

SHEET INDEX	
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3	PRELIMINARY SEDIMENT AND EROSION CONTROL PLAN & LANDSCAPE PLAN
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6	SWM DRAINAGE AREA MAP
7	SEDIMENT CONTROL DETAIL SHEET

## Environmental Concept Plan

# Children's Lighthouse Daycare Parcel 'B'

Mission Place, Phase II, Parcel 'B' (Plat Nos. 19854-19858)

Tax Map No. 43 Grid No. 14 Parcel No. 214

Zoning: CAC-CLI

APPROVED: DEPARTMENT OF PLANNING AND ZONING  
 Chief, Division of Land Development: *S. J. Martin* 11/25/19  
 Chief, Development Engineering Division: *W. H. H.* 11-29-19

### DESIGN NARRATIVE

**INTRODUCTION:**  
 THIS REPORT WILL DEMONSTRATE HOW THE CRITERIA SET FORTH IN THE MARYLAND STORMWATER DESIGN MANUAL, VOLUMES I AND II (EFFECTIVE OCTOBER 2000, REVISED MAY 2009) WILL BE SATISFIED FOR THESE LOTS. THE GOAL OF CREATING HYDROLOGY SIMILAR TO THAT OF "WOODS IN GOOD CONDITION" WILL BE ACCOMPLISHED THROUGH THE USE OF MICRO BIO-RETENTION FACILITIES (M-6), AS SUGGESTED WITHIN CHAPTER 5 OF PREVIOUSLY MENTIONED MANUAL. THE ACHIEVEMENT OF THIS GOAL WILL REMOVE THE REQUIREMENT OF PROVIDING CHANNEL PROTECTION VOLUME.

**GENERAL SITE CONDITIONS:**  
 THE CHILDREN'S LIGHTHOUSE DAYCARE PROJECT IS ZONED CAC-CLI AND LOCATED ON TAX MAP 43, PARCEL NO. 214 OF THE HOWARD COUNTY, MARYLAND TAX MAP DATABASE.

**I. NATURAL RESOURCE PROTECTION:**  
 TO ENSURE THE PROTECTION OF NATURAL RESOURCES LOCATED ON THIS SITE, ALL BUFFERS WILL BE HONORED AND ALL IMPROVEMENT WILL BE LOCATED OUTSIDE OF ENVIRONMENTALLY SENSITIVE AREAS. THERE ARE NO DEFINED SPECIMEN TREES LOCATED ON THIS PROPERTY. THIS PROPERTY IS COMPLETELY DEVOID OF ANY EXISTING TREES. THERE ARE NO STEEP SLOPES, WETLANDS, WETLAND BUFFERS, STREAM OR STREAM BUFFERS LOCATED ON THIS PROJECT.

**II. MAINTENANCE OF NATURAL FLOW PATTERNS:**  
 THE PROPOSED DEVELOPMENT IS DESIGNED WITH THE INTENT OF CREATING DRAINAGE DIVIDES SIMILAR TO THOSE OF THE NATURAL FLOW PATTERNS IN THE PROJECT AREA.

**III. REDUCTION OF IMPERVIOUS AREAS THROUGH BETTER SITE DESIGN, ALTERNATIVE SURFACES AND NONSTRUCTURAL PRACTICES:**  
 THIS SITE PROPOSES THE MINIMUM IMPERVIOUS AREAS NECESSARY TO PROVIDE ADEQUATE ACCESS TO THE PROPOSED BUILDING. ALL PROPOSED IMPERVIOUS SURFACES ARE RECEIVING TREATMENT THROUGH THE USE OF ESD STORMWATER MANAGEMENT FACILITIES. WE ARE PROVIDING FOR 5 MICRO BIO-RETENTION FACILITIES TO TREAT THE PAVING AND PROPOSED BUILDING TO CAPTURE AND TREAT THE ROOFTOP RUNOFF AND RUNOFF FROM THE PAVED AREAS.

**IV. INTEGRATION OF EROSION AND SEDIMENT CONTROLS INTO STORMWATER STRATEGY:**  
 THIS SUBMISSION PROPOSES ON-LOT SEDIMENT CONTROLS SUCH AS SUPER SILT FENCE, A STOCKPILE AND A STABILIZED CONSTRUCTION ENTRANCE.

