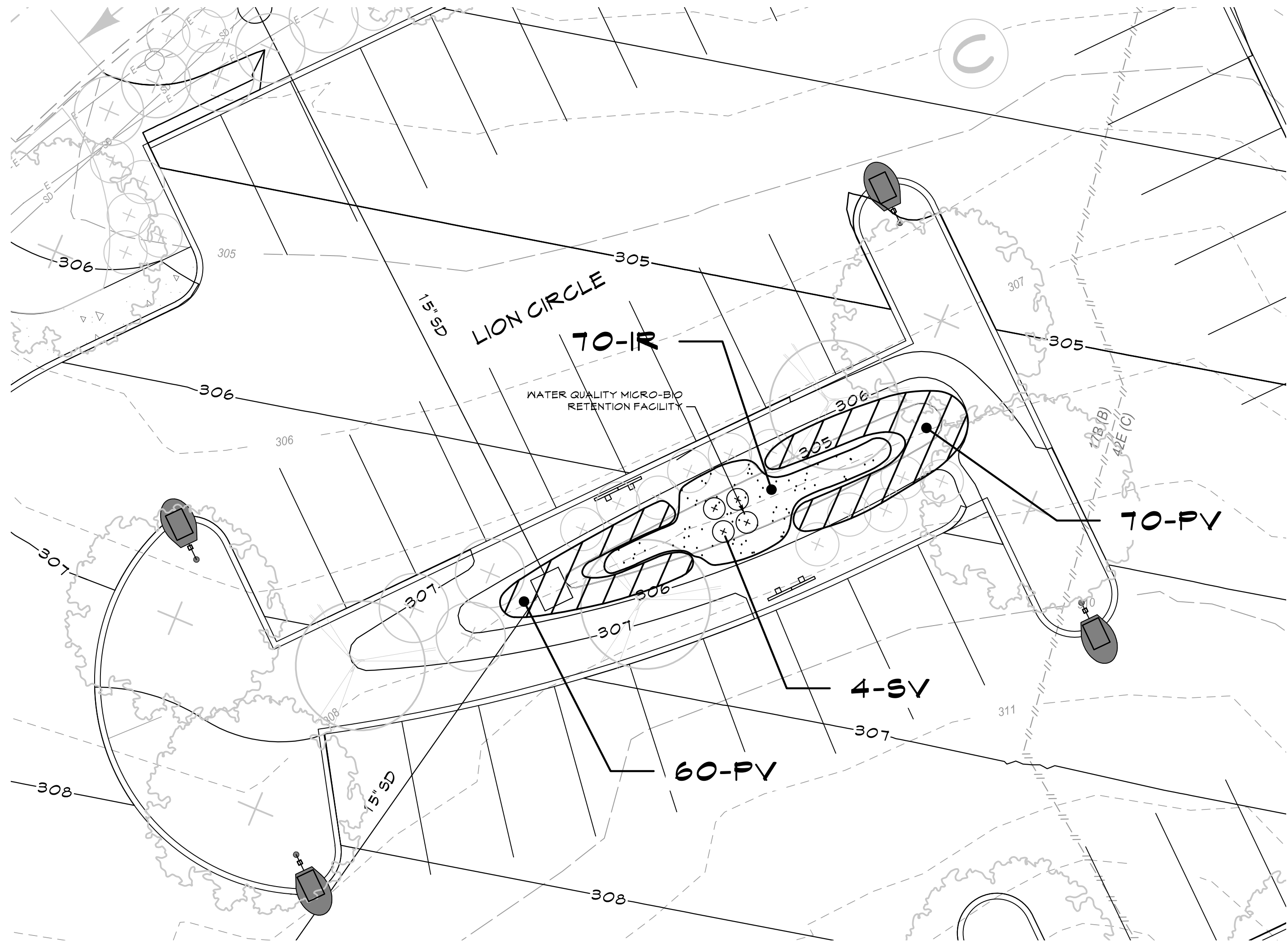
REVIEW DATE: 7/15/2022

PROJECT No: 201069.00

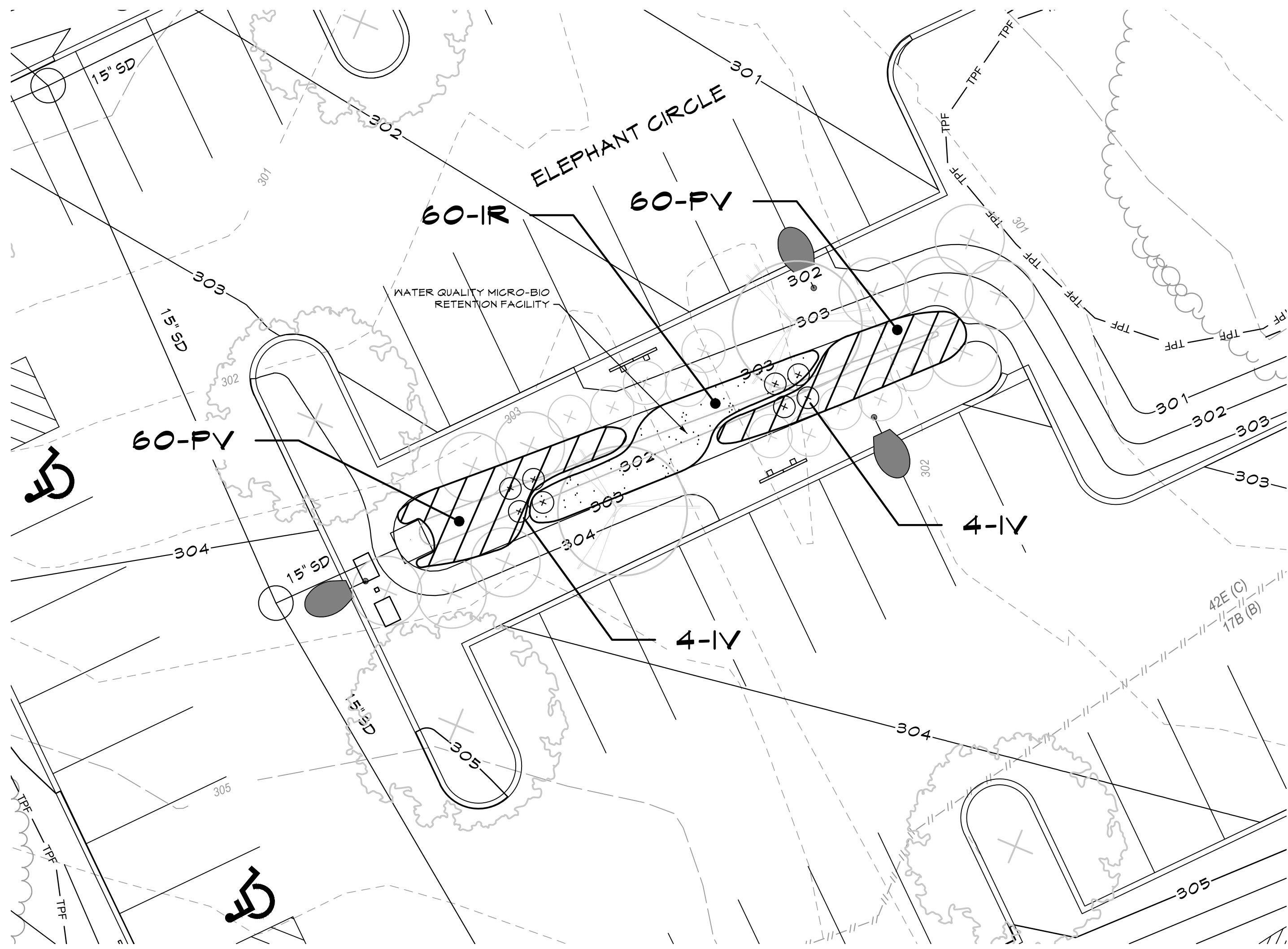
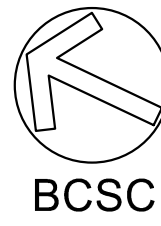
C-062

ESD # 7969

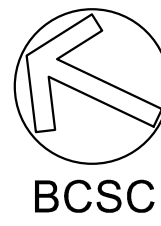
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PLAN
SCALE: 1"=10'



PLAN
SCALE: 1"=10'



LEGEND

---	676	---	Existing Minor Contour
---	670	---	Existing Major Contour
---	---	---	Existing Edge of Road
---	---	---	Existing Soils
---	18UC (B)	---	Existing Storm Drain
---	17B (B)	---	Existing Water
---	---	---	Existing Sewer
---	---	---	Existing Gas Line
---	---	---	Existing Underground Electric Line
---	---	---	Existing Curb and Gutter
---	---	---	Existing Retaining Wall
---	---	---	Existing Edge of Paving
---	---	---	Existing Sidewalk
---	---	---	Existing Tree Line
---	---	---	Existing Building/Structure
---	---	---	Water Edge or Stream Centerline
---	X	X	Existing Fence
---	---	---	Existing Pavement
---	---	---	Existing Sign
---	---	---	Existing Light
---	---	---	Existing Bollard
---	660	---	Proposed Major Contour
---	658	---	Proposed Minor Contour
---	---	---	Proposed Storm Drain Line
---	---	---	Proposed Manhole
---	---	---	Proposed Inlet
---	---	---	Proposed Tee
---	---	---	Proposed Curb and Gutter
---	---	---	Proposed Retaining Wall
---	---	---	Proposed Edge of Pavement
---	---	---	Proposed Guardrail
---	---	---	Proposed Concrete Sidewalk
---	X	X	Proposed Fence
---	---	---	Proposed Tree Line
---	---	---	Tree Protection Fence
---	---	---	Proposed ADA Parking Sign
---	---	---	Proposed ADA Parking Space
---	---	---	Proposed Bollards
---	---	---	Proposed Guard Shack
---	---	---	Proposed Pedestrian "Acorn" Type Light
---	---	---	Proposed Parking Lot "Cobra" Type Light
---	---	---	Proposed Shrubs
---	---	---	Proposed Deciduous Tree
---	---	---	Proposed Groundcover

