

# DEPARTMENT OF ENERGY & THE ENVIRONMENT

## CONCEPT DESIGN DRAWINGS FOR DPR PARKLAND STORMWATER RETROFITS IV BENNING STODDERT LID RETROFITS JANUARY 2024

SWM PLAN # XXXX  
100 STODDERT PLACE, SE  
WASHINGTON, D.C. 20019

### CLIENT

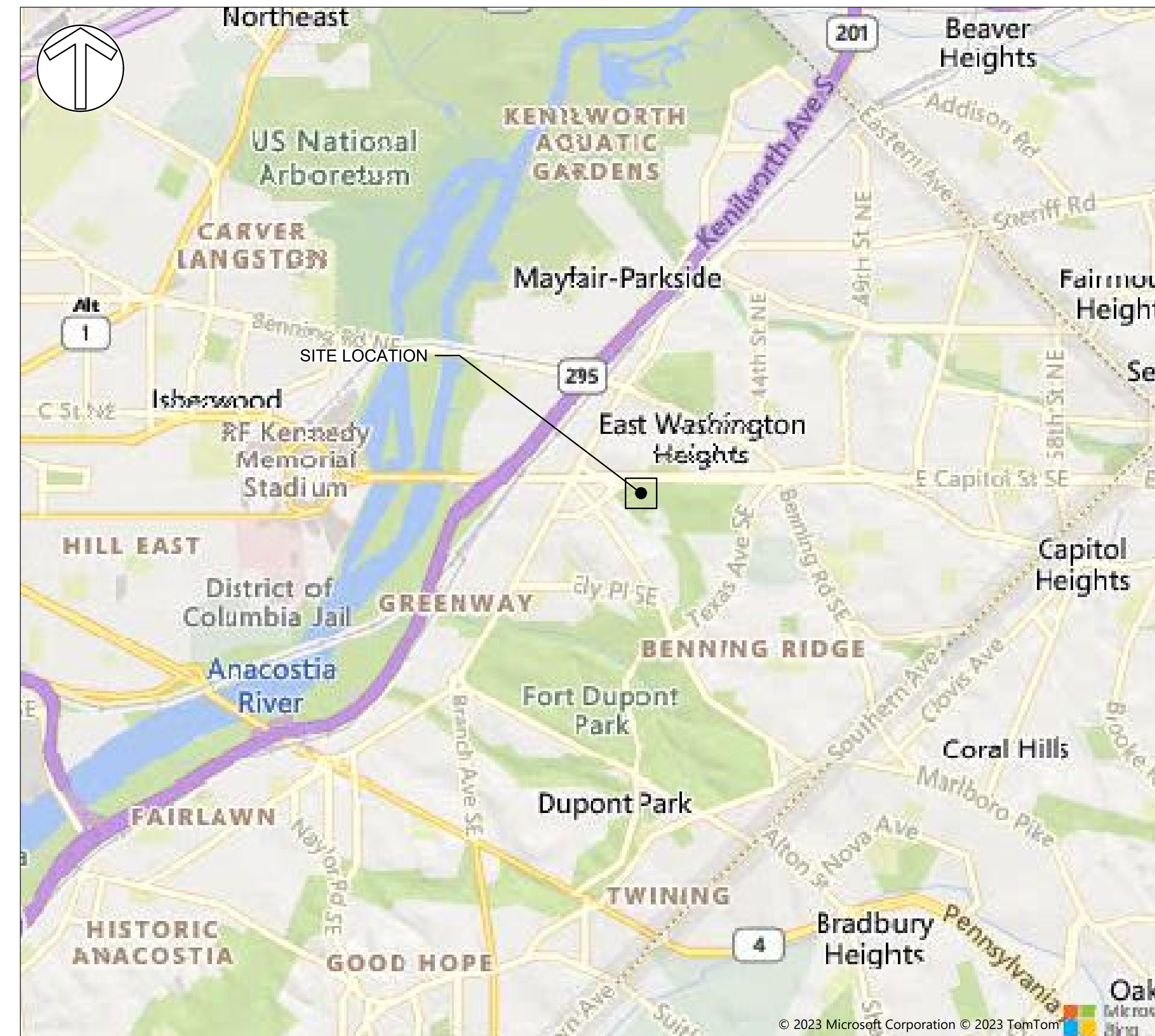
ELAINE VIDAL, ENVIRONMENTAL PROTECTION SPECIALIST  
WATERSHED PROTECTION DIVISION  
DEPARTMENT OF ENERGY AND ENVIRONMENT  
GOVERNMENT OF THE DISTRICT OF COLUMBIA  
1200 FIRST STREET, NE 5TH FLOOR  
WASHINGTON DC 20002

DATE: ISSUES / REVISIONS

### LEGEND

EXISTING	PROPOSED
— MAJOR CONTOUR	— LOD — LIMIT OF DISTURBANCE
— MINOR CONTOUR	— TOP OF BIORETENTION
— SD — SD — STORM DRAIN (GIS)	— BOTTOM OF BIORETENTION
— SS — SS — SANITARY SEWER LINE (GIS)	— UNDERDRAIN
— EDGE OF PAVEMENT	— SF — SF — SILT FENCE
— BUILDING OUTLINE (GIS)	— CIP — CURB INLET PROTECTION
— SOIL TYPE BOUNDARY (GIS)	— AT-Grade — AT-GRADE INLET PROTECTION
— TREE (GIS)	— SCE — STABILIZED CONSTRUCTION ENTRANCE
	— MULCH — MULCH ACCESS ROAD

### VICINITY MAP



LIMIT OF DISTURBANCE = 0.81 ACRES  
PROPERTY OWNER: DISTRICT OF COLUMBIA DEPARTMENT OF PARKS AND RECREATION  
SCALE: 1" = 2,000'

### PROJECT NARRATIVE

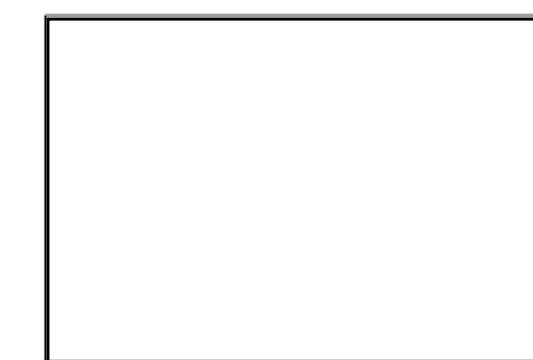
THE PROJECT AREA IS IN WARD 7, IN THE EASTERN PORTION OF THE DISTRICT OF COLUMBIA AT 100 STODDERT PLACE, SE. THE PROJECT SITE WAS IDENTIFIED THROUGH DOE'S DPR PARKLAND STORMWATER RETROFITS IV TO DESIGN AND CONSTRUCT LOW IMPACT DEVELOPMENT RETROFITS. THIS PROJECT INVOLVES THE INSTALLATION OF THREE BIORETENTION BASINS TO CAPTURE DRAINAGE FROM AN EXISTING PARKING LOT, TENNIS COURT, AND E CAPITOL ST SE. REDUCE THE QUANTITY OF STORMWATER RUNOFF AND IMPROVE THE WATER QUALITY BEFORE RETURNING BACK TO THE CONVEYANCE SYSTEM.

### STATEMENT BY PROFESSIONAL ENGINEER REGISTERED IN THE DISTRICT OF COLUMBIA

This is to certify that the engineering features of all stormwater best management practices (BMPs), stormwater infrastructure, and land covers (collectively the "Facility") have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of stormwater pollutants. I further certify that the Facility has been designed in accordance with the specification required under Chapter 5 of Title 21 of the District of Columbia Municipal Regulations. It is also stated that the undersigned has furnished the applicant with a set of instructions for the maintenance and operation of the site's Facility.

BRYAN ARVAL, PROJECT MANAGER  
Name and Title (please type)  
2081 CLIPPER PARK RD, BALTIMORE, MD 21211  
Address  
Date: 01/05/2024 Phone No: 410.554.0156

Affix Seal:



### AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Within 21 days after completion of construction of all stormwater best management practices (BMPs), stormwater infrastructure, and land covers (collectively the "Facility"), please send this page to the Watershed Protection Division of the District Department of the Environment.

1. **Facility Information:**  
Source Name: \_\_\_\_\_  
Source Location Street: \_\_\_\_\_  
City: \_\_\_\_\_  
DCRA Permit No.: \_\_\_\_\_  
Date Issued: \_\_\_\_\_

2. **As Built Certification**  
I hereby certify that all stormwater best management practices (BMPs), stormwater infrastructure, and land covers have been built substantially in accordance with the approved plans and specifications and that any deviations noted below will not prevent the system from functioning in compliance with the requirements Chapter 5 of Title 21 of the District of Columbia Municipal Regulations when properly maintained and operated. These determinations have been based upon on-site observation of construction, scheduled and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

Signature of Engineer: \_\_\_\_\_ Name (Please Type) D.C. Reg. No. \_\_\_\_\_

Affix Seal: \_\_\_\_\_  
Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
Date: \_\_\_\_\_ Phone No.: \_\_\_\_\_

Substantial deviations from the approved plans and specifications (attach additional sheets if required).

### SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
C001	COVER SHEET
C010	GENERAL NOTES (NOT INCLUDED IN CONCEPT DRAWINGS)
C020	SPECIFICATIONS (NOT INCLUDED IN CONCEPT DRAWINGS)
C100	SITE PLAN
C101	TREE SURVEY PLAN
C110	EXISTING CONDITIONS PLAN
C111	EXISTING CONDITIONS PLAN
C120	EROSION AND SEDIMENT CONTROL PLAN
C121	EROSION AND SEDIMENT CONTROL PLAN
C130	STORMWATER MANAGEMENT PLAN
C131	STORMWATER MANAGEMENT PLAN
L150	PLANTING PLAN
L151	PLANTING PLAN
C500	DETAILS
C510	ESC NOTES (NOT INCLUDED IN CONCEPT DRAWINGS)
C530	ESC DETAILS
C560	PLANTING DETAILS
C600	DA PLAN
C601	DA PLAN
C700	STORMWATER CALCULATIONS