**V. IMPLEMENTATION OF ESD PLANNING TECHNIQUES AND PRACTICES TO THE MAXIMUM EXTENT PRACTICABLE (MEP):**  
 THIS SUBMISSION PROPOSES 5 MICRO BIO-RETENTION FACILITIES (M-6) TO MEET AND EXCEED ENVIRONMENTAL SITE DESIGN TO THE MAXIMUM EXTENT PRACTICABLE (ESD TO THE MEP).

**VI. REQUEST FOR DESIGN MANUAL WAIVER:**  
 NO WAIVERS ARE EXPECTED TO BE REQUESTED ON THIS PROJECT RELATING TO SWM REQUIREMENTS.

LEGEND	
SYMBOL	DESCRIPTION
---	EXISTING CONTOUR 2' INTERVAL
---	EXISTING CONTOUR 10' INTERVAL
---102---	PROPOSED CONTOUR 2' INTERVAL
---100---	PROPOSED CONTOUR 10' INTERVAL
- SF - SF -	SILT FENCE
---	DRAINAGE LIMITS
L.O.D.	LIMIT OF DISTURBANCE
G	EXISTING GASMAIN
---	EXISTING TREELINE
---	WETLANDS BUFFER
---	WETLANDS LIMITS
FP	FLOODPLAIN LIMITS
ESD #21	STORMWATER MANAGEMENT DEVICE
○	STORM DRAIN
B-33	BORING LOCATION
○	PROPOSED STREET TREE
○	EXISTING STREET TREE
☆	PROPOSED STREET LIGHT
☆	EXISTING STREET LIGHT



VICINITY MAP  
 SCALE: 1" = 2000'

### GENERAL NOTES

- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT 410-313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL NOTIFY (MISS UTILITY) AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
- THE SUBJECT PROPERTY IS ZONED CAC-CLI (PER 10/06/04 COMPREHENSIVE ZONING PLAN).
- EXISTING TOPOGRAPHY SHOWN IS FROM A FIELD RUN SURVEY PERFORMED BY FISHER, COLLINS AND CARTER, INC. AND DATED JULY 15, 2019.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 43G8 AND 43E8 WERE USED FOR THIS PROJECT.
- STORM WATER MANAGEMENT IS IN ACCORDANCE WITH THE M.D.E. STORM WATER DESIGN MANUAL, VOLUMES I & II, REVISED 2009. PROVIDED STORM WATER MANAGEMENT INCLUDE THE USE OF FIVE (5) M-6 MICRO BIO-RETENTION FACILITIES.
- THIS PROPERTY IS LOCATED WITHIN THE METROPOLITAN DISTRICT. PUBLIC WATER AND SEWER WILL BE UTILIZED FOR THIS PROJECT.
- ANY DAMAGE TO THE COUNTY'S RIGHT-OF-WAY SHALL BE CORRECTED AT THE DEVELOPER'S EXPENSE.
- NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100 YEAR FLOODPLAIN.
- LANDSCAPING WILL BE PROVIDED AT THE SITE DEVELOPMENT STAGE OF THIS PROJECT.
- FOREST CONSERVATION WAS ADDRESSED UNDER THE MISSION PLACE SUBDIVISION FOR THIS RESIDUE PARCEL FILE # F-07-156.
- OFF-SITE GRADING PERMISSION LETTER WILL BE PROVIDED AT THE SITE DEVELOPMENT STAGE OF THIS PROJECT.
- REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SITE PLAN STAGES. THEREFORE, THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED COMMENTS INCLUDING THOSE THAT MAY ALTER OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES.
- SOIL BORING INFORMATION WILL BE PROVIDED AT THE SDP STAGE OF THIS PROJECT.
- APPROVAL OF THIS ECP DOES NOT CONSTITUTE APPROVAL OF SUBSEQUENT OR ASSOCIATED SUBDIVISION OR SITE DEVELOPMENT PLANS OR RED-LINE REVISIONS. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY ZONING REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN, SITE DEVELOPMENT PLAN, OR RED-LINE REVISION PROCESSES. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL AND MORE DETAILED REVIEW COMMENTS INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THE PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
- WETLANDS DETERMINATION WAS PERFORMED UNDER THE MISSION PLACE SUBDIVISION FOR THIS PARCEL.
- THERE ARE NO WETLANDS LOCATED ON PARCEL 'B'.
- A PRE-SUBMISSION COMMUNITY MEETING FOR THIS PROJECT WAS HELD MAY 28, 2019 AT 6:00 PM AND WAS LOCATED AT THE ELKBRIDGE LIBRARY. NO MEMBERS FROM THE COMMUNITY ATTENDED THE MEETING.
- THE DATE AND TIME OF THE DESIGN ADVISORY PANEL (DAP) MEETING WAS JUNE 12, 2019 @ 7:00 PM.
- UNDER THIS PLAN FOR REMAINING PARCEL 'B' OF MISSION PLACE (SP-06-18) THE COMMERCIAL SPACE REQUIREMENT WAS PROVIDED FROM 235 SQ.FT. PER UNIT TO 70 SQ.FT. PER UNIT TO MEET TODAY'S CURRENT ZONING REGULATIONS 127.5.E.3.C.