PLANTING NOTES

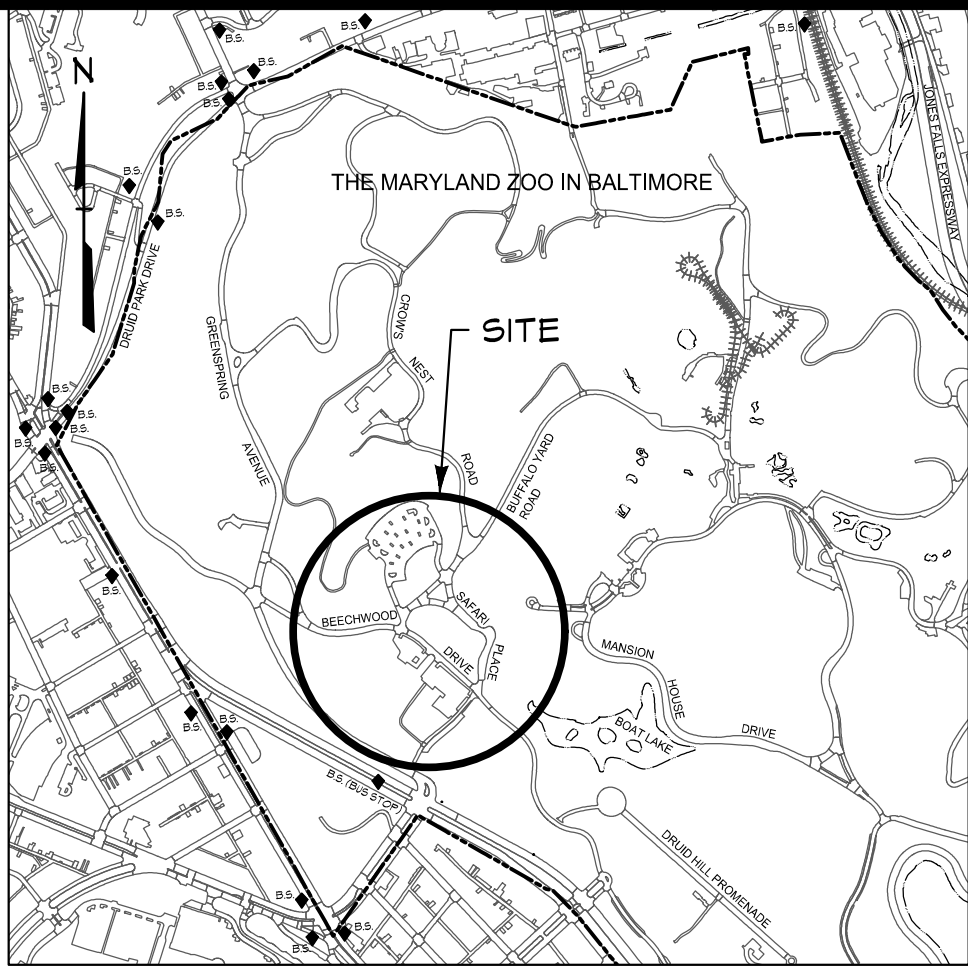
- Plant material substitutions will not be accepted without approval of the Landscape Architect.
- All shrubs and groundcover areas shall be planted in continuous prepared planting beds.
- All shrub beds shall be mulched with hardwood mulch as detailed and specified except where noted on plans.
- Maintain positive drainage out of planting beds at a minimum of two percent slope.
- Plant quantities are provided for the convenience of the contractor. If discrepancies exist between quantities shown on the plan and those shown on the plant list, the quantities on the plan shall take precedence.
- All areas within contract limits disturbed during or prior to construction not designated to receive plantings and mulch shall be fine graded and seeded in accordance with planting and construction.
- The contractor shall notify Miss Utility (800-257-7777) a minimum of three working days prior to planting and construction.
- All plant material shall be nursery grown and shall conform to American Nurserymen Association Standards.
- All planting procedures shall conform to Landscape Contractors Association Specification Guidelines for Baltimore/Washington Metropolitan Area (latest edition) and Century Engineering, Inc. specifications.
- Contractor shall test pit prior to plant installation.

MINIMUM LANDSCAPE MAINTENANCE REQUIREMENTS

- Lawn areas shall be mowed to a height of 2 to 3 inches and not allowed to reach a height of 4 inches before mowing.
- All curbs and walks shall be edged as needed.
- All lawn areas adjacent to building faces or structures shall be trimmed.
- A slow release nitrogen balanced fertilizer with a 2-1-1 ratio shall be applied at a rate of 2 pounds of nitrogen per 1000 square feet in September, October, and February.
- Lime shall be applied at the rate determined by a soils report.
- It is recommended that lawn areas be treated in mid-March to early April with pre-emergent herbicide (Betasan or equal) applied at the manufacturer's rate.
- A post-emergent herbicide (Trimec or equal) is recommended to be sprayed on lawn areas in the late spring or early fall. Follow manufacturer's rates and recommendations.
- Insecticides and fungicides are recommended for insect and disease control.
- Re-seed bare areas of lawn as necessary. Yearly aeration is recommended.
- All trash, litter, and debris shall be removed from lawn areas, parking lots, and shrub beds as needed.
- Mulch all shrub and groundcover beds yearly with 3 inches of shredded hardwood bark.
- Permit shrubs and trees to grow and enlarge to their design size. Consult project Landscape Architect for details.
- Prune trees in accordance with Landscape Specification Guidelines for Baltimore-Washington Metropolitan Areas.

MICRO-BIORETENTION PLANT LIST

KEY	QTY.	SCIENTIFIC NAME	COMMON NAME	SIZE	COMMENTS
SHRUBS, PERENNIALS, AND GROUNDCOVERS					
CS	140	Carex stricta	Tussock Sedge	1 gal.	2' o.c.
EP	130	Eupatorium purpureum	Joe Pye Weed	1 gal.	2' o.c.
IR	130	Iris versicolor	Blue Flag	1 gal.	2' o.c.
IV	8	Itea virginica	Virginia Sweetspire	24"-30" ht.	B 4 B
PV	640	Panicum virgatum	Switchgrass	1 gal.	2' o.c.
SV	8	Spiraea x 'vanhouttei'	Spiraea	24"-30"	B 4 B

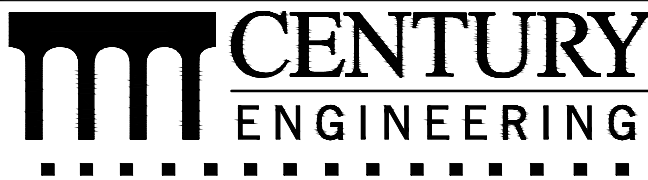


VICINITY MAP
SCALE: 1"=1000'

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35800 N 8240.190 E -9800.600 Elev. 324.640
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DATE	BY	REVISIONS



A Kleinfelder Company

10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

STORMWATER MANAGEMENT PLANTING PLAN 1

THE MARYLAND ZOO IN BALTIMORE PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE No. 1008
EXPIRATION DATE: 5/20/2022



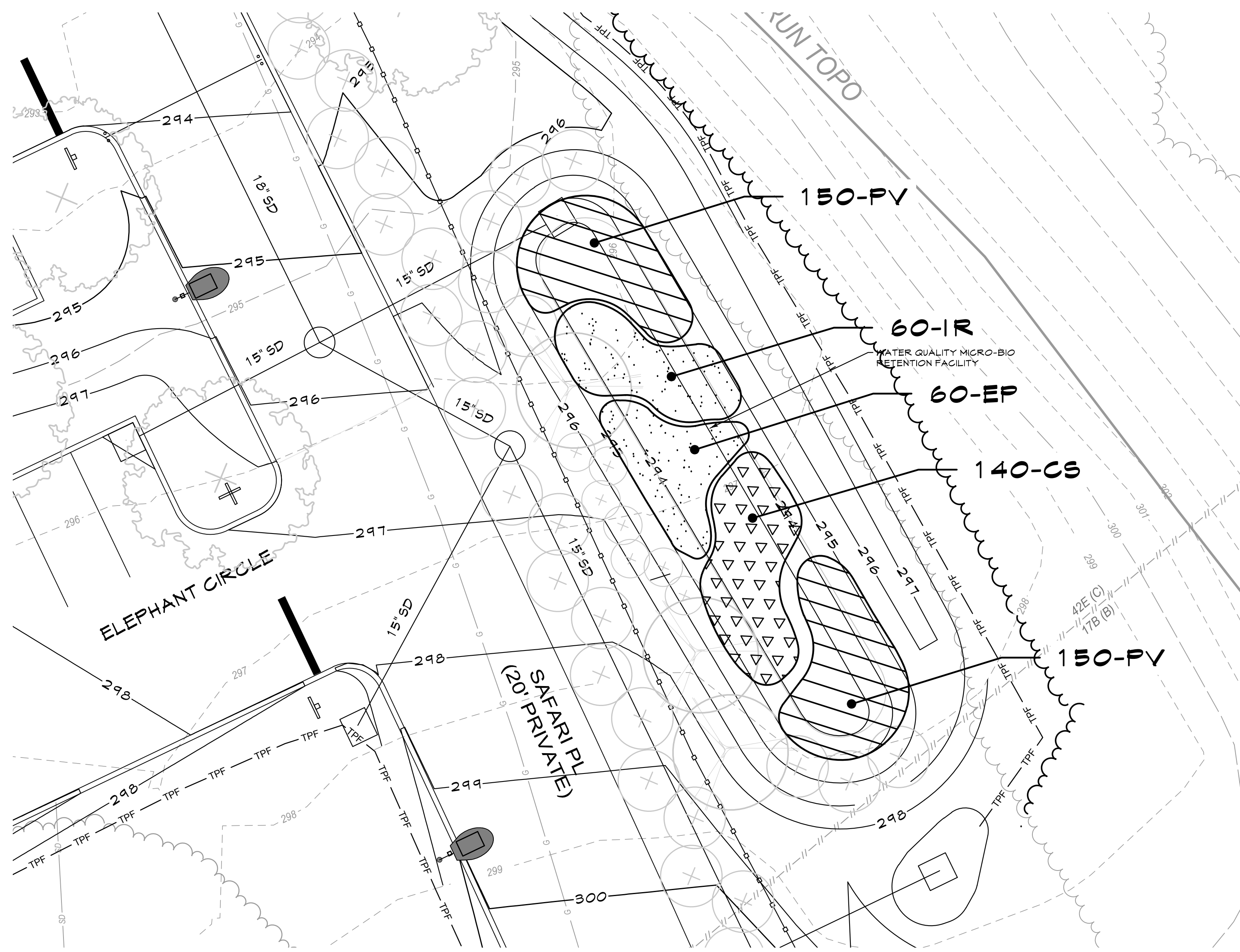
OWNER:
Mayor & City Council of Baltimore
One Calvert Plaza
201 E. Baltimore Street
Baltimore MD 21202
(410)-675-3651

DEVELOPER:
The Maryland Zoo in Baltimore
1876 Mansion House Drive
Baltimore MD 21217
C/O Karl Kranz
(410)-346-7102

COMBINED SITE DEVELOPMENT/
FINAL SHM PLAN

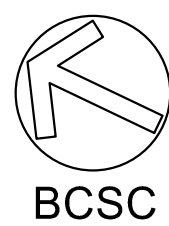
DRAWN BY: AA	REVIEW BY: AJD
DESIGN BY: DRS/KRB	REVIEW DATE: 7/15/2022
SCALE: 1"=10'	DRAWING: C-063
PROJECT No.: 201069.00	

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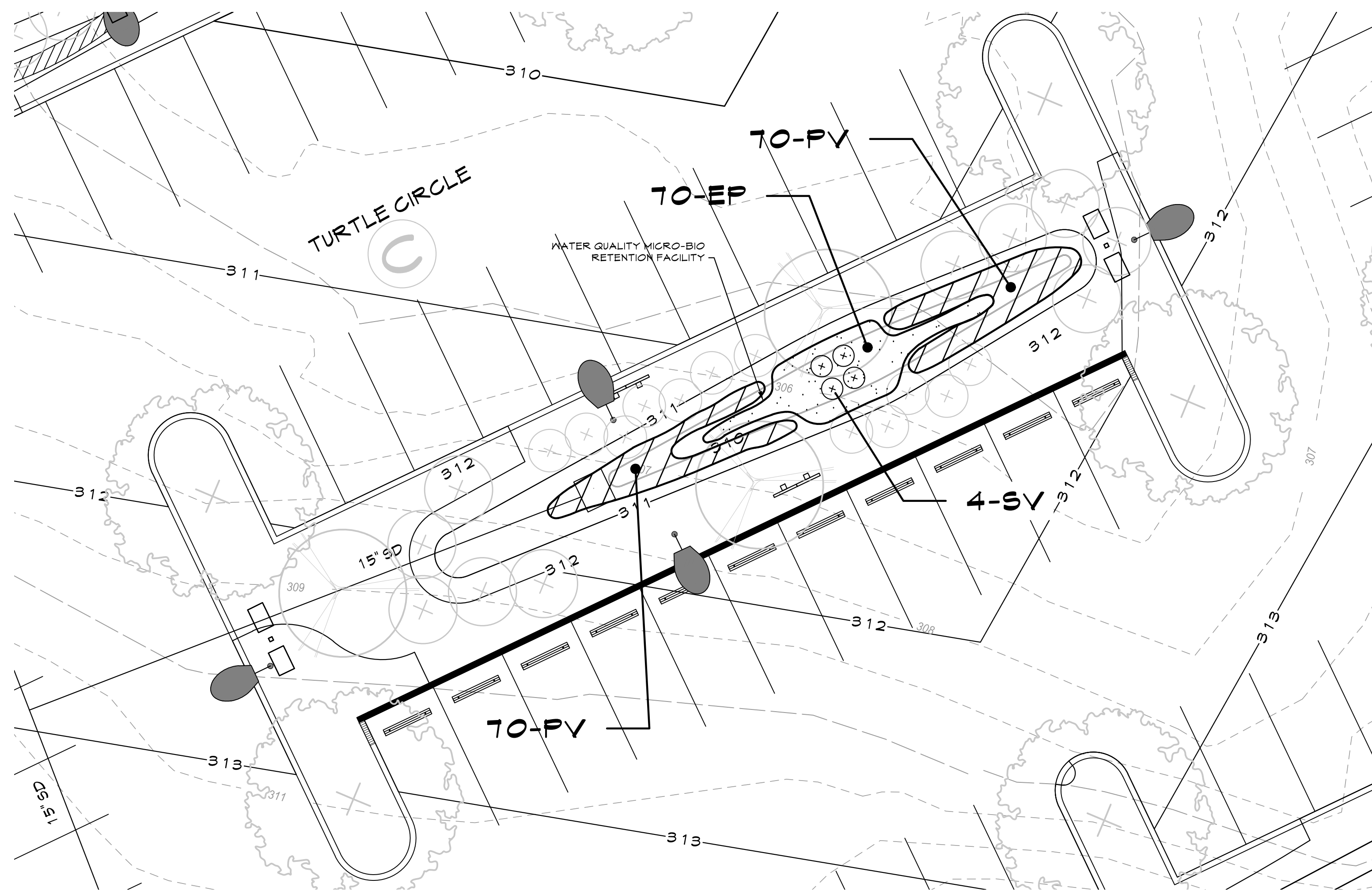