### 30% CONCEPT DRAWINGS



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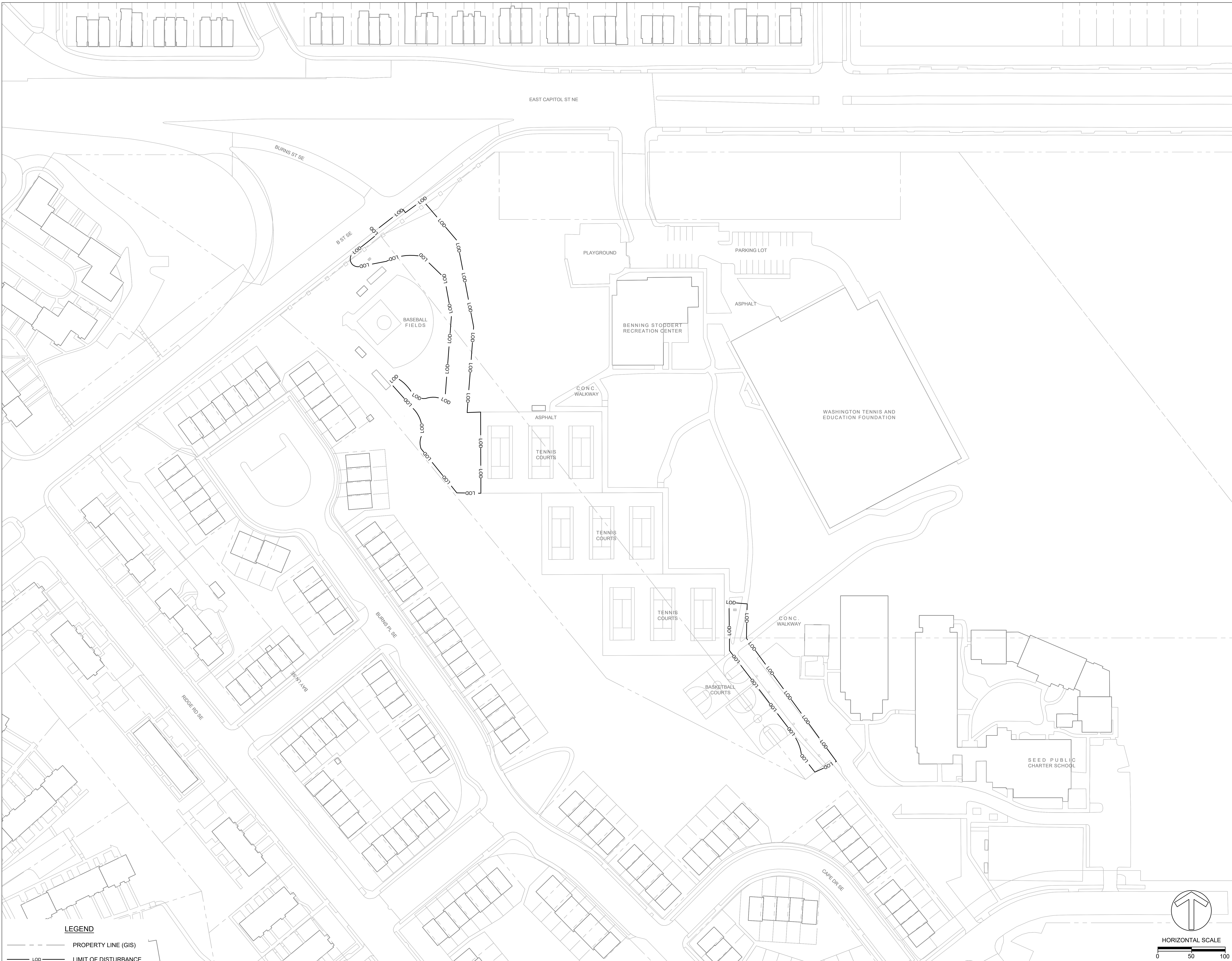
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### BENNING STODDERT LID RETROFITS

### COVER SHEET

PROJECT NO.: 23014.02 SCALE:  
SEAL: BY: EM CHECK: BA  
DWG. NO.:

C001



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**BENNING STODDERT LID RETROFITS**

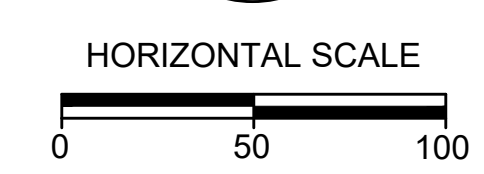
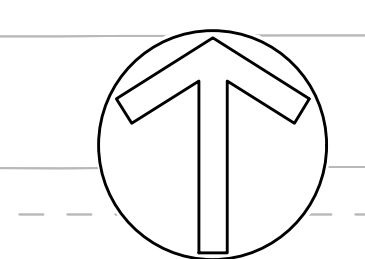
**SITE PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 50'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

**C100**

**LEGEND**

- PROPERTY LINE (GIS)
- LOD — LIMIT OF DISTURBANCE



1/10/2024 T:\Projects\23014.02\DOCS\DPREV\Benning Stoddert\CAD\Plans\lid\Site.dwg

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Project: DPR IV, Benning Stoddert LID Retrofits No: 23014.02 Date: 1/5/2024  
Subject: Tree Assessment Completed by: EM

Table with 3 columns: Condition Score, Scoring System, and various problem counts (No Apparent Problems, Minor Problems, Major Problems, Extreme Problems).

Main tree data table with columns: TREE, DBH1 (in), DBH2 (in), DBH3 (in), DBH4 (in), Circ. (in), SCIENTIFIC, COMMON, Structure, Health, Factor 1-5 (Roots, Trunk, Branches, Small Branches/Twigs, Foliage/Canopy/Deadwood), TOTAL, CONDITION SCORE, CONDITION RATING, Critical Root Zone (CRZ) Area (sq ft) and Impacts (%), and Comments.

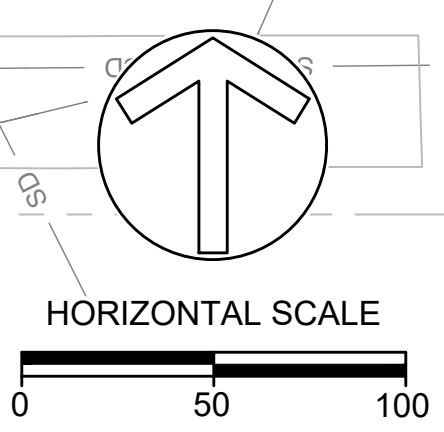
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BENNING STODDERT LID RETROFITS

TREE PROTECTION PLAN

Project details form including PROJECT NO. (23014.02), SCALE (1" = 50'), SEAL, BY (EM), CHECK (BA), and DWG. NO. (C101).





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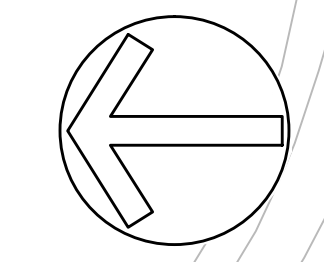
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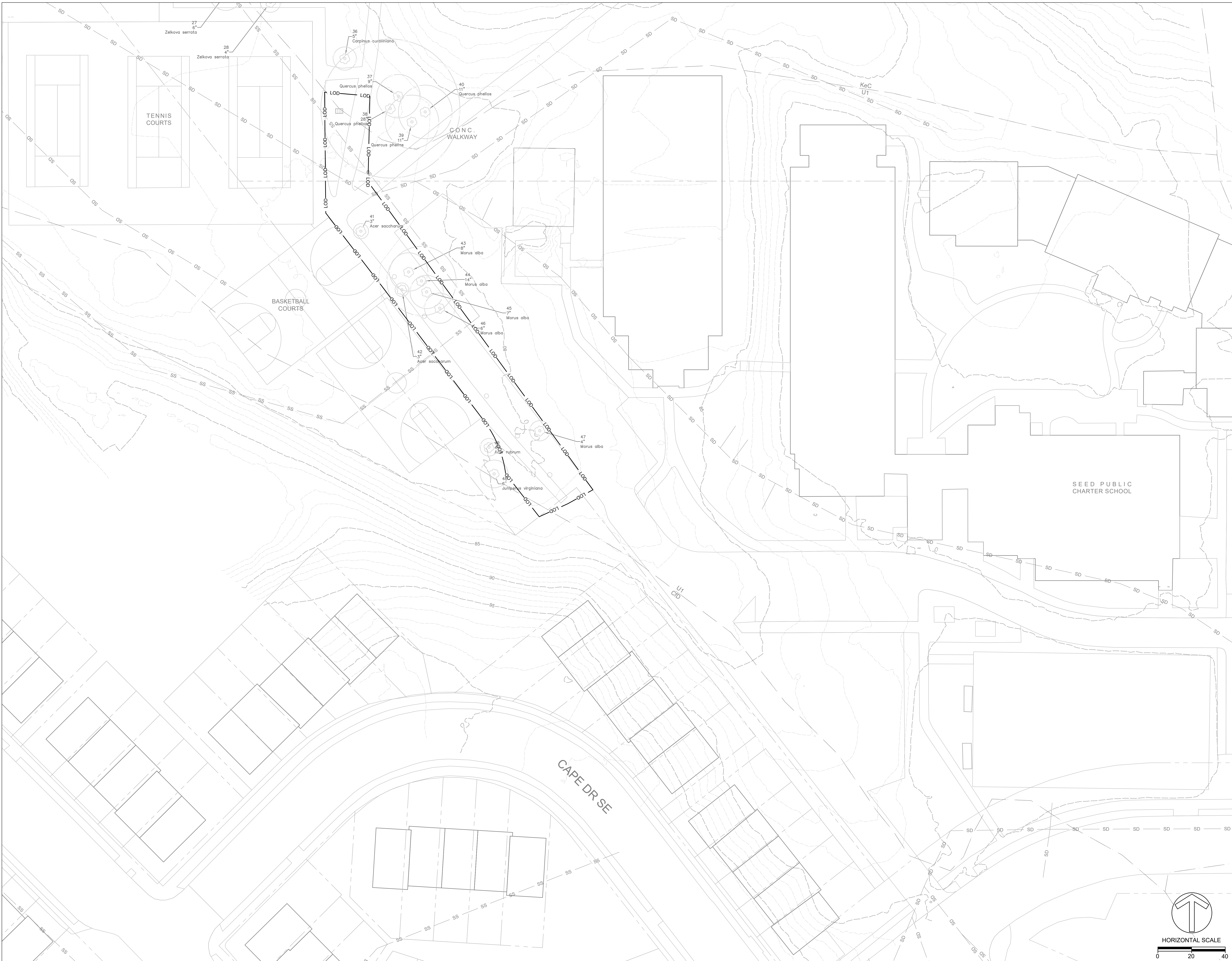
**EXISTING CONDITIONS PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

C110



HORIZONTAL SCALE  
 0 20 40



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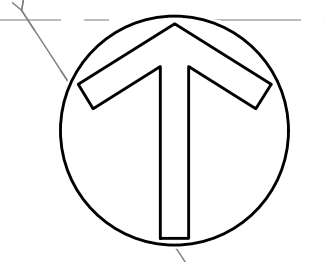
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**BENNING STODDERT LID RETROFITS**

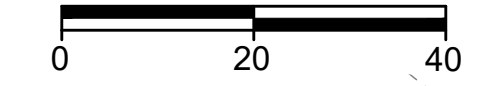
**EXISTING CONDITIONS PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