PLAN

SCALE: 1"=10'

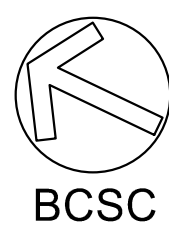


BCSC

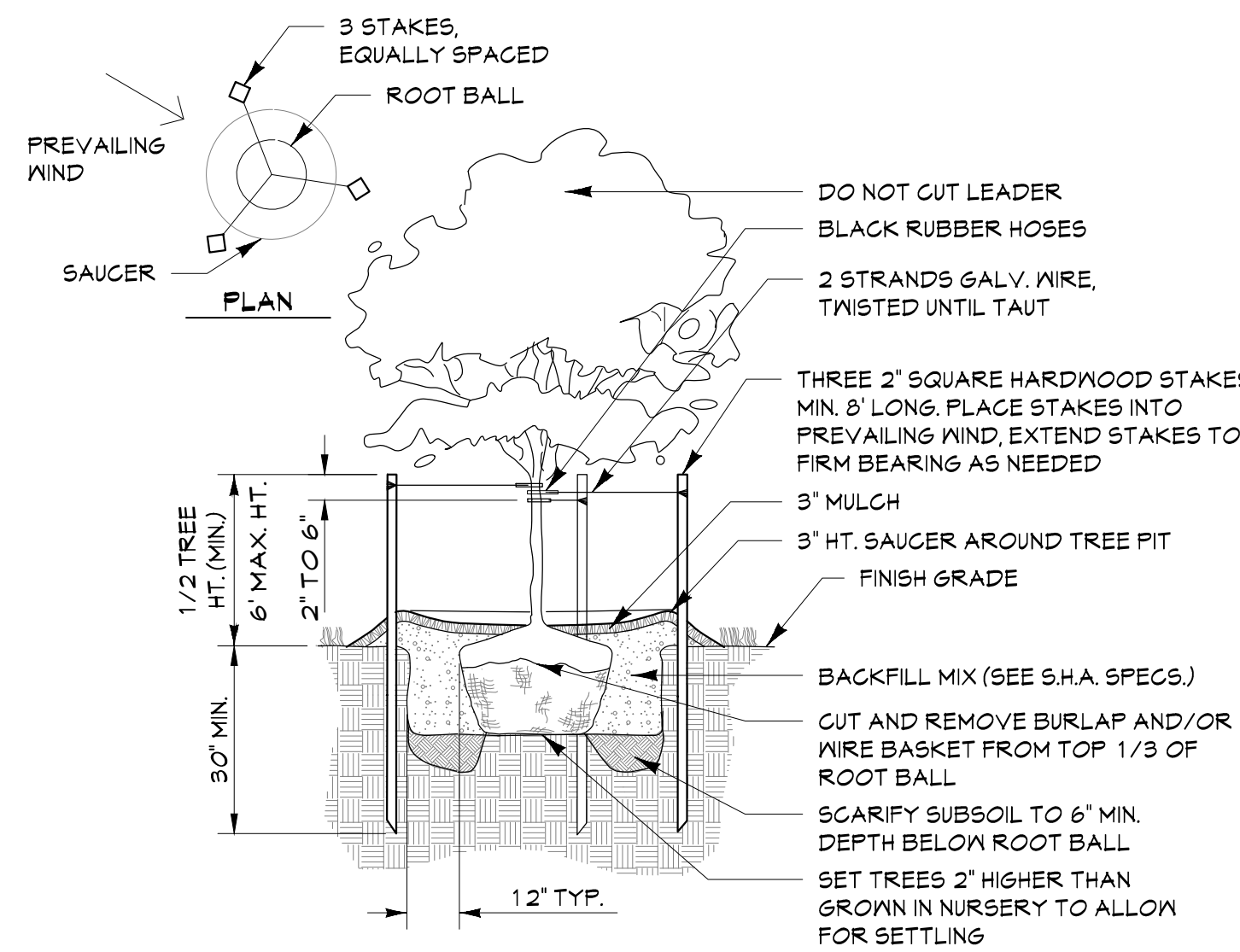


PLAN

SCALE: 1"=10'



BCSC



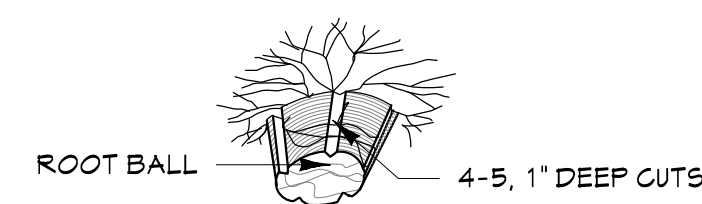
DECIDUOUS TREE PLANTING

Not To Scale

LEGEND

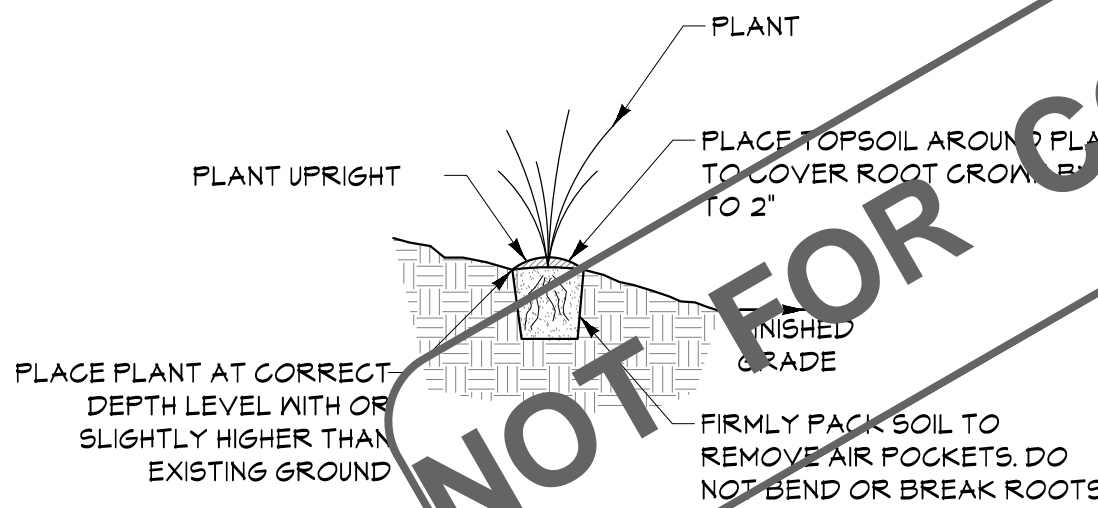
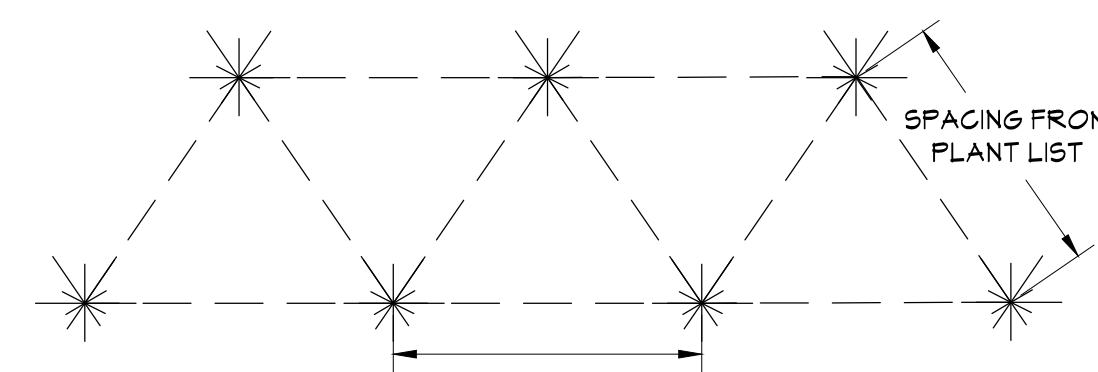
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- Proposed Curb and Gutter
- Proposed Retaining Wall
- Proposed Edge of Pavement
- Proposed Guardrail
- Proposed Concrete Sidewalk
- Proposed Fence
- Proposed Tree Line
- Tree Protection Fence
- Proposed ADA Parking Sign
- Proposed ADA Parking Space
- Proposed Bollards
- Proposed Guard Shack
- Proposed Pedestrian 'Acorn' Type Light
- Proposed Parking Lot 'Cobra' Type Light
- Proposed Shrubs
- Proposed Deciduous Tree
- Proposed Groundcover

- NOTES:
- FOR CONTAINER SHRUBS, COMPLETELY REMOVE ALL NON-BIODEGRADABLE CONTAINERS AND SCARIFY ROOTBALL BY USING A SHARP BLADE AND MAKING 4 TO 5 ONE INCH CUTS THE LENGTH OF THE ROOTBALL.
 - FOR BAB SHRUBS, CUT AND REMOVE BURLAP FROM TOP 1/3 OF ROOTBALL.



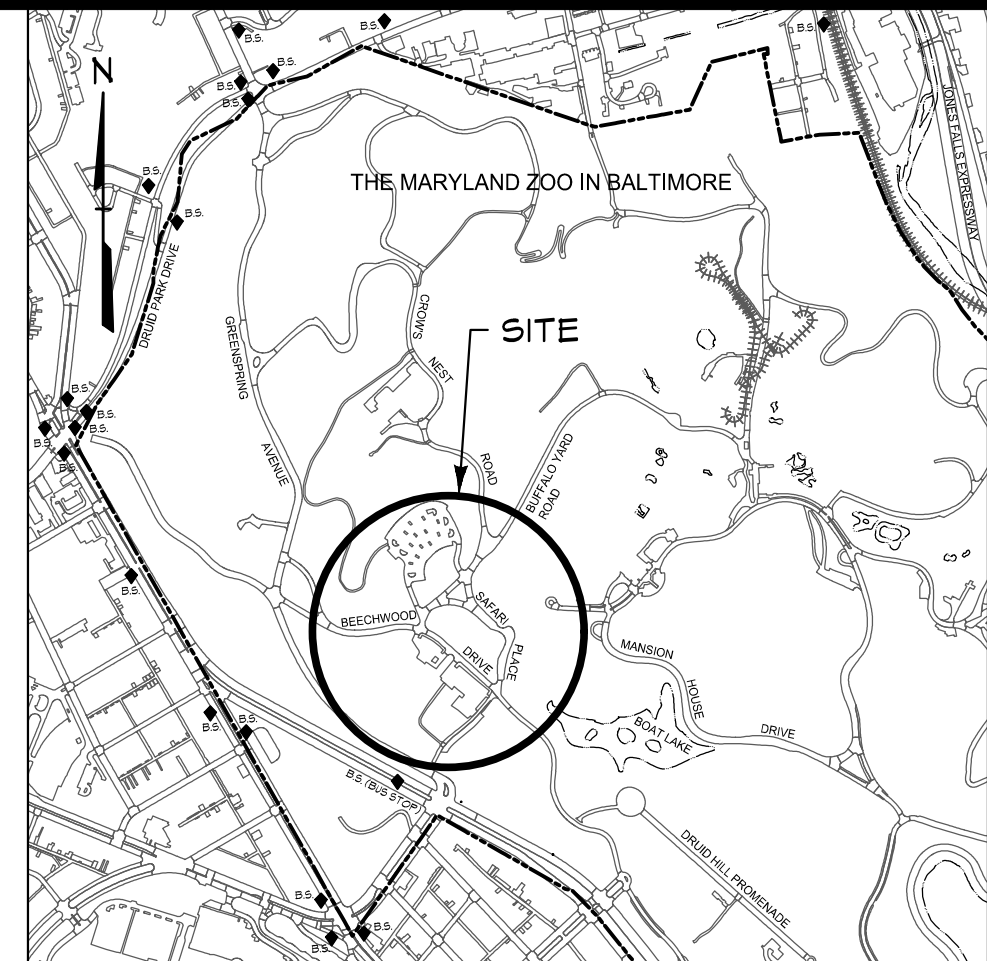
SHRUB PLANTING

Not To Scale



GROUND COVER PLANTING

Not To Scale



VICINITY MAP

SCALE: 1"=1000'

DATA SOURCES

- Existing topography and structures shown hereon outside of the limits of field run topography are from the Baltimore City Office of Technology - GIS Lab.
- Existing topography from field run survey by Century Engineering Inc. dated Aug-Sept. 2020
- Coordinates & elevations are referred to the Baltimore City Survey Control System and are tied to the following stations:
35500 N 1969.820 E -9323.550 Elev. 301.060
35501 N 8240.190 E -9800.600 Elev. 324.640
- Public utilities shown hereon are from public drawings, field location and other sources.

DATE	BY	REVISIONS



A Kleinfelder Company
10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

STORMWATER MANAGEMENT
PLANTING PLAN 2

THE MARYLAND ZOO
IN BALTIMORE
PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

PROFESSIONAL
CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE No. 1008
EXPIRATION DATE: 5/20/2022



OWNER:
Mayor & City Council of Baltimore
One Calvert Plaza
201 E. Baltimore Street
Baltimore MD 21202
(410)-675-3651

DEVELOPER:
The Maryland Zoo in Baltimore
1876 Mansion House Drive
Baltimore MD 21217
C/O Karl Kranz
(410)-346-7102

DRAWN BY: AA	DESIGN BY: DRS/KRB	REVIEW BY: AJD
SCALE: 1"=10'	PROJECT No: 201069.00	DRAWING: C-065

COMBINED SITE DEVELOPMENT/
FINAL SHM PLAN

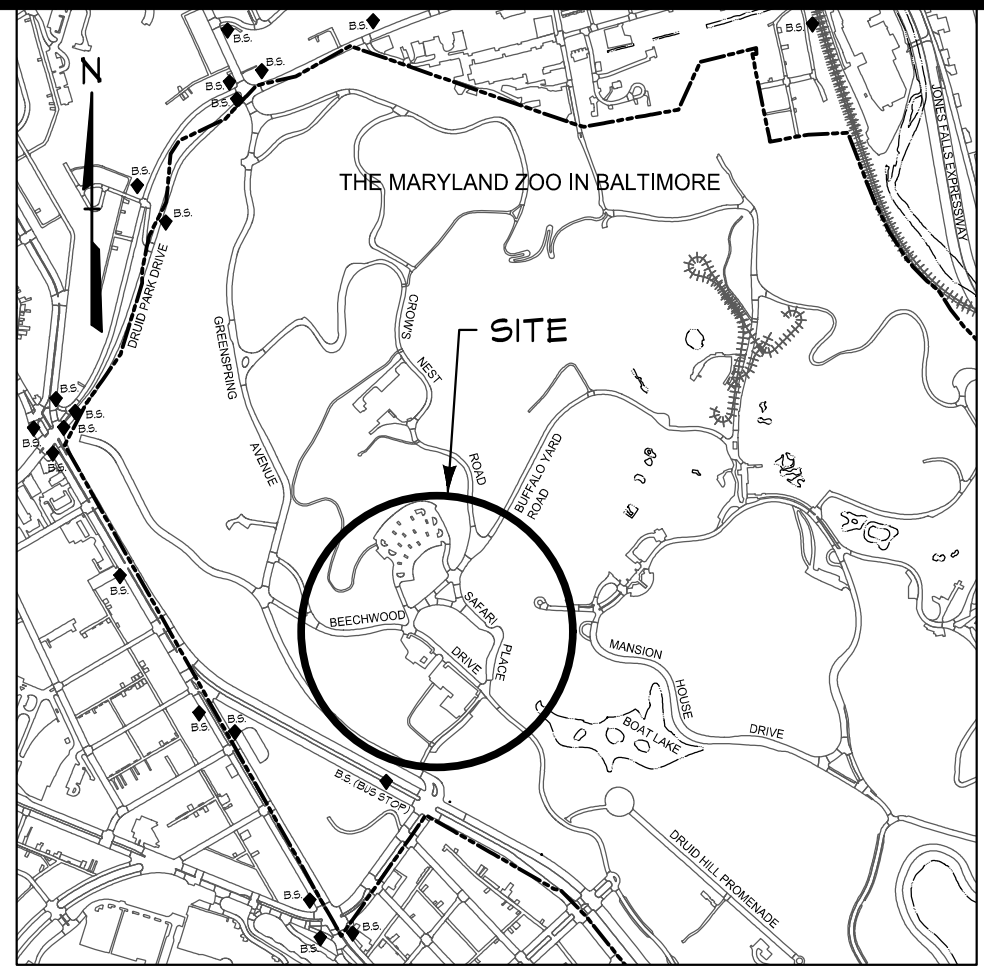
T:\2020\Facilities\20106400 MD Zoo Parking\Civil\CADD\Drawings\Construction\20106400 (C-066) SWM Plan 3.dwg Jul 16, 2022 1:28pm dhanan

CONSTRUCTION INSPECTION SCHEDULE
FOR SAND FILTERS

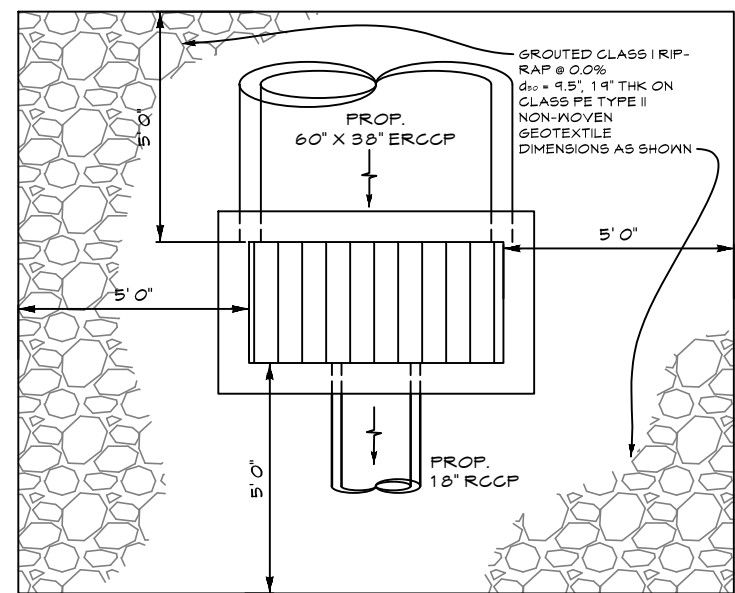
MILESTONE	BMP#17 DATE:	BMP#16 DATE:
1. DURING EXCAVATION TO SUBGRADE AND PLACEMENT AND BACKFILL OF UNDERDRAIN SYSTEMS		
2. DURING PLACEMENT OF FILTER MEDIA		
3. DURING PLACEMENT OF APPURTENANT CONVEYANCE		
4. UPON COMPLETION OF FINAL GRADING AND ESTABLISHMENT OF PERMANENT VEGETATIVE STABILIZATION		

LEGEND

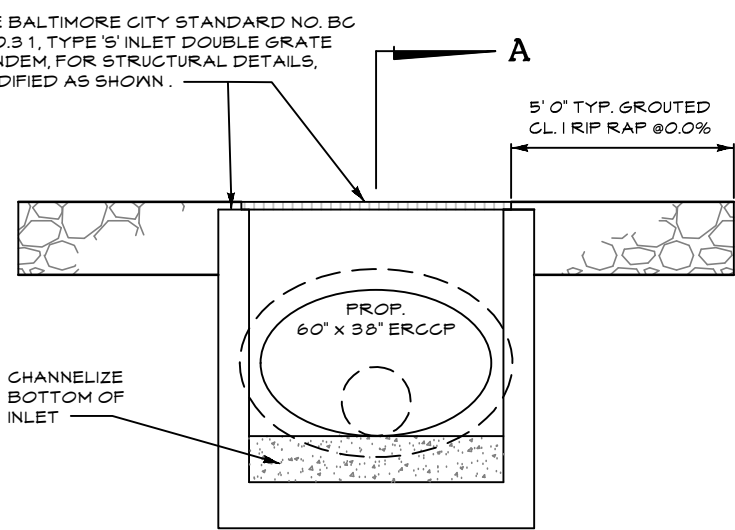
---	Existing Minor Contour
---	Existing Major Contour
---	Existing Edge of Road
---	Existing Soils
---	Existing Storm Drain
---	Existing Water
---	Existing Sewer
---	Existing Gas Line
---	Existing underground Electric Line
---	Existing Curb and Gutter
---	Existing Retaining Wall
---	Existing Edge of Paving
---	Existing Sidewalk
---	Existing Tree Line
---	Existing Building/Structure
---	Water Edge or Stream Centerline
---	Existing Fence
---	Existing Pavement
---	Existing Sign
---	Existing Light
---	Existing Bollard
---	Proposed Major Contour
---	Proposed Minor Contour
---	Proposed Storm Drain Line
---	Proposed Manhole
---	Proposed Inlet
---	Proposed Tee
---	Proposed Curb and Gutter
---	Proposed Variable Reveal Curb
---	Proposed Flush Curb
---	Proposed Curb Transition
---	Proposed Retaining Wall
---	Proposed Edge of Pavement
---	Proposed Guardrail
---	Proposed Concrete Sidewalk
---	Proposed Fence
---	Proposed Tree Line
---	Proposed Underground SWM Facility
---	Proposed Underground Sand Filter
---	Tree Protection Fence
---	Proposed ADA Parking Sign
---	Proposed ADA Parking Space
---	Proposed Bollards
---	Proposed Guard Shack
---	Proposed Pedestrian "Acorn" Type Light
---	Proposed Parking Lot "Cobra" Type Light
---	Proposed Precast Wheelstop
---	Proposed Crosswalk



VICINITY MAP
SCALE: 1"=1000'



PLAN



ELEVATION

OUTFALL STRUCTURE
BUBBLE UP INLET RS-1
Scale: N.T.S.