C111



HORIZONTAL SCALE



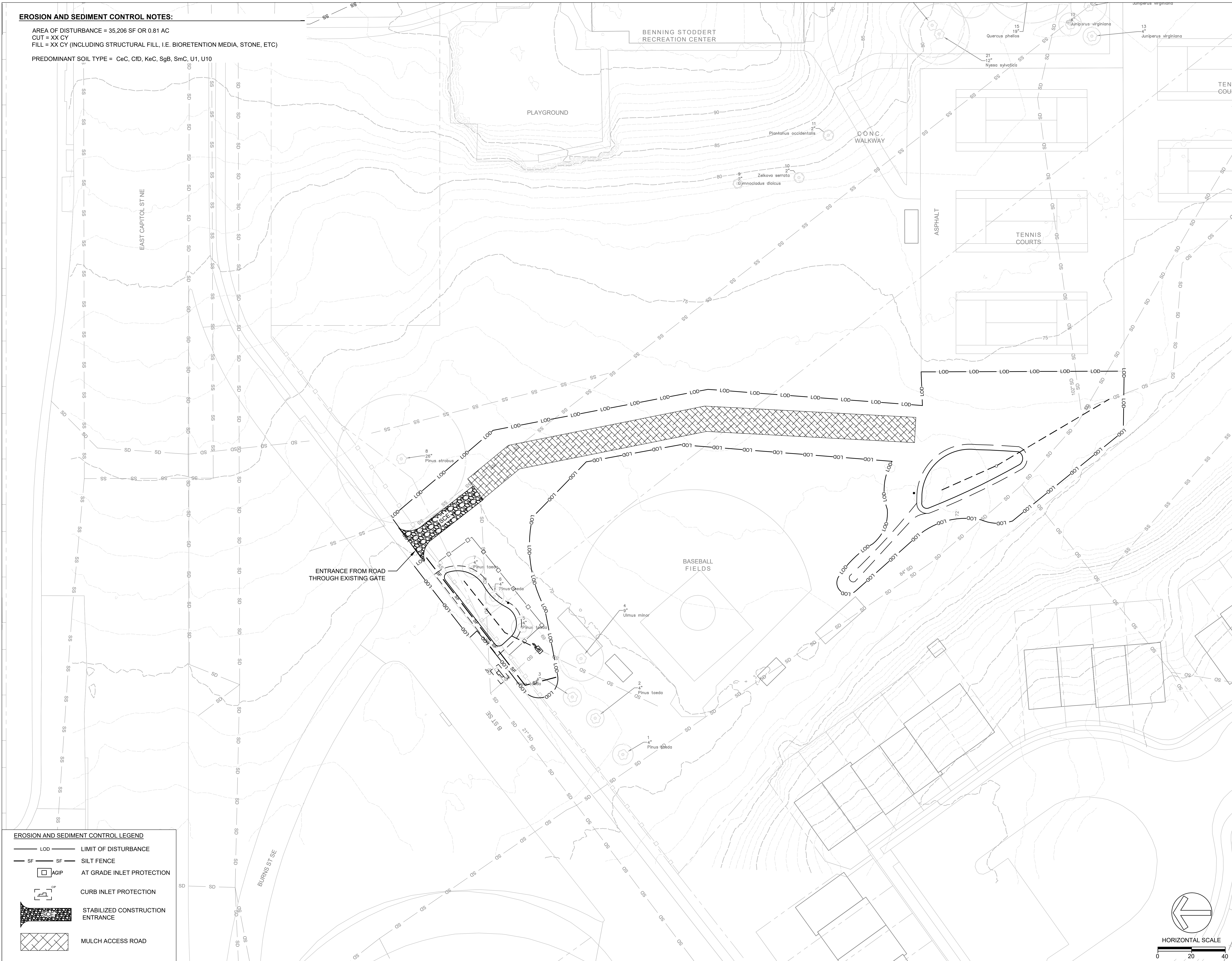
**EROSION AND SEDIMENT CONTROL NOTES:**

AREA OF DISTURBANCE = 35,206 SF OR 0.81 AC  
 CUT = XX CY  
 FILL = XX CY (INCLUDING STRUCTURAL FILL, I.E. BIORETENTION MEDIA, STONE, ETC)  
 PREDOMINANT SOIL TYPE = CeC, CfD, KeC, SgB, SmC, U1, U10

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**EROSION AND SEDIMENT CONTROL LEGEND**

- LOD — LIMIT OF DISTURBANCE
- SF — SILT FENCE
- AGIP AT GRADE INLET PROTECTION
- CURB INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE
- MULCH ACCESS ROAD

**30% CONCEPT DRAWINGS**

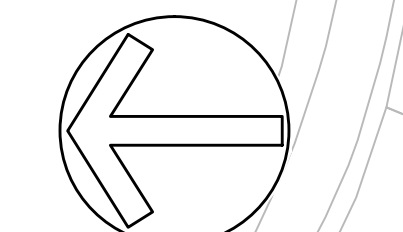


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**BENNING STODDERT LID RETROFITS**

**EROSION AND SEDIMENT CONTROL PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:



HORIZONTAL SCALE  
 0 20 40

C120

**EROSION AND SEDIMENT CONTROL NOTES:**

AREA OF DISTURBANCE = 35,206 SF OR 0.81 AC  
 CUT = XX CY  
 FILL = XX CY (INCLUDING STRUCTURAL FILL, I.E. BIORETENTION MEDIA, STONE, ETC)  
 PREDOMINANT SOIL TYPE = CeC, CfD, KeC, SgB, SmC, U1, U10



**EROSION AND SEDIMENT CONTROL LEGEND**

- LOD — LIMIT OF DISTURBANCE
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- AGIP AT GRADE INLET PROTECTION
- ⌈ CURB INLET PROTECTION
- ▨ STABILIZED CONSTRUCTION ENTRANCE
- ▩ MULCH ACCESS ROAD

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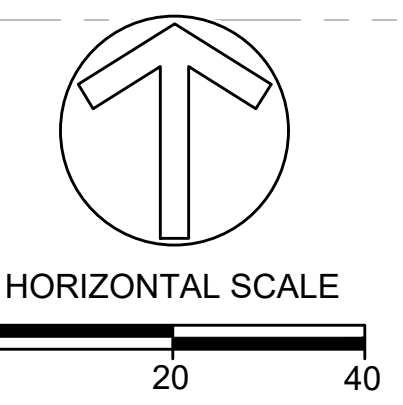


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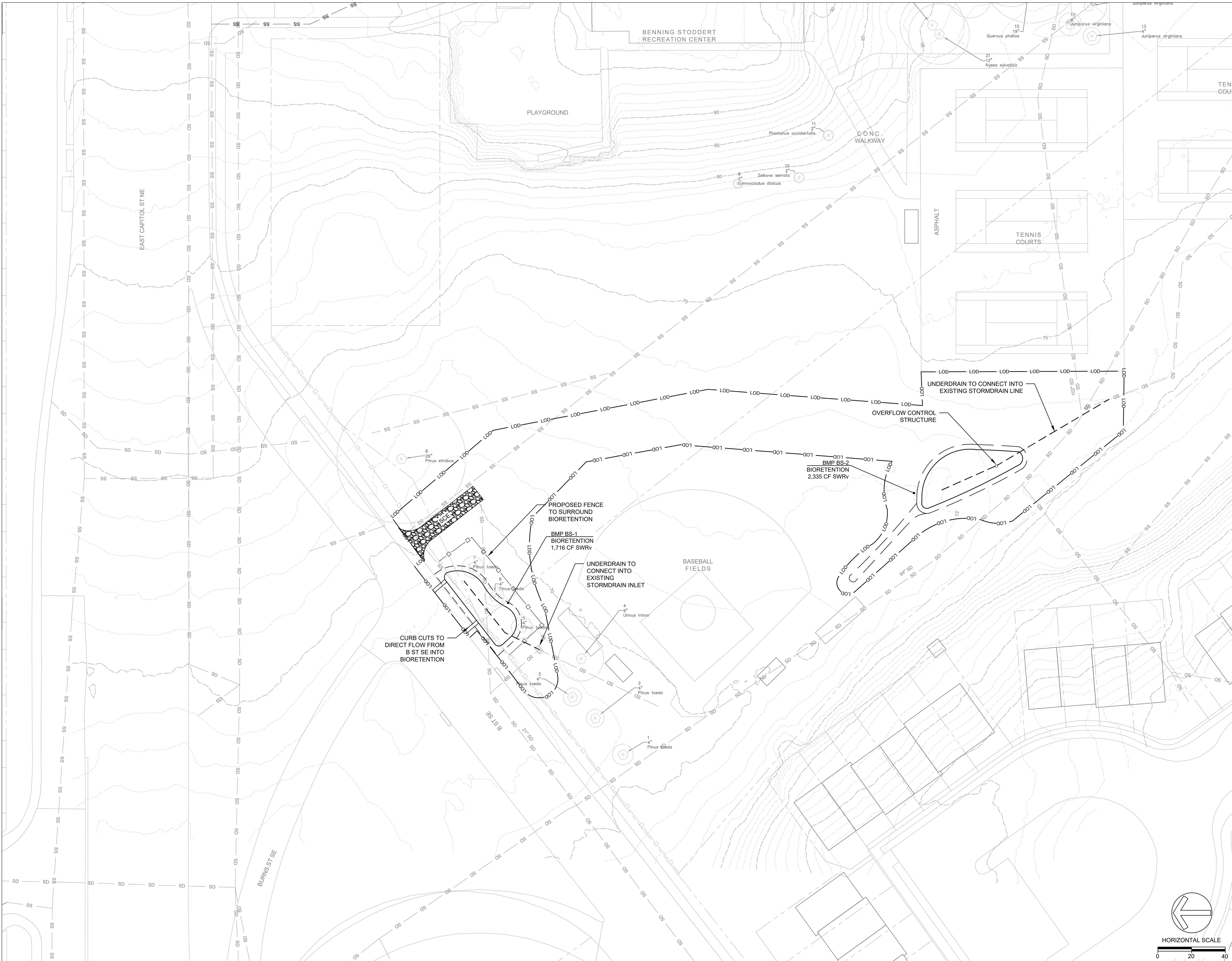
**BENNING STODDERT LID RETROFITS**

**EROSION AND SEDIMENT CONTROL PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:



C121



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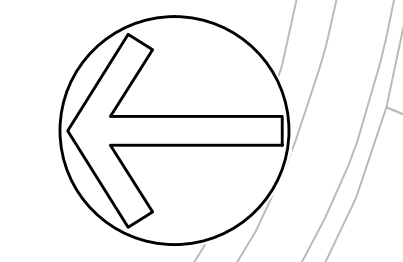
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**BENNING STODDERT LID RETROFITS**

**STORMWATER MANAGEMENT PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

C130



HORIZONTAL SCALE  
 0 20 40





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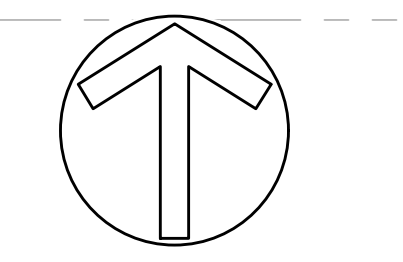


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**STORMWATER MANAGEMENT PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:



HORIZONTAL SCALE  
 0 20 40

C131



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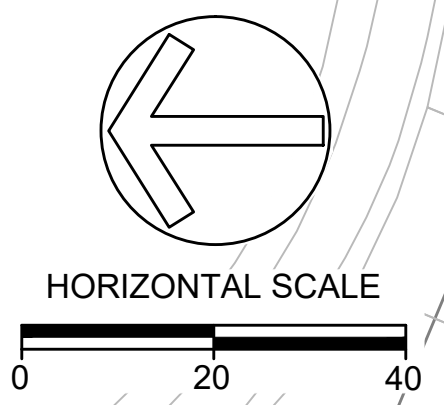
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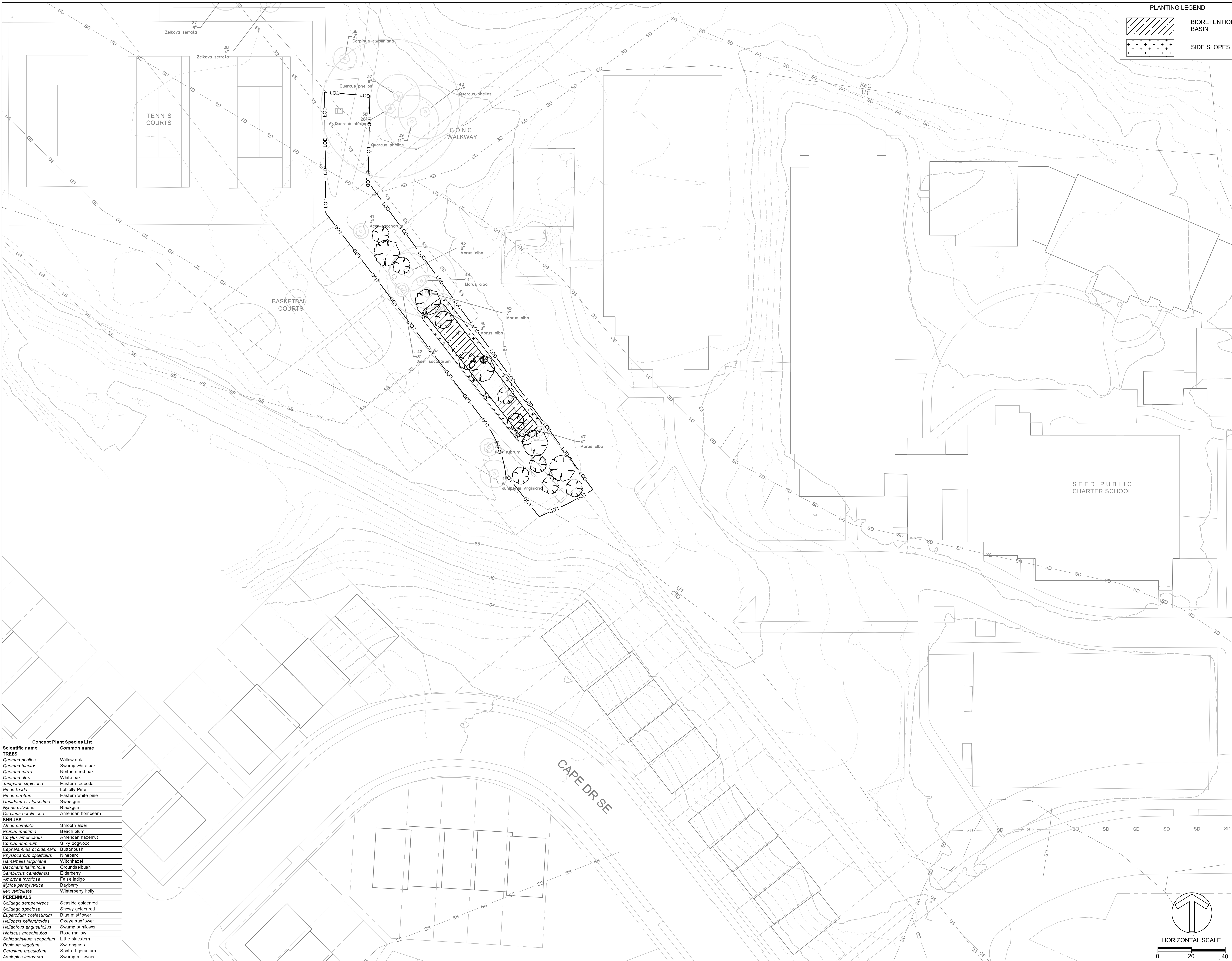
**PLANTING PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.: L150