UNDERGROUND
QUANTITY MANAGEMENT*
AND SAND FILTER #5 PLAN

SCALE: 1"=10'

*REFER TO STRUCTURAL PLANS FROM
ROTONDO FOR ADDITIONAL DETAILS
OF VAULTS.

NOTES:

1. THERE ARE NO WETLANDS OR OTHER ENVIRONMENTALLY SENSITIVE AREAS OR THEIR BUFFER ZONES ON SITE.
2. THERE ARE NO STREAMS, RIVERS, CREEKS, BROOKS, PONDS, DETENTION BASINS, OR DRAINAGE WAYS ON SITE.
3. THERE ARE NO HIGHLY ERODIBLE SOILS, ROCK OUTCROPS OR STEEP SLOPES ON SITE.
4. THE SITE IS NOT LOCATED WITHIN THE CHESAPEAKE BAY CRITICAL AREA (CBA).
5. THERE ARE NO FORESTED AREAS ON SITE.

NOTES:

- THIS PLAN REFLECTS FULL BUILD OUT OF ALL PROPOSED PARKING LOTS.
- CONSTRUCTION WILL PROCEED IN PHASES DEPENDENT UPON FUNDING
- REFER TO LANDSCAPE PLANS ON SHEETS C-010 THRU C-012 FOR PROPOSED TREES AND PLANTINGS

DATA SOURCES

1. Existing topography and structures shown hereon outside of the limits of field run topography are from the Baltimore City Office of Technology - GIS Lab.
2. Existing topography from field run survey by Century Engineering Inc. dated Aug-Sept. 2020
3. Control points 4 elevations are referred to the Baltimore City Survey Control System and are tied to the following control stations:
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35001 N 8240.140 E -9800.600 Elev. 324.640
4. Public utilities shown hereon are from public drawings, field location and other sources.

DATE	BY	REVISIONS

**CENTURY
ENGINEERING**

A Kleinfelder Company
10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

STORMWATER MANAGEMENT
PLAN 3

THE MARYLAND ZOO
IN BALTIMORE
PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

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.: 32574
EXPIRATION DATE: 1/16/2024



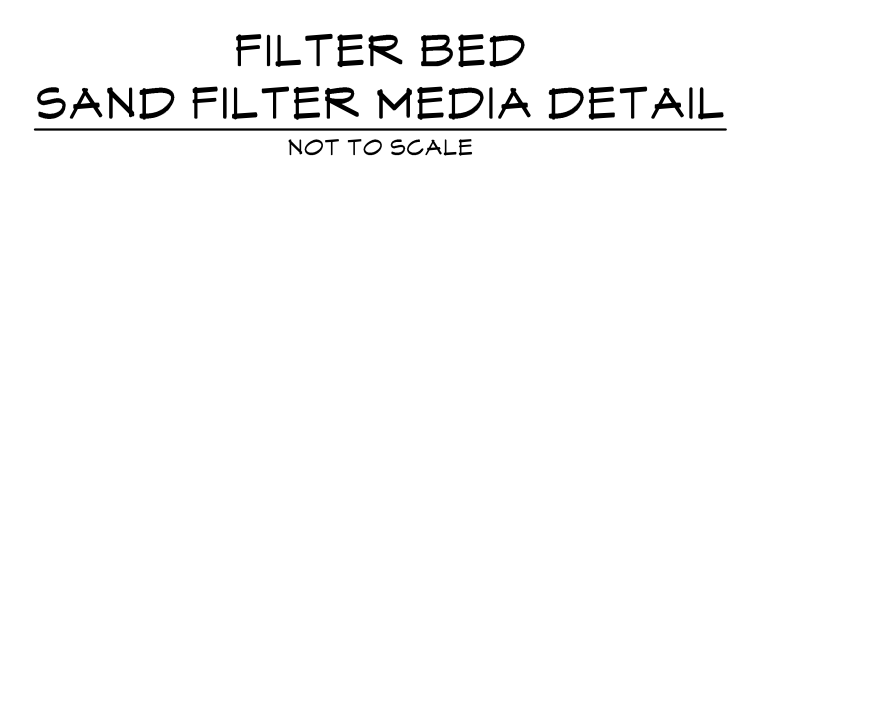
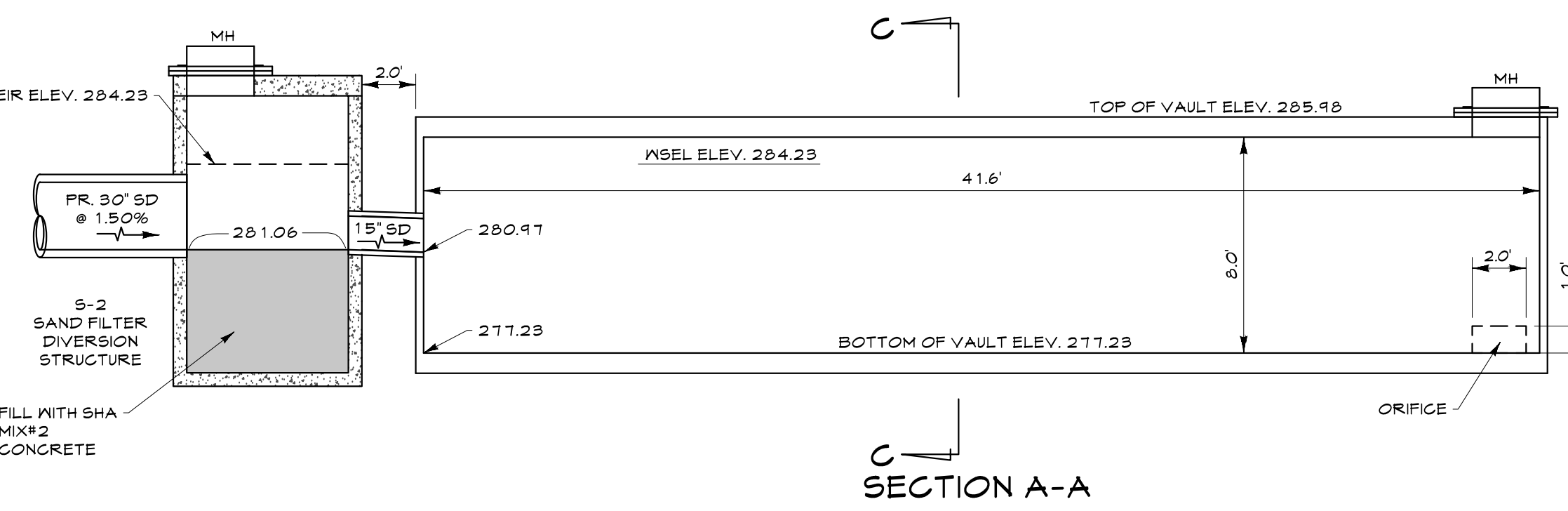
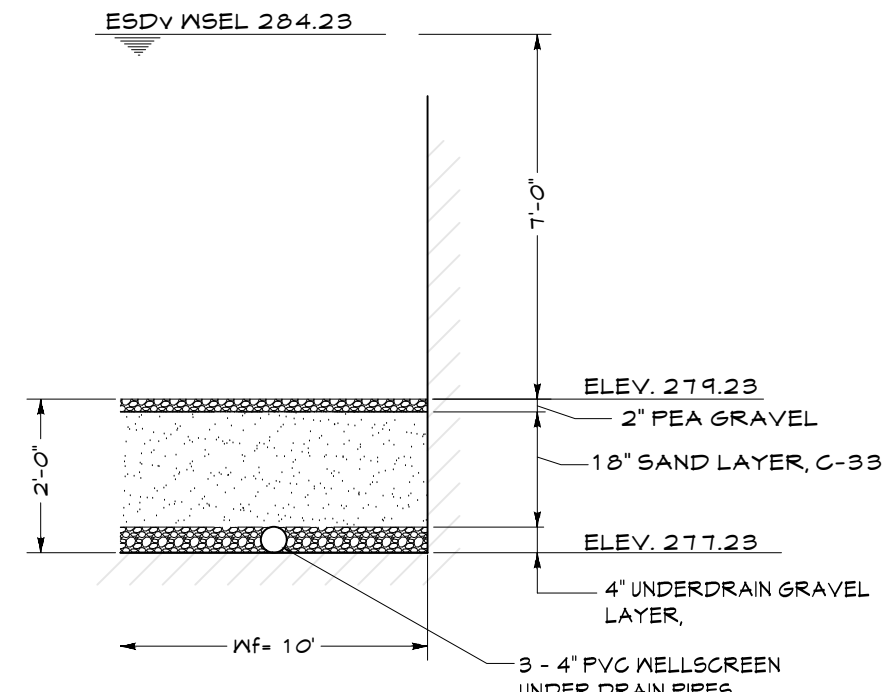
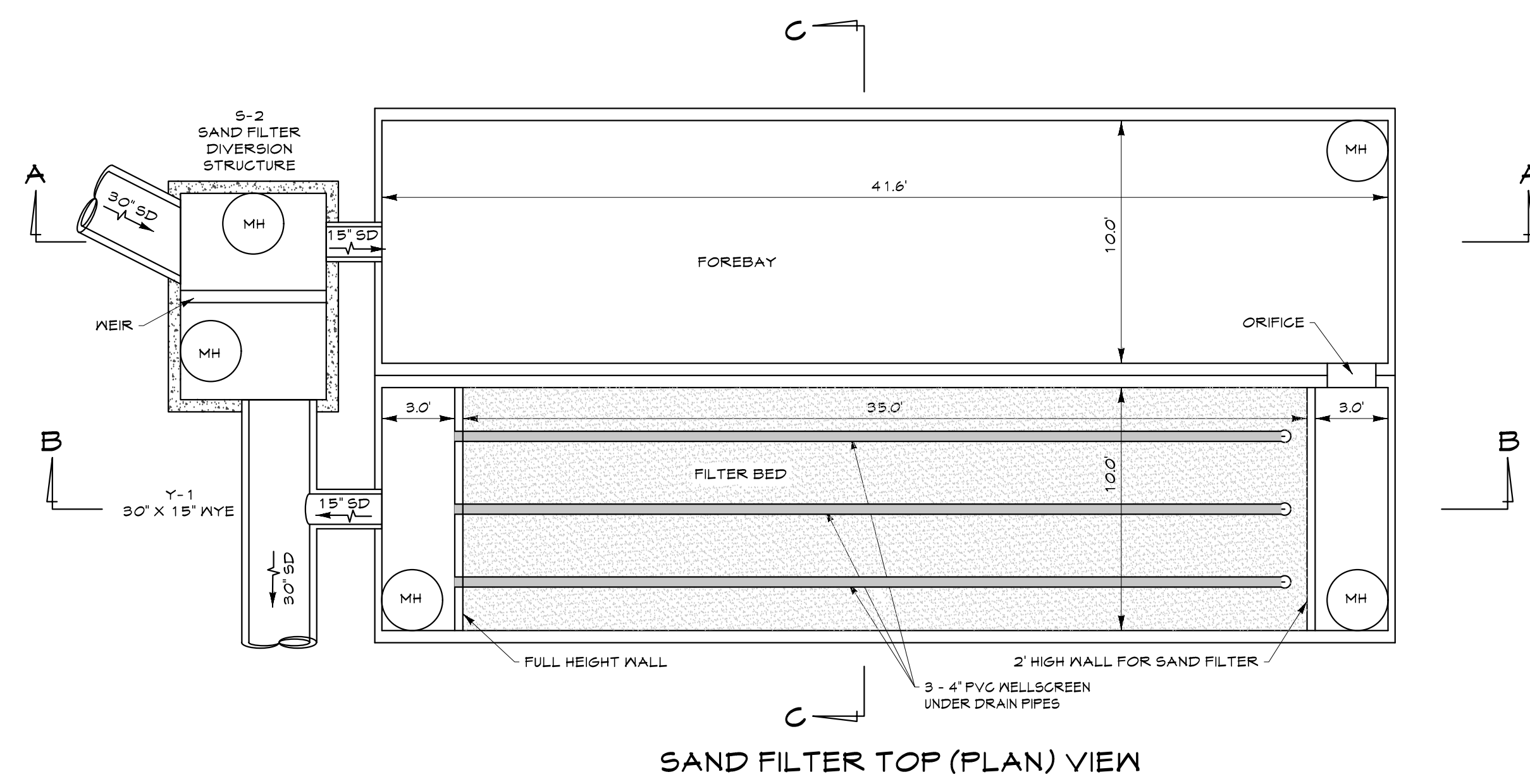
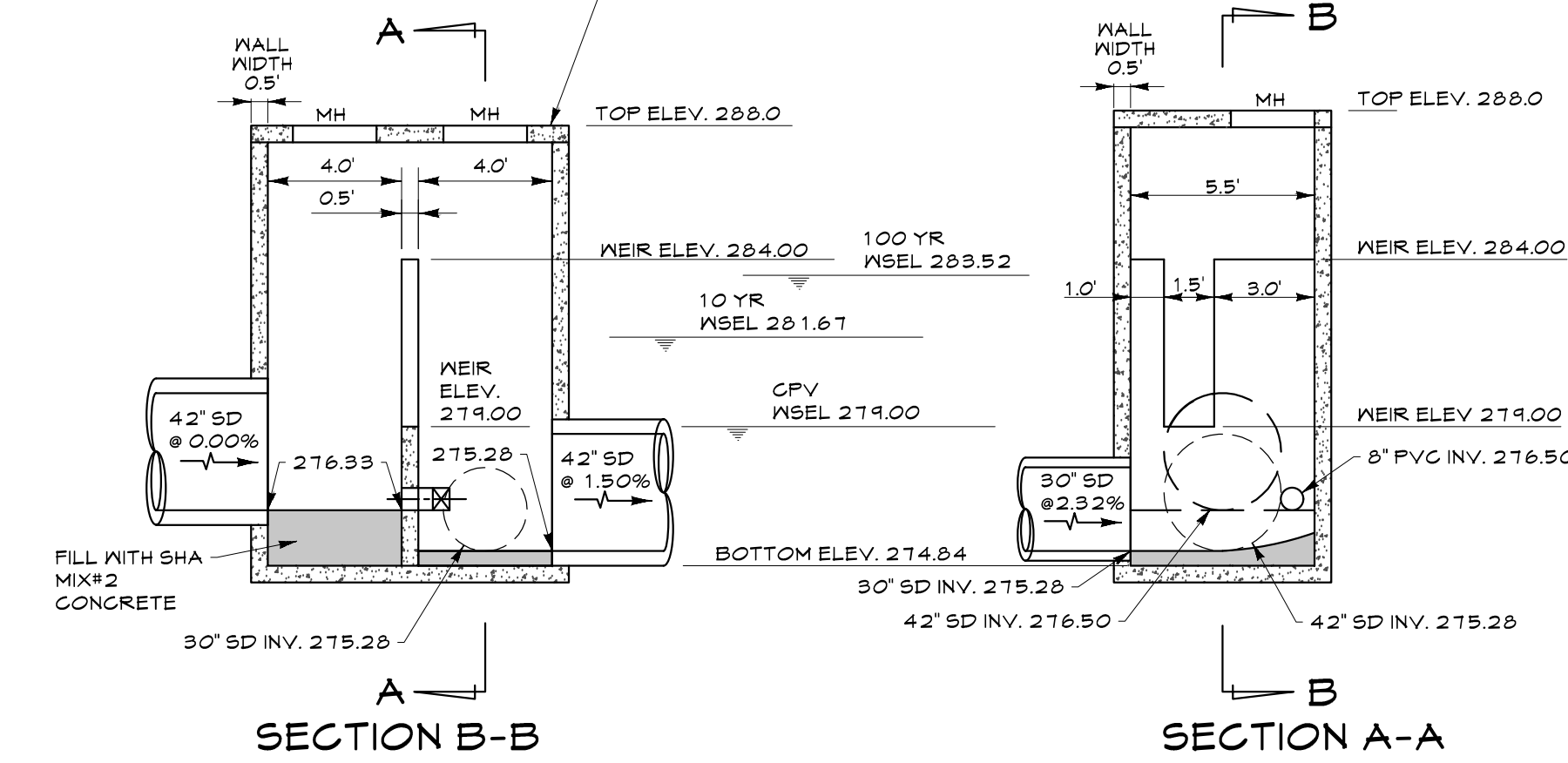
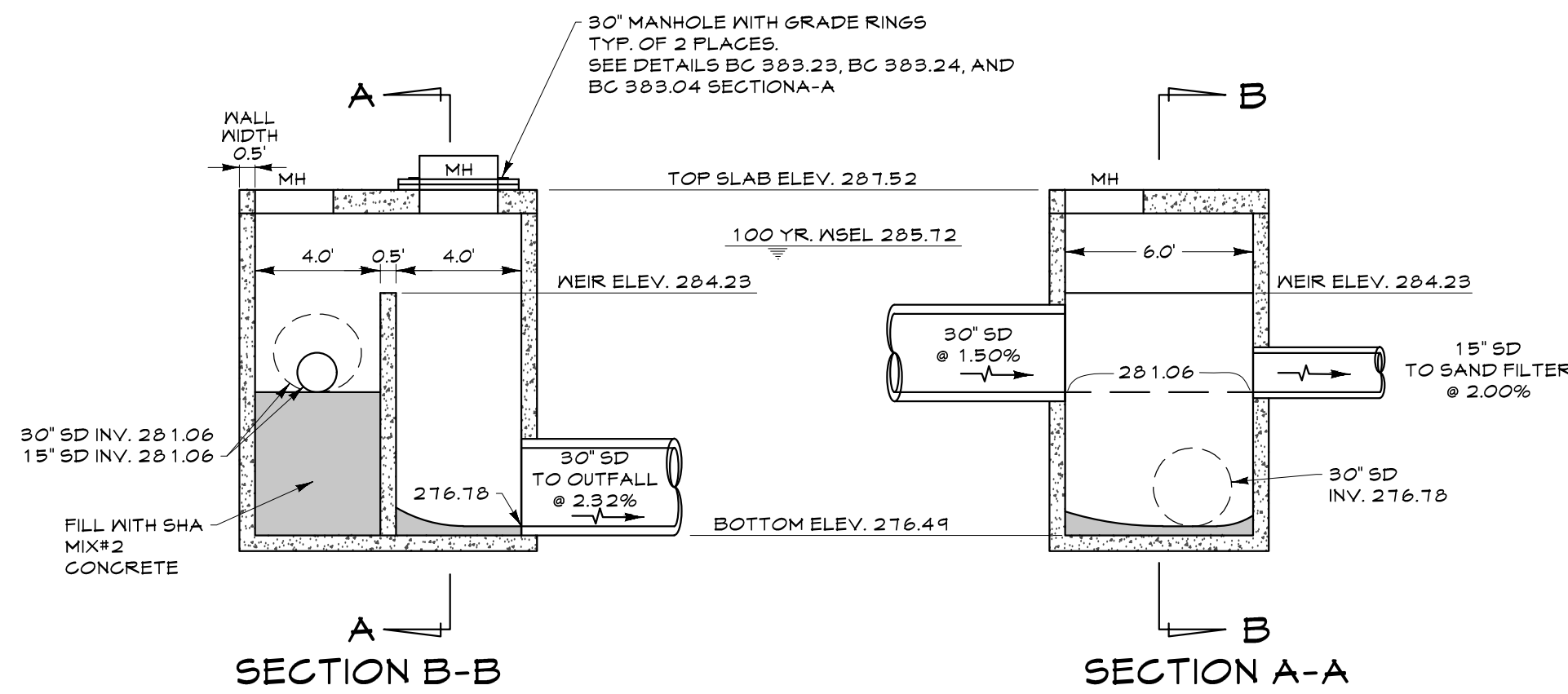
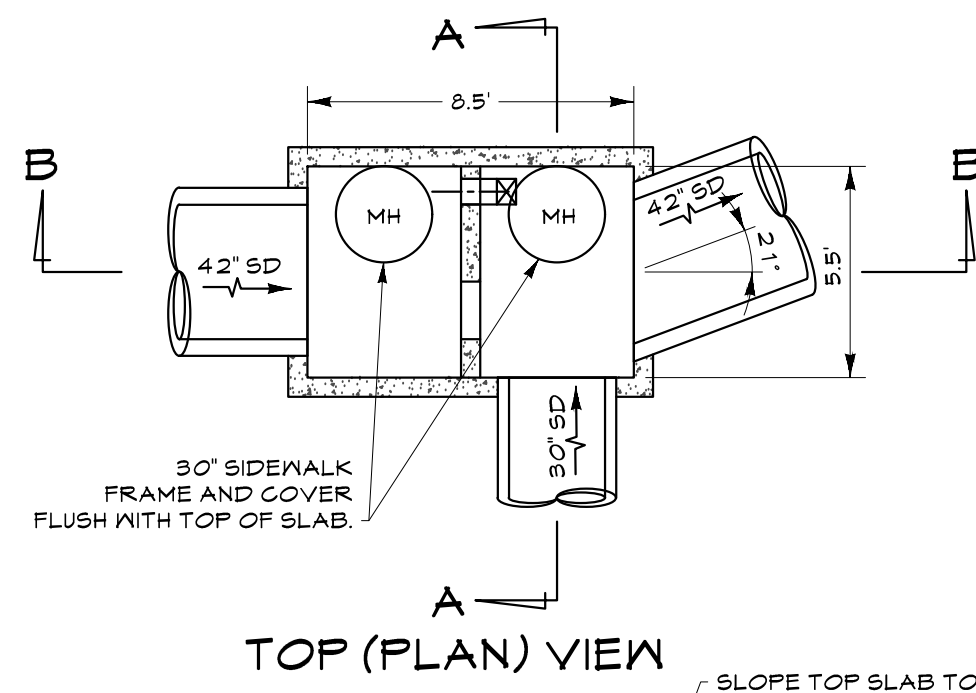
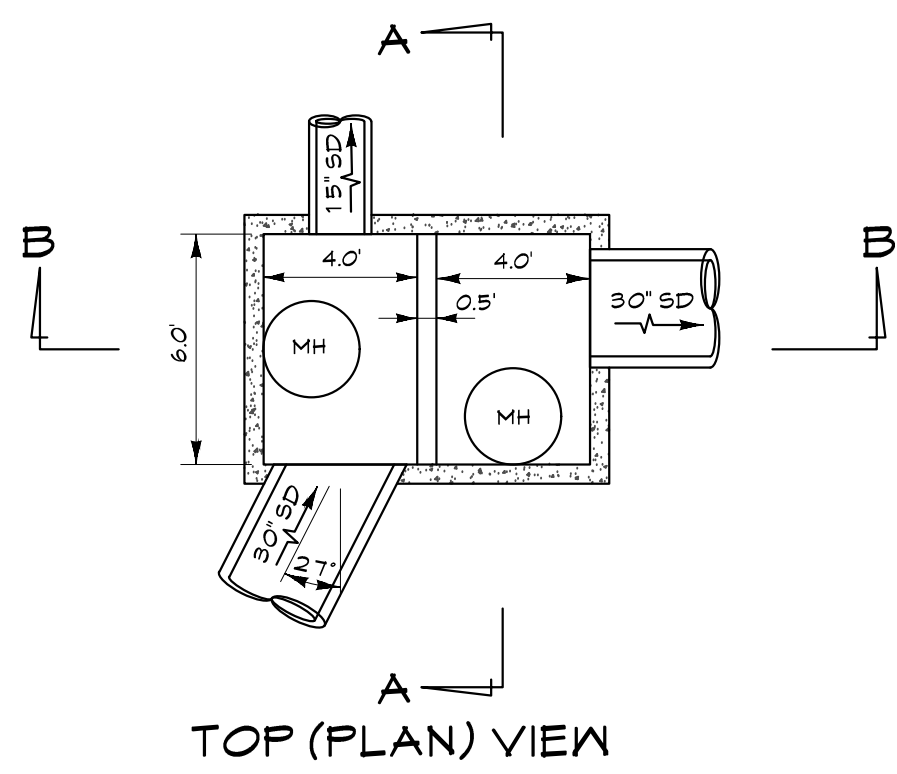
OWNER:
Mayor & City Council of Baltimore
One Calvert Plaza
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Baltimore MD 21202
(410)-675-3651