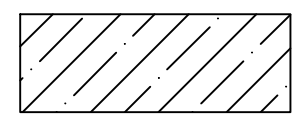
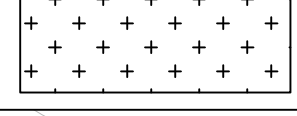
**Concept Plant Species List**

Scientific name	Common name
<b>TREES</b>	
<i>Quercus phellos</i>	Willow oak
<i>Quercus bicolor</i>	Swamp white oak
<i>Quercus rubra</i>	Northern red oak
<i>Quercus alba</i>	White oak
<i>Juniperus virginiana</i>	Eastern redcedar
<i>Pinus taeda</i>	Loblolly pine
<i>Pinus strobus</i>	Eastern white pine
<i>Liquidambar styraciflua</i>	Sweetgum
<i>Nyssa sylvatica</i>	Blackgum
<i>Carpinus caroliniana</i>	American hornbeam
<b>SHRUBS</b>	
<i>Alnus serrulata</i>	Smooth alder
<i>Prunus maritima</i>	Beach plum
<i>Corylus americana</i>	American hazelnut
<i>Cornus amomum</i>	Silky dogwood
<i>Cephaelis occidentalis</i>	Butterbush
<i>Physocarpus opulifolius</i>	Ninebark
<i>Hamamelis virginiana</i>	Witchhazel
<i>Baccharis halimifolia</i>	Groundselbush
<i>Sambucus canadensis</i>	Elderberry
<i>Amorpha fruticosa</i>	False indigo
<i>Myrica pensylvanica</i>	Bayberry
<i>Ilex verticillata</i>	Winterberry holly
<b>PERENNIALS</b>	
<i>Solidago sempervirens</i>	Seaside goldenrod
<i>Solidago speciosa</i>	Showy goldenrod
<i>Eupatorium coelestinum</i>	Blue mistflower
<i>Helianthus helianthoides</i>	Oxeye sunflower
<i>Helianthus angustifolius</i>	Swamp sunflower
<i>Hibiscus moscheutos</i>	Rose mallow
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Panicum virgatum</i>	Switchgrass
<i>Senecio maculatum</i>	Spotted geranium
<i>Asclepias incarnata</i>	Swamp milkweed
<i>Asclepias syriaca</i>	Common milkweed





**PLANTING LEGEND**

 BIORETENTION BASIN  
 SIDE SLOPES

**CLIENT**

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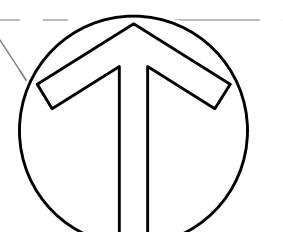
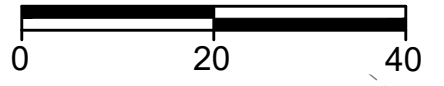
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**BENNING STODDERT LID RETROFITS**

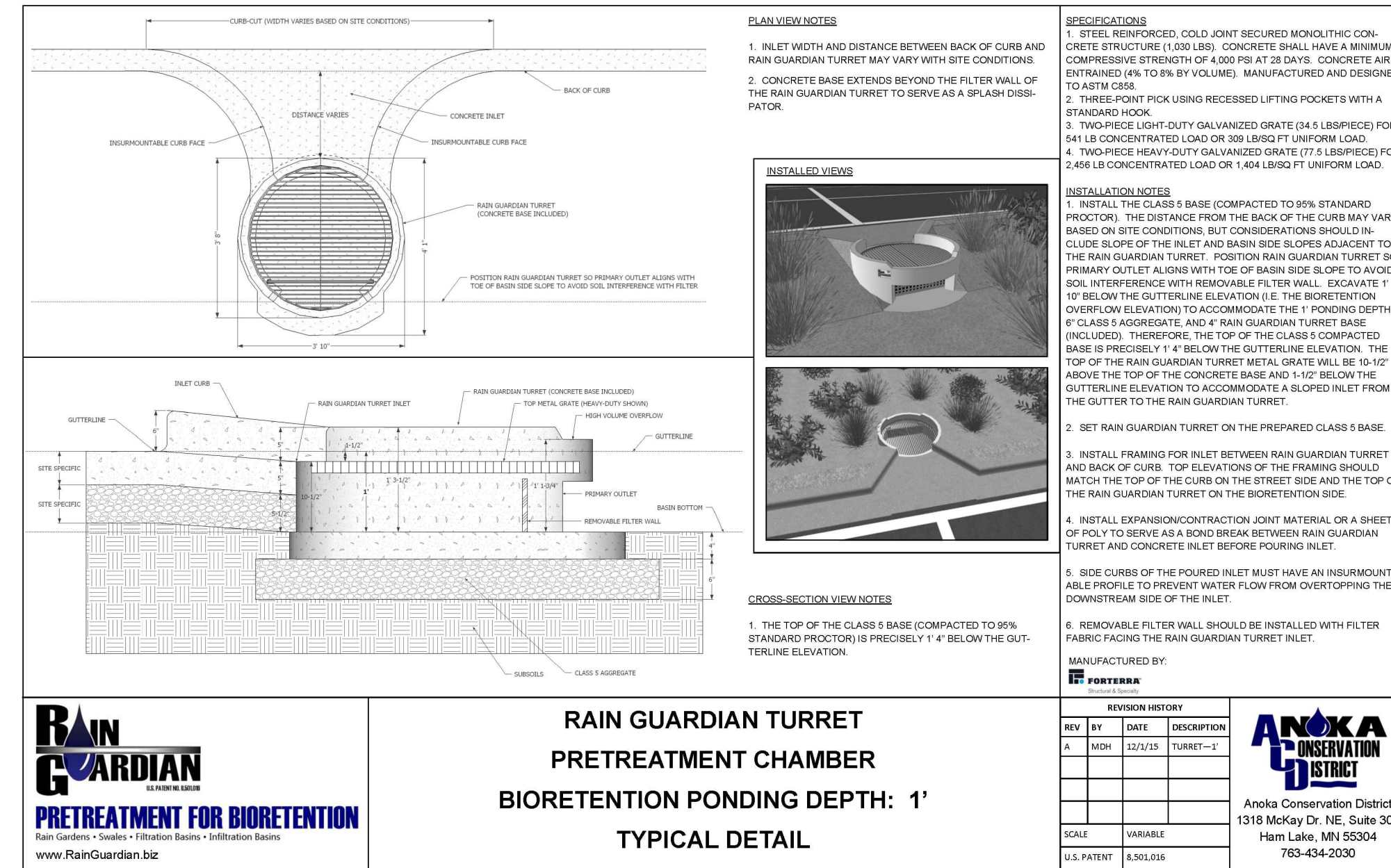
**PLANTING PLAN**

PROJECT NO.: 23014.02 SCALE: 1" = 20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

  
 HORIZONTAL SCALE  


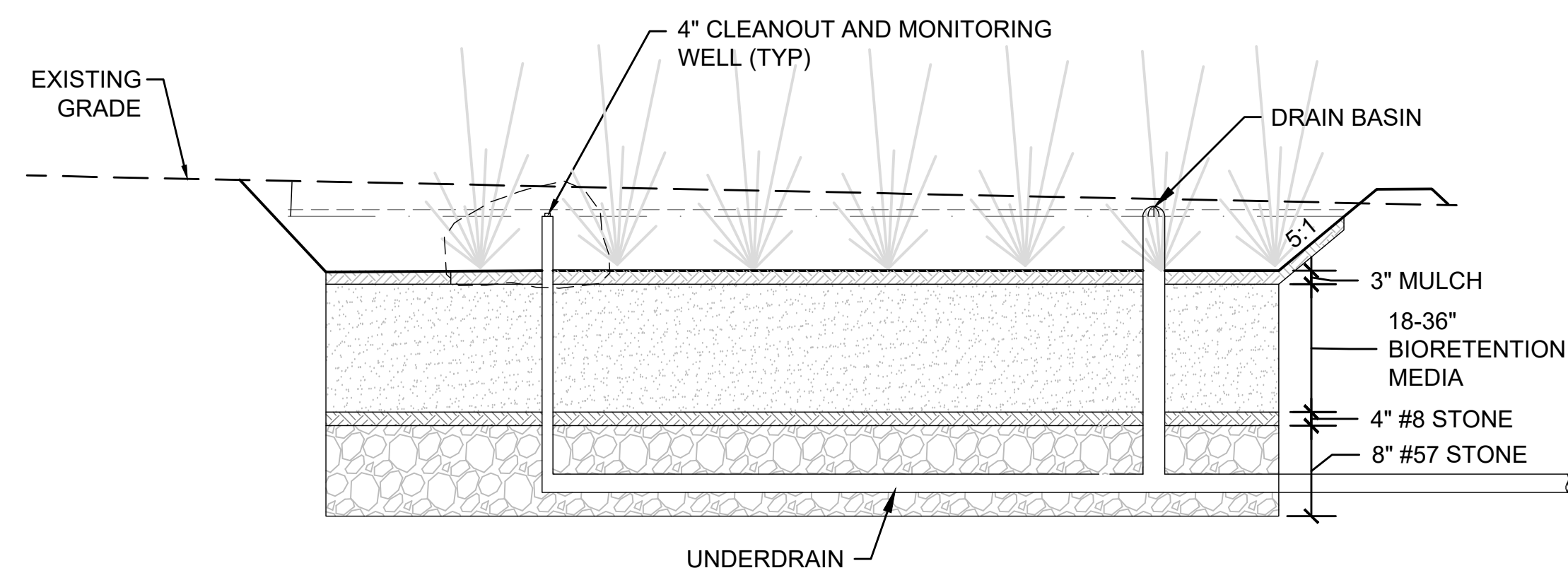
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<i>Amorpha fruticosa</i>	Faise indigo
<i>Myrica pensylvanica</i>	Bayberry
<i>Ilex verticillata</i>	Winterberry holly
<b>PERENNIALS</b>	
<i>Solidago sempervirens</i>	Seaside goldenrod
<i>Solidago speciosa</i>	Showy goldenrod
<i>Eupatorium coelestinum</i>	Blue mistflower
<i>Helianthus helianthoides</i>	Oxeye sunflower
<i>Helianthus angustifolius</i>	Swamp sunflower
<i>Hibiscus moscheutos</i>	Rose mallow
<i>Schizachyrium scoparium</i>	Little bluestem
<i>Panicum virgatum</i>	Switchgrass
<i>Geranium maculatum</i>	Spotted geranium
<i>Asclepias incarnata</i>	Swamp milkweed
<i>Asclepias syriaca</i>	Common milkweed



**NOTE:**

- CONTRACTOR SHALL INSTALL 1/2-INCH PREFORMED EXPANSION JOINT FILLER AND TWO (2X) 3/4-INCH DIAMETER, 6-INCH LONG DOWELS THROUGH RAINGUARDIAN TURRET INTO CONCRETE RUNNEL TO PROVIDE SECURE CONNECTION OF TURRET TO CONCRETE RUNNEL.