DEVELOPER:
The Maryland Zoo in Baltimore
1876 Mansion House Drive
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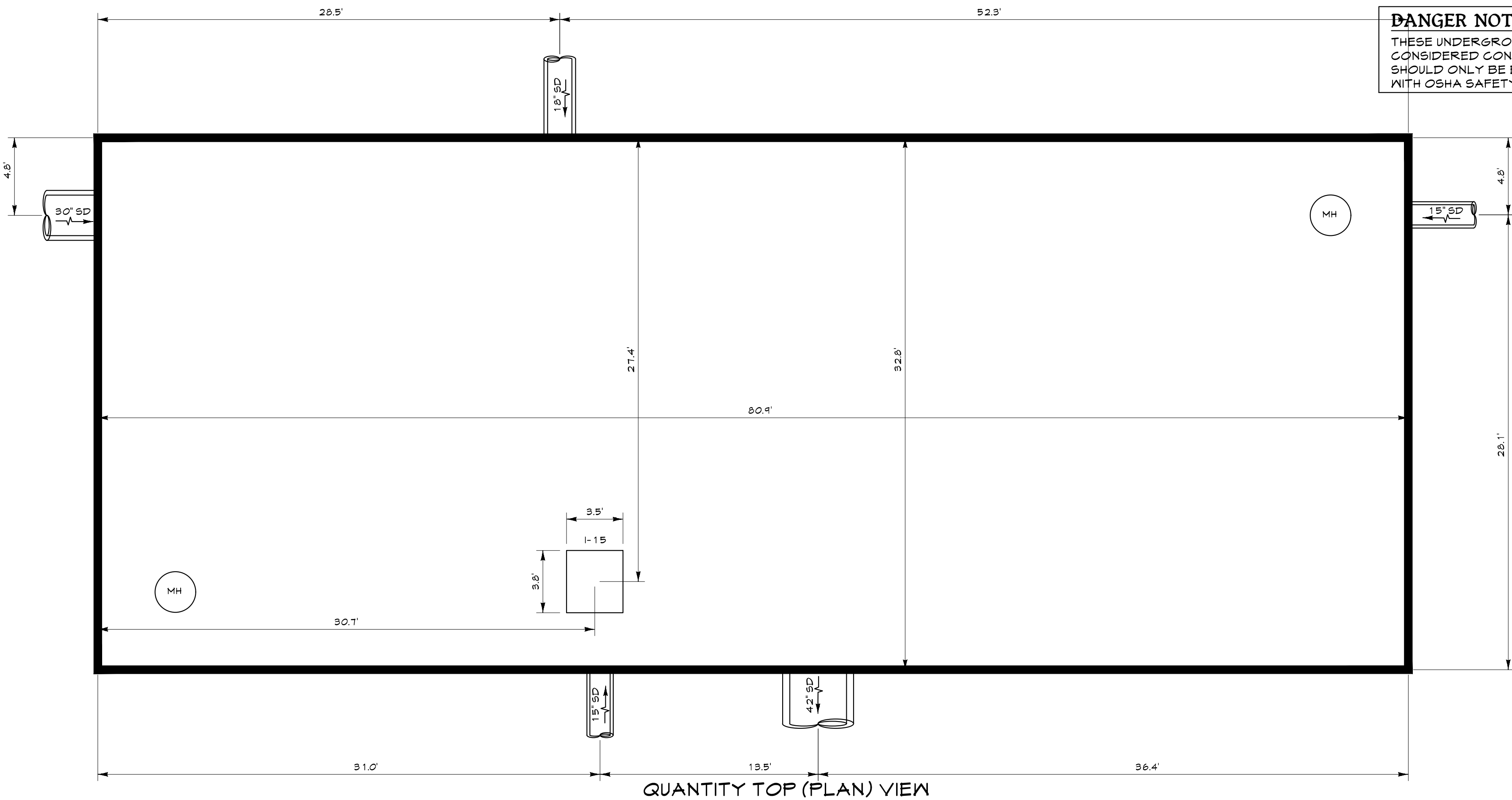
DRAWN BY: AA	DESIGN BY: DRS/KRB	REVIEW BY: AJD
SCALE: 1"=10'	DRAWING: C-066	PROJECT No.: 201069.00

COMBINED SITE DEVELOPMENT/
FINAL SWM PLAN

T:\2020\Facilities\20106400 MD Zoo Parking\CAD\Drawings\Construction\20106400 (C-067) SWM Cross Sections and Details.dwg, Jul 18, 2022 1:28pm dshannan



DANGER NOTE:
THESE UNDERGROUND FACILITIES ARE CONSIDERED CONFINED SPACES BY OSHA AND SHOULD ONLY BE ENTERED IN ACCORDANCE WITH OSHA SAFETY GUIDELINES.



B.3.1 MATERIAL SPECIFICATIONS FOR SAND FILTERS

MATERIAL	SPECIFICATION	SIZE	NOTES
SAND	CLEAN AASHTO-M-6 OR ASTM-C-33 SAND	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRAYSTONE NO. 10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATED OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND.
PEA GRAVEL UNDERDRAIN GRAVEL	ASTM D 442 AASHTO-M-43	NO. 6 0.315" TO 0.15"	USE CLEAN BANK-RUN GRAVEL.
UNDERDRAIN PIPING	ASTM F 158, TYPE PS 28 OR AASHTO-M-210	4" TO 6" RIGID SCH. 40 PVC OR SDR35	3/8" PERFORATIONS @ 6" ON CENTER, 4 HOLES PER ROW; MINIMUM OF 3" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES.
CONCRETE (CAST IN PLACE)	MSHA STANDARDS AND SPECS. SECTION 402, MIX NO. 3, FC = 3500 PSI, NORMAL WEIGHT, AIR-ENTRAINED, RE-ENFORCING TO MEET ASTM-C-115-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONCRETE REQUIRED; 28 DAY STRENGTH AND SLUMP TEST; ALL CONCRETE DESIGN (CAST-IN-PLACE OR PRE-CAST) NOT USING PREVIOUSLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND.
CONCRETE (PRE-CAST)	PER PRE-CAST MANUFACTURER	N/A	SEE ABOVE NOTE
NON-REBAR STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM-A-123

UNDERGROUND SAND FILTER STRUCTURE

B.3.A SAND FILTER SPECIFICATIONS

- Material Specifications for Sand Filters
- Sand Filter Testing Specifications

Underground sand filters, facilities within sensitive groundwater aquifers, and filters designed to serve urban hot spots are to be tested for water tightness prior to placement of filter media. Entrances and exits should be plugged and the system completely filled with water to demonstrate water tightness. Water tightness means no leakage for a period of 8 hours. All overflow weirs, multiple orifices, and flow distribution slots are to be field-tested to verify adequate distribution of flows.

3. Sand Filter Construction Specifications

Provide sufficient maintenance access (i.e., 12" x 12" x 12" road with legally recorded easement). Vegetated access slopes are to be a minimum of 1:0.5 gravel slopes to 15%; paved slopes to 3:0.5. Absolutely no traffic is to enter the filter until all contributing drainage areas have been stabilized. Surface of filter bed is to be level. All underground sand filters should be clearly delineated with signs so that they may be located when maintenance is due.

4. Specific signs pertaining to Underground Sand Filters (F-2)

Provide manhole and/or grates to all underground and below grade structures. Manholes shall be in compliance with standard specifications for each county but shall be at least 30" minimum (to comply with OSHA confined space requirements). Minimum and self-ventilating doors are also acceptable. Ten inch wide (minimum) manhole steps (12" o.c.) shall be cast in place or drilled and mortared into the wall below each manhole. A 5' minimum height clearance (from the top of the sand layer to the bottom of the upper/surface slab) is required for all permanent underground structures. Lift rings are to be supplied to remove/replace top slabs on pre-fabricated structures. Manhole covers should allow for proper ventilation. Underground sand filters should be constructed with a gate valve located just above the top of the filter bed for dewatering in the event that clogging occurs. Underground sand beds shall be protected from trash accumulation by a wide mesh geotextile screen to be placed on the surface of the sand bed; screen is to be rolled up, removed, cleaned and re-installed during maintenance operations.

NOTE: THIS PLAN SHOWS SIZE AND CONFIGURATION OF VAULT. REFER TO STRUCTURAL PLANS FOR STORM POD PROVIDED BY ROTONDO FOR ADDITIONAL DETAILS.

OWNER:
Mayor & City Council of Baltimore
One Calvert Plaza
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(410)-675-3651

DEVELOPER:
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(410)-346-7102

DATE	BY	REVISIONS

CENTURY ENGINEERING
A Kleinfelder Company
10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 www.centuryeng.com

STORMWATER MANAGEMENT CROSS-SECTIONS AND DETAILS

THE MARYLAND ZOO IN BALTIMORE PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