**NOTES:**

- BIORETENTION IS AN OFF-LINE BIORETENTION. IN-FLOW WILL BE CONTROLLED BY ENGINEERED INLET TO ONLY CONVEY STORMS BELOW 1.2".
- TOP OF CLEANOUT ELEVATIONS SHALL BE INSTALLED 1" ABOVE PONDING DEPTH.
- MULCH LAYERS MAY BE REPLACED BY BIORETENTION MEDIA IF DESIRED. IF OMITTING MULCH, FACILITY SHALL BE LINED WITH COIR FIBER MATTING.

**BIORETENTION**  
**TYPICAL SECTION** NOT TO SCALE

**CLIENT**

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**DETAILS**

PROJECT NO.:	23014.02	SCALE:	NTS
SEAL:	BY: EM	CHECK:	BA
DWG. NO.:		C500	

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**STABILIZED CONSTRUCTION ENTRANCE**

CONSTRUCTION SPECIFICATIONS

- PLACE THE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE A MINIMUM LENGTH OF 50 FEET (30 FEET FOR SINGLE-FAMILY RESIDENCE LOT) AND A MINIMUM WIDTH OF 10 FEET. FLARE THE SCE AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
- PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE MAINTAINING POSITIVE DRAINAGE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. PROVIDE PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN THE SCE IS NOT LOCATED AT A HIGH SPOT.
- PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE.
- PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
- MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE. MOUNTABLE BERM AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

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 DWG. NO 201.1

**ROLLED EROSION CONTROL PRODUCTS CHANNEL STABILIZATION**

CONSTRUCTION SPECIFICATIONS

- PREPARE SOIL BEFORE INSTALLING MATTING, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED. FOR SOIL-FILLED RECPs, THE PLANTING BED MAY BE INSTALLED AFTER THE PRODUCT IS INSTALLED.
- START LAYING THE PROTECTIVE COVERING AT THE CHANNEL INLET (I.E., HIGHEST ELEVATION) ALONG THE BOTTOM OF THE CHANNEL. UNROLL IN THE DIRECTION OF FLOW.
- AT THE CHANNEL INLET, BURY THE FIRST MATS IN AN ANCHOR SLOT NO LESS THAN 6 INCHES DEEP. TAMP EARTH FIRMLY OVER THE MATERIAL. STAPLE THE MATERIAL AT A MINIMUM OF EVERY 12 INCHES ACROSS THE TOP END.
- LAY MATS END OVER END WITH A 6-INCH OVERLAP AND SECURED WITH A DOUBLE ROW OF STAGGERED STAPLES 4 INCHES APART.
- IN HIGH FLOW APPLICATIONS, INSTALL A STAPLE CHECK DAM (A DOUBLE ROW OF STAGGERED STAPLES 4 INCHES APART ACROSS THE ENTIRE CHANNEL WIDTH), AT 30-FOOT TO 40-FOOT INTERVALS.
- ANCHOR THE TERMINAL END OF EACH MAT IN A 6-INCH BY 6-INCH TRENCH. BACKFILL AND COMPACT AFTER STAPLING.
- MATS INSTALLED ALONG THE SIDE SLOPES SHOULD OVERLAP THE CENTER MAT BY 4 INCHES. INSTALL WITH A STAPLE DENSITY OR SPACING PER MANUFACTURERS' RECOMMENDATIONS.

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 DWG. NO 209.2

**AT GRADE INLET PROTECTION STORM DRAIN INLET PROTECTION**

CONSTRUCTION SPECIFICATIONS

- LIFT GRATE AND WRAP WITH GEOTEXTILE CLASS E TO COMPLETELY COVER ALL OPENINGS, SECURE WITH WIRE TIES, THEN SET GRATE BACK IN PLACE.
- PLACE CLEAN 3/4 TO 1-1/2 INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 4 TO 6 INCHES THICK ON THE GRATE TO SECURE THE FABRIC.
- IF THERE ARE ANY SIGNS OF STREET FLOODING OR WATER PONDING, THIS STRUCTURE MUST BE CLEANED OR REPLACED, OR REDESIGNED WITH A VIABLE ALTERNATIVE.

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 DWG. NO 307.2

**SILT FENCE-1**

CONSTRUCTION SPECIFICATIONS

- FENCE POSTS MUST BE A MINIMUM OF 36 IN. LONG DRIVEN 16 IN. MINIMUM INTO THE GROUND. WOOD POSTS MUST BE OF SOUND QUALITY HARDWOOD WITH 1-1/2 IN. MINIMUM WIDTH WHEN SQUARE CUT, OR 1-3/4 IN. MINIMUM DIAMETER WHEN ROUND. STEEL POSTS MUST BE STANDARD T OR U SECTION WEIGHING NOT LESS THAN 1.00 POUND PER LINEAR FOOT.
- FASTEN GEOTEXTILE SECURELY TO EACH FENCE POST WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION. GEOTEXTILE MUST MEET THE FOLLOWING REQUIREMENTS (GEOTEXTILE CLASS F):

PROPERTY	VALUE	TEST METHOD
TENSILE STRENGTH	90 LBS/IN (MIN.)	ASTM D-4595
TENSILE MODULUS	20 LBS/IN (MIN.)	ASTM D-4595
FLOW RATE	0.3 GAL/FT <sup>2</sup> /MINUTE (MAX.)	ASTM D-5141
FILTERING EFFICIENCY	75% (MIN.)	ASTM D-5141

- WHERE ENDS OF GEOTEXTILE FABRIC COME TOGETHER, OVERLAP, FOLD, AND STAPLE THEM TO PREVENT SEDIMENT BYPASS.
- INSPECT SILT FENCE AFTER EACH RAINFALL EVENT, AT LEAST DAILY DURING SUSTAINED RAINFALL EVENTS, AND MAINTAIN WHEN BULGES OCCUR OR WHEN SEDIMENT ACCUMULATION REACHES SIDE OF THE FABRIC HEIGHT.

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 DWG. NO 301.1

**SILT FENCE DESIGN CRITERIA:**

SLOPE STEEPNESS	SLOPE LENGTH (MAXIMUM) (FEET)	SILT FENCE LENGTH (MAXIMUM) (FEET)
FLATTER THAN 50:1 (2%)	UNLIMITED	UNLIMITED
> 50:1 TO 10:1 (2% TO 10%)	125	1,000
> 10:1 TO 5:1 (10% TO 20%)	100	750
> 5:1 TO 3:1 (20% TO 33%)	60	500
> 3:1 TO 2:1 (33% TO 50%)	40	250
> 2:1 (> 50%)	20	125

NOTE:  
 \* IN AREAS OF LESS THAN 2% SLOPE AND SANDY SOILS (USDA GENERAL CLASSIFICATION SYSTEM, SOIL CLASS A) MAXIMUM SLOPE LENGTH AND SILT FENCE LENGTH WILL BE UNLIMITED. IN THESE AREAS A SILT FENCE MAY BE THE ONLY PERIMETER CONTROL REQUIRED.  
 \* TO AVOID CIRCUMVENTION, EXTEND THE ENDS OF THE SILT FENCE UPSLOPE TO PREVENT WATER AND SEDIMENT FROM FLOWING AROUND THE ENDS OF THE FENCE.

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 DWG. NO 301.2

**CURB INLET PROTECTION STORM DRAIN INLET PROTECTION**

CONSTRUCTION SPECIFICATIONS

- ATTACH A CONTINUOUS PIECE OF 1/2 INCH x 1/2 INCH WIRE MESH, (30 INCHES MINIMUM WIDTH BY THROAT LENGTH, PLUS 4 FEET) TO THE 2-INCH x 4-INCH WEIR (MEASURING THROAT LENGTH PLUS 2 FEET) AS SHOWN ON THE STANDARD DRAWING.
- PLACE A CONTINUOUS PIECE OF GEOTEXTILE CLASS E OF THE SAME DIMENSIONS AS THE WIRE MESH AND SECURELY ATTACH TO THE 2-INCH x 4-INCH WEIR.
- SECURELY NAIL THE 2-INCH x 4-INCH WEIR TO A 9-INCH LONG VERTICAL SPACER TO BE LOCATED BETWEEN THE WEIR AND THE INLET FACE (MAXIMUM 4 FEET APART).
- PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL (MINIMUM 2-FOOT LENGTHS OF 2-INCHES x 4-INCHES TO THE TOP OF THE WEIR AT SPACER LOCATIONS) EXTEND THESE 2-INCH x 4-INCH ANCHORS ACROSS THE INLET TOP AND BE HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHT.
- PLACE THE ASSEMBLY SO THAT THE END SPACERS ARE 1 FOOT BEYOND BOTH ENDS OF THE THROAT OPENING.
- FORM THE 1/2-INCH x 1/2-INCH WIRE MESH AND THE GEOTEXTILE FABRIC TO THE CONCRETE GUTTER AND AGAINST THE FACE OF THE CURB ON BOTH SIDES OF THE INLET. PLACE CLEAN 3/4 TO 1-1/2 INCH STONE OVER THE WIRE MESH AND GEOTEXTILE IN SUCH A MANNER AS TO PREVENT WATER FROM ENTERING THE INLET UNDER OR AROUND THE GEOTEXTILE.
- THIS TYPE OF PROTECTION MUST BE INSPECTED FREQUENTLY AND THE GEOTEXTILE FABRIC AND STONE REPLACED WHEN CLOGGED WITH SEDIMENT.
- ASSURE THAT STORM FLOWS DO NOT BYPASS THE INLET BY INSTALLING A TEMPORARY EARTH OR ASPHALT DIKE TO DIRECT THE FLOW TO THE INLET.
- IF THERE ARE ANY SIGNS OF STREET FLOODING OR WATER PONDING, THIS STRUCTURE MUST BE CLEANED OR REPLACED, OR REDESIGNED WITH A VIABLE ALTERNATIVE SUCH AS 3.3 FILTER SOCK.

NOTE: FILTER SOCK IS AN ALTERNATIVE WHICH IS EASIER TO INSTALL AND MAINTAIN THAN THIS STANDARD DESIGN.

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 DWG. NO 307.3

**ACCESS ROADS**

CONSTRUCTION SPECIFICATIONS

- ACCESS ROUTES TO BE VERIFIED BY ENGINEER AT PRE-CONSTRUCTION MEETING. REVISIONS TO THE ALIGNMENT THAT MINIMIZE TREE DISTURBANCE ARE ENCOURAGED AND REQUIRE REVIEW AND APPROVAL BY DESIGN ENGINEER.
- CONTRACTOR SHALL MAINTAIN MULCH MAT THROUGHOUT CONSTRUCTION PERIOD.
- THE HAIL ROAD IS DESIGNED TO PREVENT COMPACTION OF EXISTING SOILS USING LOW GROUND PRESSURE EQUIPMENT WHICH EXERTS NO MORE THAN 8 PSF. IF THE CONTRACTOR INTENDS TO USE ANY EQUIPMENT WITH HIGHER LOADS ADDITIONAL PROTECTION MEASURES MUST BE PROVIDED SUCH AS HARDWOOD MATS. (SEE DETAILS ABOVE).