PROFESSIONAL CERTIFICATION

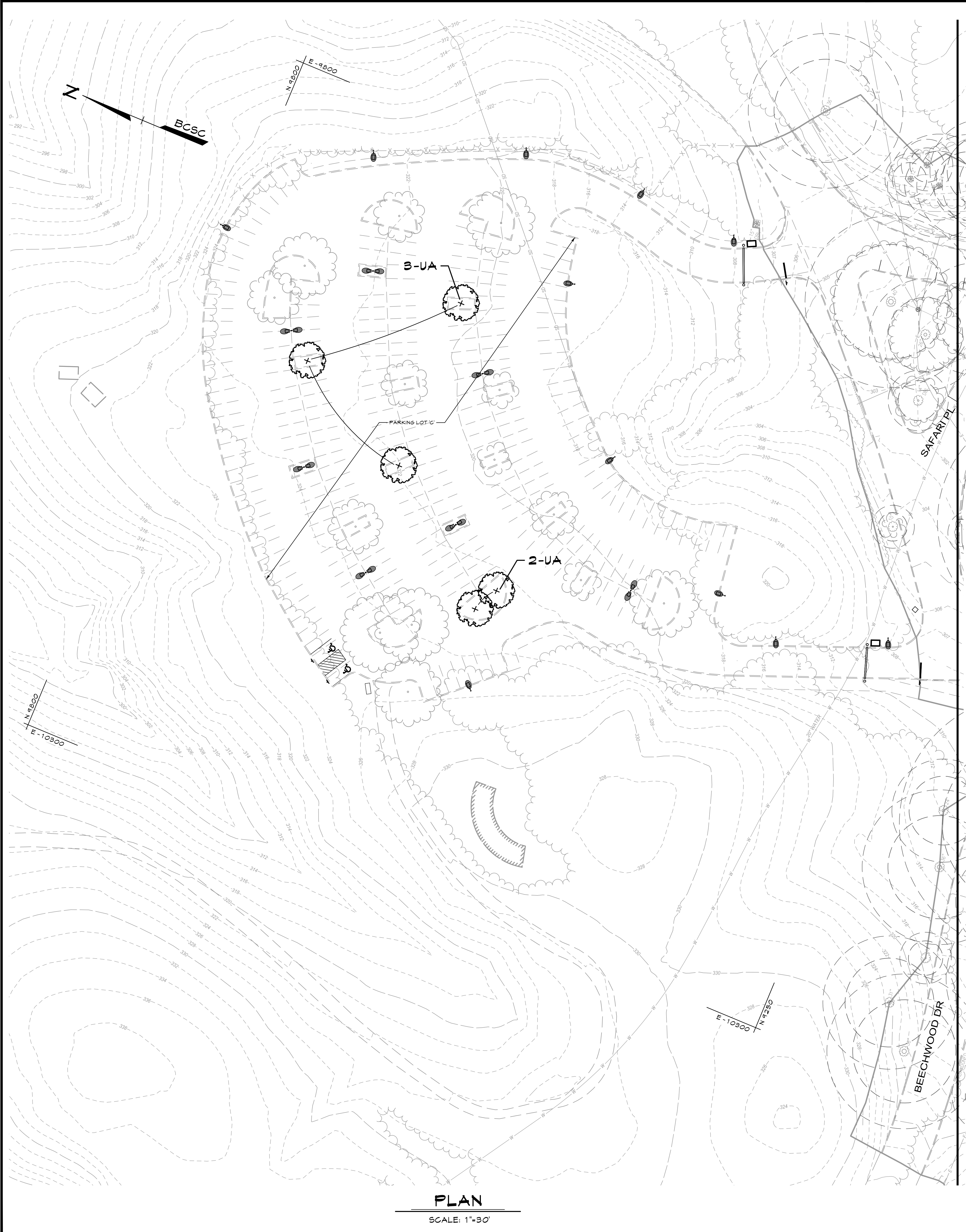
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO.: 33574
EXPIRATION DATE: 1/16/2024

DRAWN BY: AA
DESIGN BY: DRS/KRB
SCALE: 1" = 5'
PROJECT NO.: 201069.00

REVIEW BY: AJD
REVIEW DATE: 7/15/2022
DRAWING:

ESD # 7969

T:\2020\Facilities\20106400 MD Zoo Parking\Civil\CADD\Drawings\Construction\20106400 (C-011) Landscape Plan 2.dwg Jul 16, 2022 1:24pm dhananian

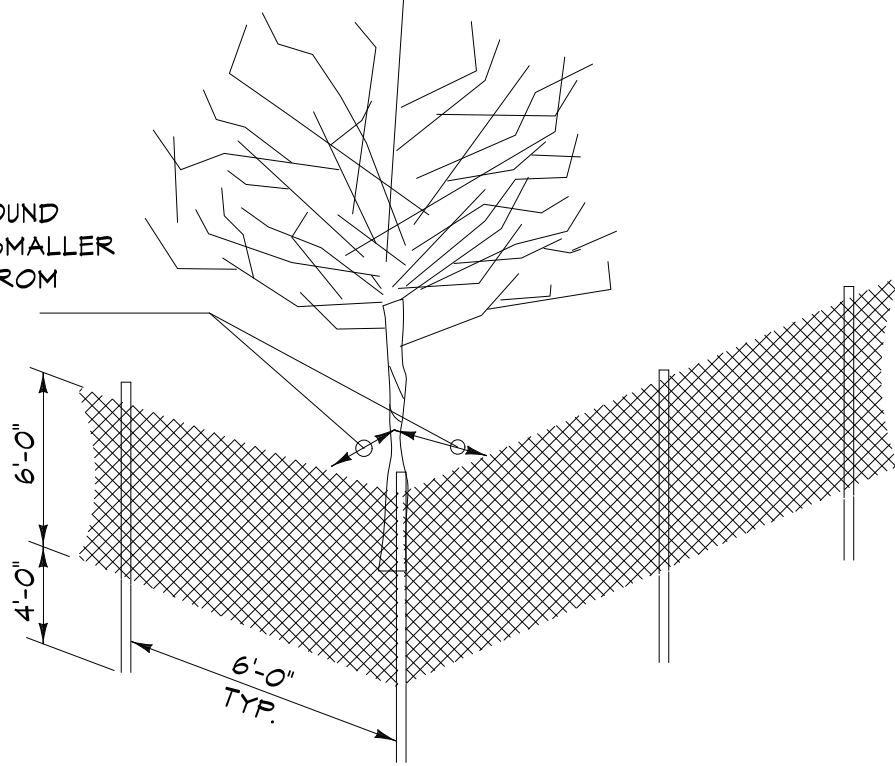


MATCHLINE - SEE SHEET C-010

LEGEND

- | | | | |
|-----|------------------------------------|-----|--|
| --- | Existing Minor Contour | --- | Proposed Curb and Gutter |
| --- | Existing Major Contour | --- | Proposed Retaining Wall |
| --- | Existing Edge of Road | --- | Proposed Edge of Pavement |
| --- | Existing Storm Drain | --- | Proposed Guardrail |
| --- | Existing Water | --- | Proposed Concrete Sidewalk |
| --- | Existing Sewer | --- | Proposed Fence |
| --- | Existing Gas Line | --- | Proposed Tree Line |
| --- | Existing Underground Electric Line | --- | Tree Protection Fence |
| --- | Existing Curb and Gutter | --- | Proposed Shade Tree
(Common Hackberry, Ginkgo, Honeylocust,
American Sycamore, Swamp White Oak, Bur
Oak, Silver Linden, American Elm, etc.) |
| --- | Existing Retaining Wall | --- | Proposed Ornamental Tree
(Serviceberry, Redbud, Dogwood, Green
Hawthorne, Sweetbay Magnolia, Sourwood, etc.) |
| --- | Existing Edge of Paving | --- | Proposed Evergreen Tree
(American Holly, White Pine, Norway Spruce, etc.) |
| --- | Existing Sidewalk | --- | Proposed Shrubs
(Viburnum, Sweetspire, Inkberry, Red-twig Dogwood, etc.) |
| --- | Existing Tree Line | --- | Proposed Groundcover
(Coreopsis, Big Blue Liriope, Black-eyed Susan,
Coneflower, Plumbago, Sedge, Blue Flag, Aster, Joe
Pye Weed, Solomon's Seal, etc.) |
| --- | Existing Building/Structure | --- | Proposed Pedestrian "Acorn" Type Light |
| --- | Water Edge or Stream Centerline | --- | Proposed Parking Lot "Cobra" Type Light |
| --- | Existing Fence | | |
| --- | Existing Pavement | | |
| --- | Existing Sign | | |
| --- | Proposed Major Contour | | |
| --- | Proposed Minor Contour | | |
| --- | Proposed Storm Drain Line | | |
| --- | Proposed Manhole | | |
| --- | Proposed Inlet | | |
| --- | Proposed Tee | | |

PLACE FENCE AT DRIPLINE AROUND TREES WITH 20' SPREAD. FOR SMALLER TREES, PLACE FENCE 10' MIN FROM TRUNK.



- TREE PROTECTION FENCE SHALL BE 6'-0" HIGH CHAIN LINK FENCE WITH 2' O.D. POSTS AT 6'-0" ON CENTER. ALL POSTS SHALL BE HAND DUG INTO EXISTING GROUND WITH MINIMUM DISRUPTION TO EXISTING TREE ROOTS. SEE PLAN FOR LOCATION OF ALL TREE PROTECTION FENCES.
- NO CONSTRUCTION EQUIPMENT MATERIALS OR EXCAVATED EARTH PERMITTED INSIDE TREE PROTECTION FENCES.

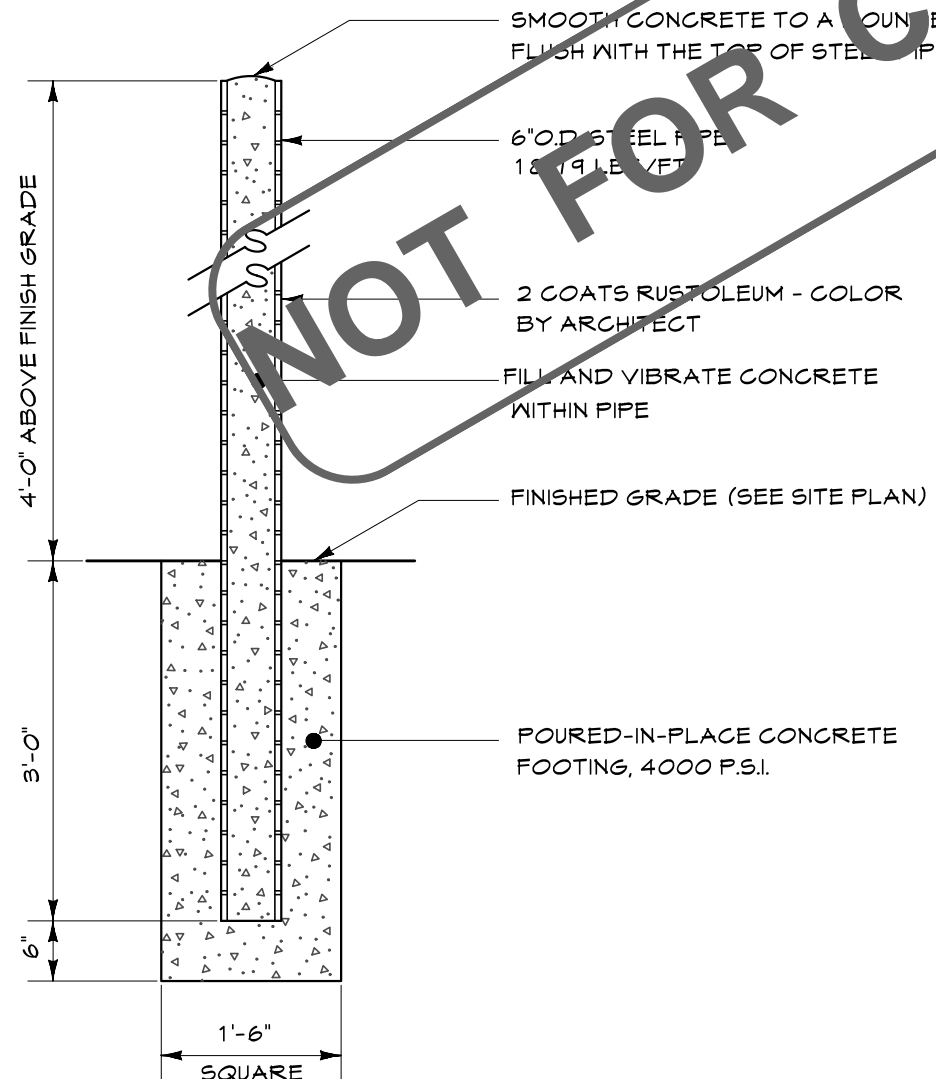
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

6-23-5

MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

CHAIN LINK TREE PROTECTION FENCE

Not To Scale



Not To Scale

SEE DRAWING C-013 FOR PLANTING DETAILS

DATA SOURCES

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- Spot elevations 4 elevations are referred to the Baltimore City Survey Control System and are tied to the following control stations:
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- Public utilities shown hereon are from public drawings, field location and other sources.

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CENTURY ENGINEERING

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LANDSCAPE PLAN 2

THE MARYLAND ZOO IN BALTIMORE PARKING LOT REHABILITATION

BALTIMORE, MARYLAND
WARD 13 SECTION 5 BLOCK 3499 LOT 001

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DRAWN BY: AA
DESIGN BY: DRS/KRB

REVIEW BY: AJD
REVIEW DATE: 7/15/2022

SCALE: AS SHOWN
PROJECT No: 201069.00

DRAWING: C-071

ESD # 7969