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 DWG. NO 806.1

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ESC DETAILS

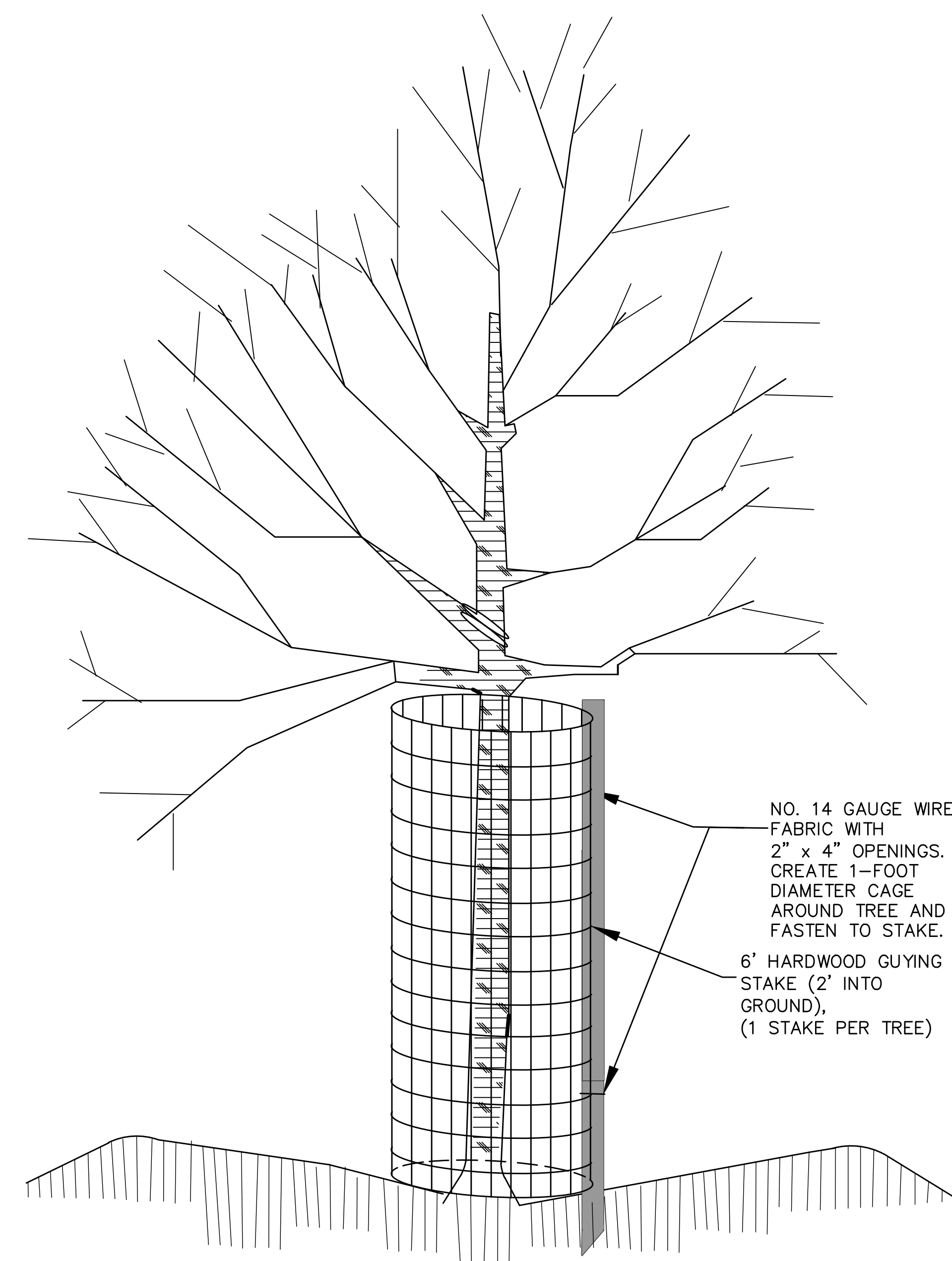
PROJECT NO.: 23014.02 SCALE: NTS  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

C530

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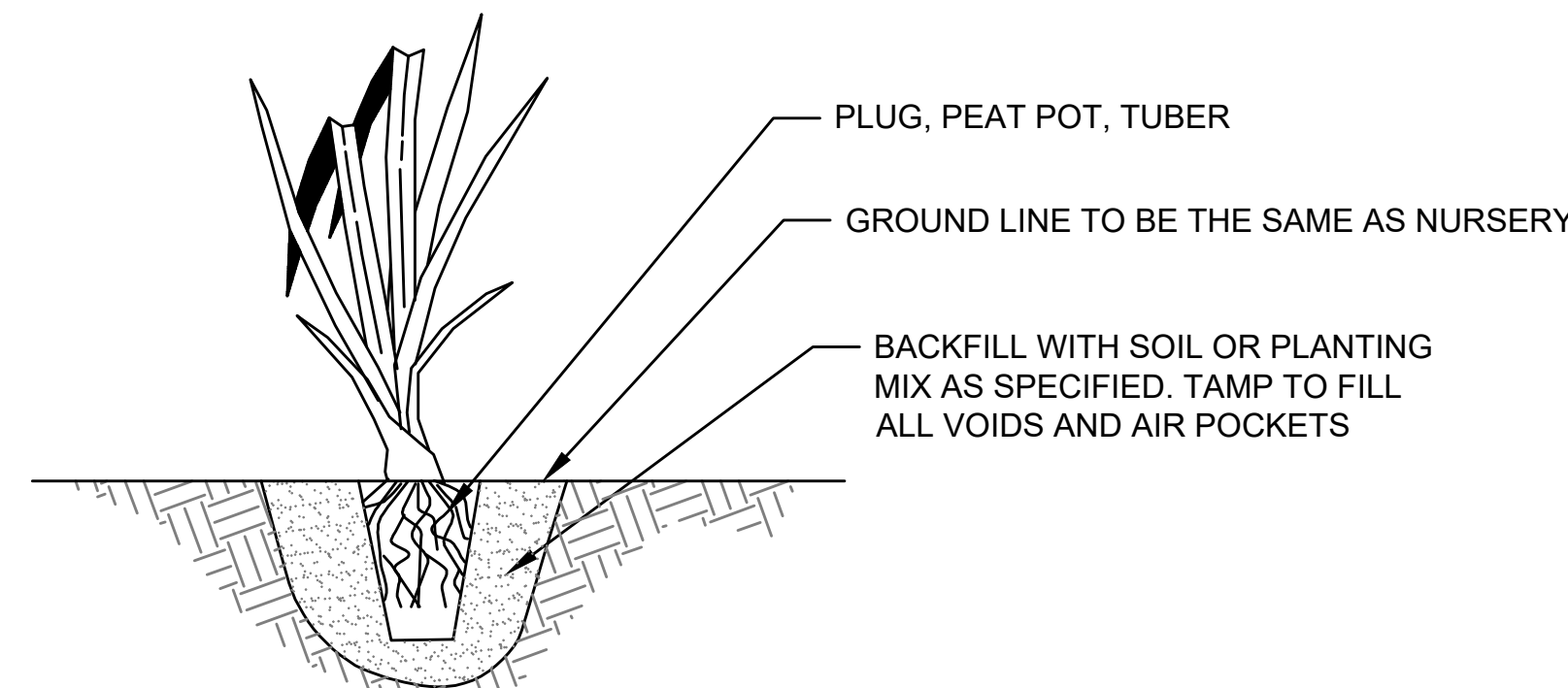


NO. 14 GAUGE WIRE FABRIC WITH 2" x 4" OPENINGS. CREATE 1-FOOT DIAMETER CAGE AROUND TREE AND FASTEN TO STAKE.  
 6' HARDWOOD GUYING STAKE (2" INTO GROUND), (1 STAKE PER TREE)

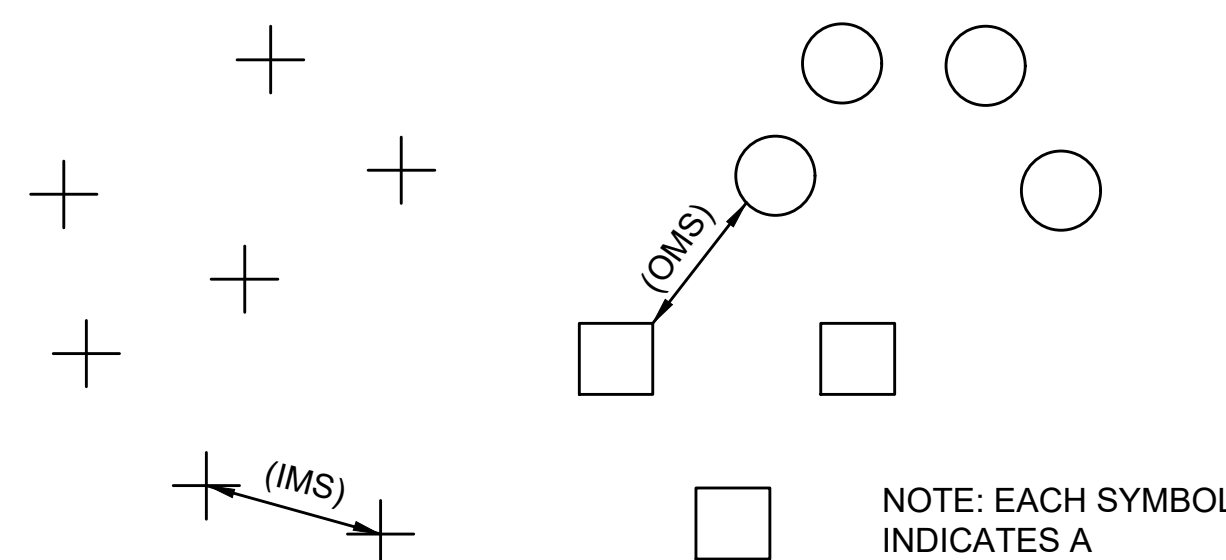
- NOTES:**
1. DEER PROTECTION CAGES TO BE INSTALLED AROUND ALL PLANTED TREES AND SHRUB CLUSTERS AS DIRECTED BY LANDSCAPE ARCHITECT.
  2. HEIGHT OF CAGE SHALL BE 4- FEET (MIN.)
  3. CAGE SHALL BE FASTENED TO STAKE WITH TWO (MIN.) 11-INCH RELEASABLE CABLE TIES (ONE AT TOP AND ONE 6" (MIN.) ABOVE THE GROUND).
  4. DO NOT DAMAGE TREE DURING INSTALLATION.
  5. DEER BARK PROTECTORS (ITEM #bg48, BY A.M. LEONARD, OR EQUAL) MAY BE SUBSTITUTED FOR TREES GREATER THAN 3/4" CALIPER. ALL OTHER SUBSTITUTIONS MUST BE APPROVED BY FOREST ECOLOGIST.
  6. CAGES TO BE REMOVED AT DIRECTION OF FOREST ECOLOGIST.
  7. ENSURE CAGE IS SECURE TO GROUND TO PREVENT UPLIFT BY DEER.

**DEER PROTECTION CAGE**

NOT TO SCALE



**HERBACEOUS PLANTING - QUARTS**

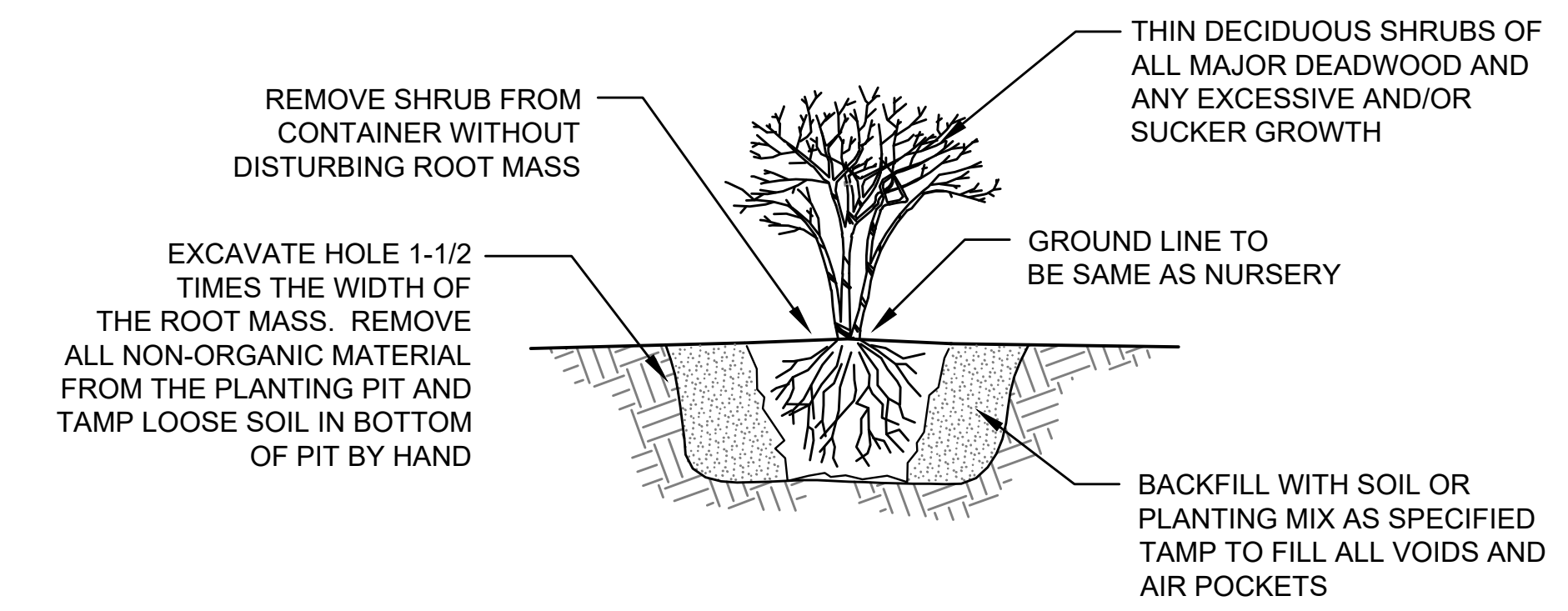


- NOT TO SCALE
1. PLANTS ARE ARRANGED IN CLUSTERS CONSISTING OF THE SAME SPECIES.
  2. SPACING BETWEEN EACH CLUSTER IS DETERMINED BY THE OVERALL MINIMUM SPACING DISTANCE (OMS).
  3. SPACING BETWEEN EACH SPECIES WITHIN EACH CLUSTER IS DETERMINED BY THE INDIVIDUAL MINIMUM SPACING DISTANCE (IMS).
  4. CLUSTERS, WHENEVER POSSIBLE, SHALL CONSIST OF ODD NUMBERS WITH NO LESS THAN 3 AND NO MORE THAN 11 INDIVIDUALS OF ONE SPECIES.

NOTE: EACH SYMBOL INDICATES A DIFFERENT SPECIES

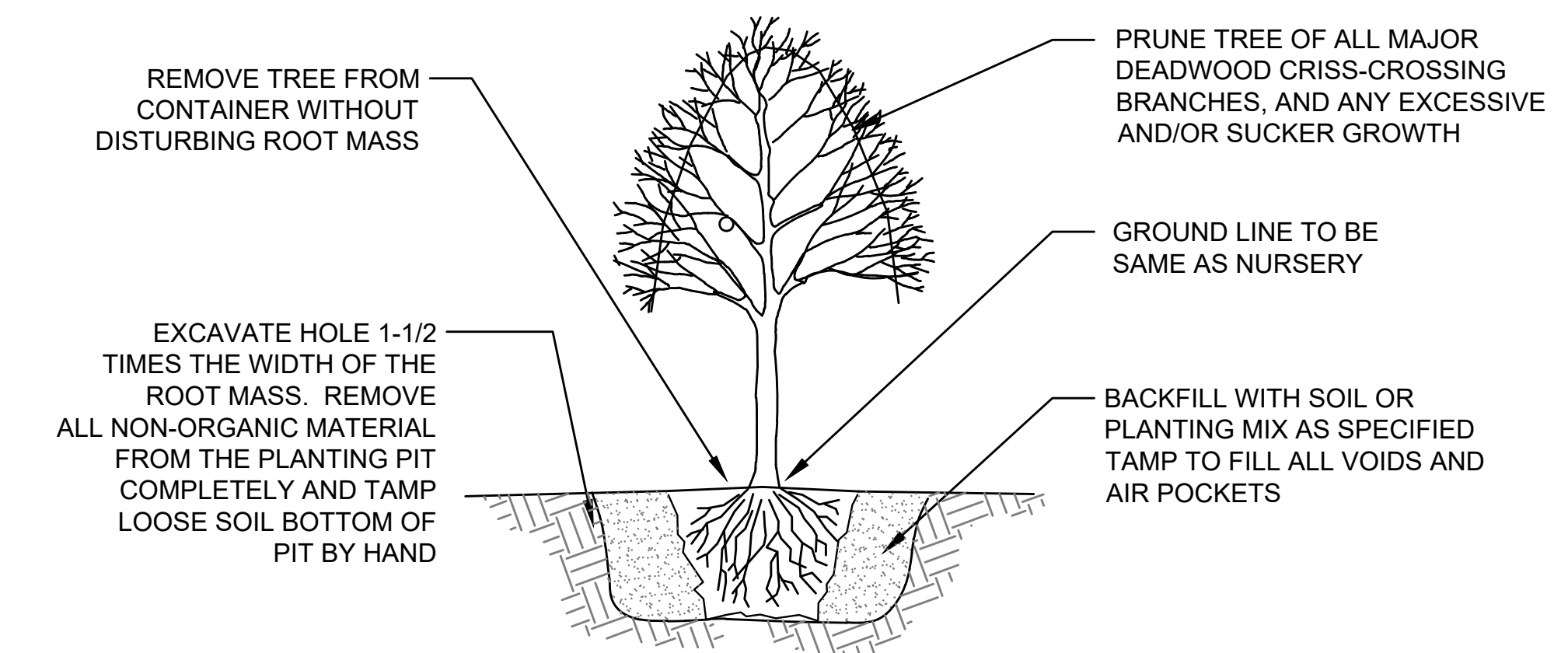
**PLANT SPACING - CLUSTER PLAN VIEW**

NOT TO SCALE



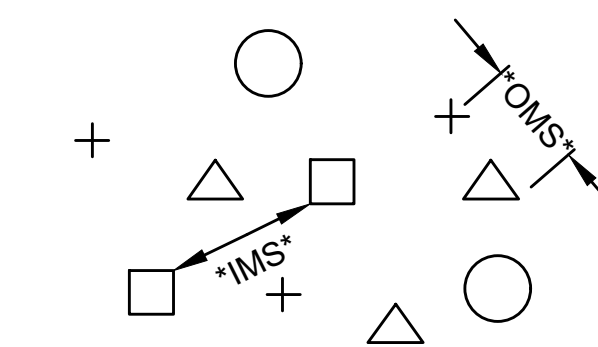
**SHRUB PLANTING - CONTAINER GROWN**

NOT TO SCALE



**TREE PLANTING - CONTAINER GROWN**

NOT TO SCALE



OMS- AN OVERALL MINIMUM SPACING DISTANCE \*OMS\* IS ASSIGNED TO THE PLANTING CONFIGURATION \*SEE PLANT SCHEDULE\*  
 IMS- AN INDIVIDUAL MINIMUM SPACING DISTANCES \*IMS\* IS ASSIGNED TO EACH INDIVIDUAL SPECIES \*SEE PLANT SCHEDULE\*

**PLANT SPACING - RANDOM PLAN VIEW**

NOTE: EACH SYMBOL INDICATES A DIFFERENT SPECIES  
 NOT TO SCALE

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**PLANTING DETAILS**

PROJECT NO.: 23014.02 SCALE: NTS  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

C560

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DA PLAN

PROJECT NO.: 23014.02 SCALE: 1"=20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.:

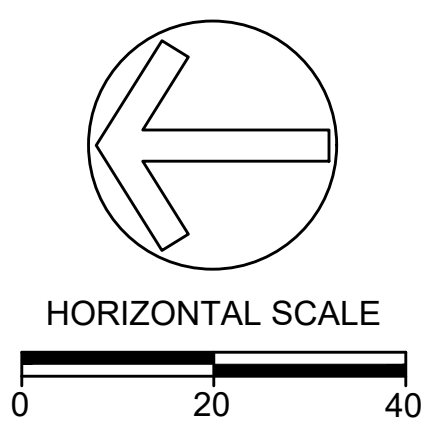
C600



**LEGEND**

- CDA X SITE DRAINAGE AREA ID
- CONTRIBUTING DRAINAGE AREA
- IMPERVIOUS COVER
- COMPACTED COVER
- NATURAL COVER
- CONVERSION FROM COMPACTED TO BMP COVER

BMP ID	Total CDA SF	Natural SF	Compacted SF	Impervious SF	BMP SF	Vehicular SF	Target SWRv (P=1.2") CF	Max SWRv (P=1.7") CF	BMP Version	CDA	SWRv		SA <sub>top</sub> SF	SA <sub>bottom</sub> SF	SA <sub>average</sub> SF	d <sub>ponding</sub> IN	d <sub>media</sub> IN	Gravel Underdrain IN	Infiltration Sump IN	Sv CF	Retention Volume Provided %	Retention Volume Provided CF				
											(P=1.2") CF	(P=1.7") CF														
BS-1	77,689	33,082	39,444	5,163	0	0	1,477	2,092	BS-1	1	1,477	2,092	1,277	845	1,061	12	18	12	1,716	60%	1,030					
BS-2	44,611	0	31,139	13,472	0	0	2,058	2,916	BS-2	2	2,058	2,916	1,660	1,180	1,420	12	18	12	2,335	60%	1,401					
BS-3	41,840	0	29,156	12,684	0	0	1,934	2,740	BS-3	3	1,934	2,740	1,759	1,111	1,435	12	18	12	2,296	60%	1,378					
											<b>7,527</b>	<b>10,663</b>														
											<b>Total</b>													<b>6,346</b>		<b>3,808</b>



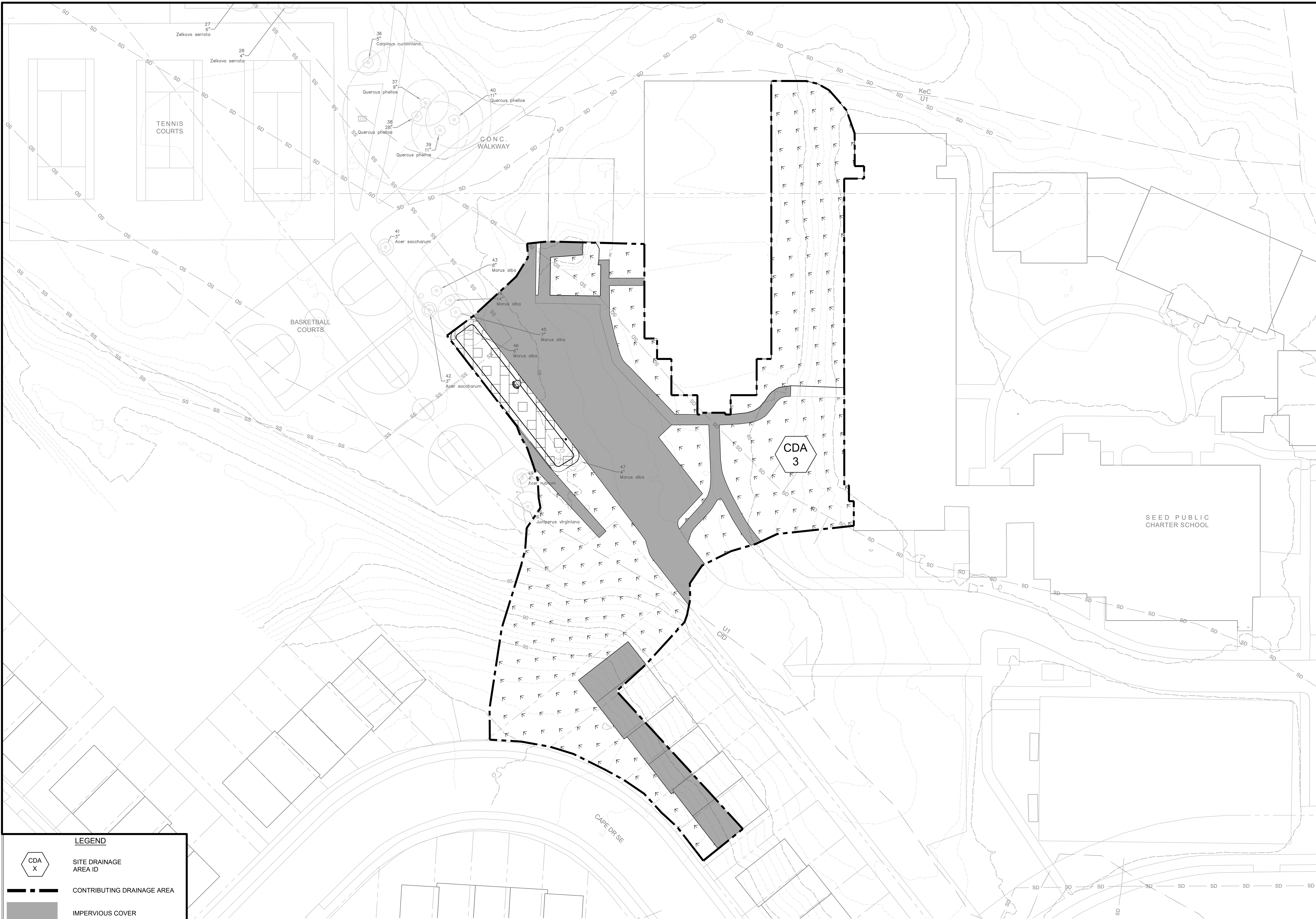
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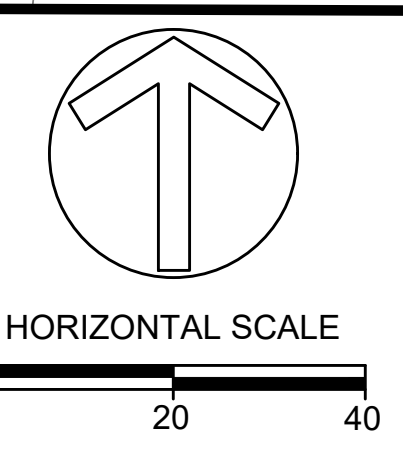
BENNING STODDERT LID RETROFITS

DA PLAN

**LEGEND**

- CDA X SITE DRAINAGE AREA ID
- CONTRIBUTING DRAINAGE AREA
- IMPERVIOUS COVER
- COMPACTED COVER
- NATURAL COVER
- CONVERSION FROM COMPACTED TO BMP COVER

PRE-PROJECT CONTRIBUTING DRAINAGE AREA (CDA)					Target SWR <sub>v</sub>		Max SWR <sub>v</sub>		BMP	Bioretention Version	CDA	SWR <sub>v</sub>		Areas			Depths			Retention Volume Provided	Retention Volume Provided		
BMP ID	Total CDA SF	Natural SF	Compacted SF	Impervious SF	BMP SF	Vehicular SF	(P = 1.2") CF	(P = 1.7") CF				(P = 1.2") CF	(P = 1.7") CF	SA <sub>top</sub> SF	SA <sub>bottom</sub> SF	SA <sub>average</sub> SF	d <sub>ponding</sub> IN	d <sub>media</sub> IN	Gravel Underdrain IN			Infiltration Sump IN	Sv CF
BS-1	77,689	33,082	39,444	5,163	0	0	1,477	2,092	BS-1	Standard	1	1,477	2,092	1,277	845	1,061	12	18	1,715	60%	1,030		
BS-2	44,611	0	31,139	13,472	0	0	2,058	2,916	BS-2	Standard	2	2,058	2,916	1,660	1,180	1,420	12	18	2,335	60%	1,401		
BS-3	41,840	0	29,156	12,684	0	0	1,934	2,740	BS-3	Standard	3	1,934	2,740	1,759	1,111	1,435	12	18	2,296	60%	1,378		
												<b>7,527</b>	<b>10,663</b>							<b>Total</b>	<b>6,346</b>		<b>3,808</b>



1/10/2024 1:\Projects\23014.02\B08\DRPV\Benning Stoddert\CAD\Plans\da01a.dwg

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PROJECT NO.: 23014.02 SCALE: 1"=20'  
 SEAL: BY: EM CHECK: BA  
 DWG. NO.: C601



SUMMARY TABLE

BMP	Bioretention Version	CDA	SWR <sub>v</sub>		Areas			Depths			Retention Volume Provided %	Retention Volume Provided CF	
			(P = 1.2")	(P = 1.7")	SA <sub>top</sub>	SA <sub>bottom</sub>	SA <sub>average</sub>	d <sub>ponding</sub>	d <sub>media</sub>	Gravel Underdrain			Infiltration Sump
			CF	CF	SF	SF	SF	IN	IN	IN			IN
BS-1	Standard	1	1,477	2,092	1,277	845	1,061	12	18	12	1,716	60%	1,030
BS-2	Standard	2	2,058	2,916	1,660	1,180	1,420	12	18	12	2,335	60%	1,401
BS-3	Standard	3	1,934	2,740	1,759	1,111	1,435	12	18	12	2,296	60%	1,378
<b>Total</b>											<b>6,346</b>		<b>3,808</b>



Project: DOEE DPR IV - Benning Stoddert  
 No: 23014.02  
 Date: 1/5/2024  
 Subject: BS-1 Bioretention Basin Design Calculations  
 Completed By: EM  
 QAQC By: BA



Project: DOEE DPR IV - Benning Stoddert  
 No: 23014.02  
 Date: 1/5/2024  
 Subject: BS-2 Bioretention Basin Design Calculations  
 Completed By: EM  
 QAQC By: BA



Project: DOEE DPR IV - Benning Stoddert  
 No: 23014.02  
 Date: 1/5/2024  
 Subject: BS-3 Bioretention Basin Design Calculations  
 Completed By: EM  
 QAQC By: BA

Calculations

**BMP 1**

Step 1: Determine Max. Filter Depth from SA:CDA & RvCDA (Table 3.21)

SA:CDA = 1277:77689  
**SA:CDA = 1.6%**

$R_v CDA = (A_{comp} * 0.25 + A_{impervious} * 0.95 + 0 * A_{natural}) / A_{total}$   
**R<sub>v</sub>CDA = 0.19**

From DDOE Table 3.20 for SA:CDA & RvCDA Above  
**Max. Filter Media Depth = 42 inches**

Step 2: Select Ponding & Media Depths, based on Site Constraints

Note: Gravel Depth layer to the Underdrain (d<sub>gravel-UD</sub>) has been capped at 12" during treatment

- d<sub>ponding</sub> = 12.0 inches
- d<sub>media</sub> = 18.0 inches
- d<sub>gravel-UD</sub> = 12.0 inches
- d<sub>gravel-sump</sub> = 0.0 inches
- d<sub>p</sub> = 30.0 inches**

Step 3: Calculate Storage Volume

$S_v = SA_{bottom} * [(d_{media} * \eta_{media}) + (d_{stone} * \eta_{stone})] + [(SA_{bottom} + SA_{top}) / 2 * d_{ponding-bio}]$   
 $S_v = 845 * [(1.5 * 0.25) + (1 * 0.4)] + [(1277+845) / 2 * 1]$   
**S<sub>v</sub> = 1,716 cubic feet**

Step 4: Check S<sub>v</sub> vs SWR<sub>v</sub> of Drainage Area

$S_v : SWR_v = 1716 : 1477$   
**S<sub>v</sub>:SWR<sub>v</sub> = 116%**

Calculations

**BMP 2**

Step 1: Determine Max. Filter Depth from SA:CDA & RvCDA (Table 3.21)

SA:CDA = 1660:44611  
**SA:CDA = 3.7%**

$R_v CDA = (A_{comp} * 0.25 + A_{impervious} * 0.95 + 0 * A_{natural}) / A_{total}$   
**R<sub>v</sub>CDA = 0.45**

From DDOE Table 3.20 for SA:CDA & RvCDA Above  
**Max. Filter Media Depth = 36 inches**

Step 2: Select Ponding & Media Depths, based on Site Constraints

Note: Gravel Depth layer to the Underdrain (d<sub>gravel-UD</sub>) has been capped at 12" during treatment

- d<sub>ponding</sub> = 12.0 inches
- d<sub>media</sub> = 18.0 inches
- d<sub>gravel-UD</sub> = 12.0 inches
- d<sub>gravel-sump</sub> = 0.0 inches
- d<sub>p</sub> = 30.0 inches**

Step 3: Calculate Storage Volume

$S_v = SA_{bottom} * [(d_{media} * \eta_{media}) + (d_{stone} * \eta_{stone})] + [(SA_{bottom} + SA_{top}) / 2 * d_{ponding-bio}]$   
 $S_v = 1180 * [(1.5 * 0.25) + (1 * 0.4)] + [(1660+1180) / 2 * 1]$   
**S<sub>v</sub> = 2,335 cubic feet**

Step 4: Check S<sub>v</sub> vs SWR<sub>v</sub> of Drainage Area

$S_v : SWR_v = 2335 : 2058$   
**S<sub>v</sub>:SWR<sub>v</sub> = 113%**

Calculations

**BMP 3**

Step 1: Determine Max. Filter Depth from SA:CDA & RvCDA (Table 3.21)

SA:CDA = 1759:41840  
**SA:CDA = 4.2%**

$R_v CDA = (A_{comp} * 0.25 + A_{impervious} * 0.95 + 0 * A_{natural}) / A_{total}$   
**R<sub>v</sub>CDA = 0.45**

From DDOE Table 3.20 for SA:CDA & RvCDA Above  
**Max. Filter Media Depth = 36 inches**

Step 2: Select Ponding & Media Depths, based on Site Constraints

Note: Gravel Depth layer to the Underdrain (d<sub>gravel-UD</sub>) has been capped at 12" during treatment

- d<sub>ponding</sub> = 12.0 inches
- d<sub>media</sub> = 18.0 inches
- d<sub>gravel-UD</sub> = 12.0 inches
- d<sub>gravel-sump</sub> = 0.0 inches
- d<sub>p</sub> = 30.0 inches**

Step 3: Calculate Storage Volume

$S_v = SA_{bottom} * [(d_{media} * \eta_{media}) + (d_{stone} * \eta_{stone})] + [(SA_{bottom} + SA_{top}) / 2 * d_{ponding-bio}]$   
 $S_v = 1111 * [(1.5 * 0.25) + (1 * 0.4)] + [(1759+1111) / 2 * 1]$   
**S<sub>v</sub> = 2,296 cubic feet**

Step 4: Check S<sub>v</sub> vs SWR<sub>v</sub> of Drainage Area

$S_v : SWR_v = 2296 : 1934$   
**S<sub>v</sub>:SWR<sub>v</sub> = 119%**

CLIENT

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