STORMWATER MANAGEMENT PRACTICES								
AREA ID	PERMEABLE PAVING A-2 (Y/N)	DISCONNECTION OF ROOFTOP RUNOFF N-1 (Y/N)	DISCONNECTION OF NON-ROOFTOP RUNOFF N-2 (Y/N)	FILTERTRA INLETS (Y/N)	MICRO BIO-RETENTION M-6 (Y/N)	BIO-RETENTION F-5 (Y/N)	SUBMERGED GRAVEL WETLAND M-2 (Y/N)	RAINWATER HARVESTING M-1
BUILDING	NO	NO	NO	NO	Y-1	NO	NO	NO
PARKING LOT	NO	NO	NO	NO	Y-4	NO	NO	NO

### SITE ANALYSIS DATA CHART

#### BENCHMARK INFORMATION

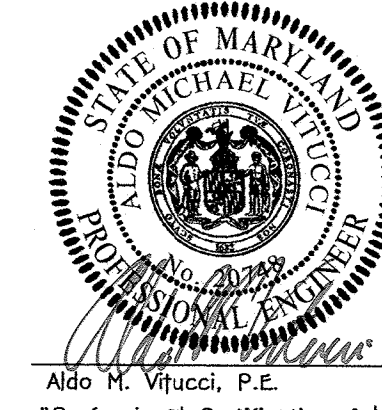
BM#1 HOWARD COUNTY CONTROL STATION #43G6 - HORIZONTAL - (NAD '83)  
 N 544,117.488  
 E 1,370,590.920  
 ELEVATION = 219.402 - VERTICAL - (NAVD '88)

BM#2 HOWARD COUNTY CONTROL STATION #43E8 - HORIZONTAL - (NAD '83)  
 N 545,963.613  
 E 1,371,573.894  
 ELEVATION = 216.312 - VERTICAL - (NAVD '88)

A. TOTAL AREA OF THIS SUBMISSION = 1.96 AC.  
 B. LIMIT OF DISTURBED AREA = 73,616 SQ.FT. OR 1.69 AC.  
 C. PRESENT ZONING DESIGNATION = CAC-CLI (PER 10/06/13 COMPREHENSIVE ZONING PLAN)  
 D. PROPOSED USE: DAY CARE CENTER; 12,510 SQ.FT.  
 E. OPEN SPACE ON SITE: N/A  
 F. RECREATIONAL AREA PROVIDED: N/A  
 G. BUILDING COVERAGE OF SITE: 12,510 SQ.FT. OR 0.287 AC.  
 H. PREVIOUS HOWARD COUNTY FILES: F-07-156, SP-06-18, SDP-07-113, SDP-07-101, SDP-007-104, WP-06-96, AA-06-016, 28-1048-B & HD-827.  
 I. TOTAL AREA OF EX. FLOODPLAIN LOCATED ON SITE: 0.00 AC.  
 J. TOTAL AREA OF SLOPES IN EXCESS OF 15% = 0.00 AC.  
 K. NET TRACT AREA = 1.96 AC.  
 (TOTAL SITE AREA - FLOODPLAIN - STEEP SLOPES AREA)  
 L. TOTAL AREA OF WETLANDS (INCLUDING BUFFERS) = 0.00 AC.  
 M. TOTAL AREA OF EX. FOREST = 0.00 AC.  
 N. TOTAL GREEN OPEN AREA = 1.02 AC.  
 O. TOTAL IMPERVIOUS AREA = 0.77 AC.  
 P. AREA OF ERODIBLE SOILS = 0.00 AC.

## 6th Election District Howard County, Maryland

OWNER AND DEVELOPER  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE DOLBEN CO. INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
 WOBURN, MAINE 01801-1121  
 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001



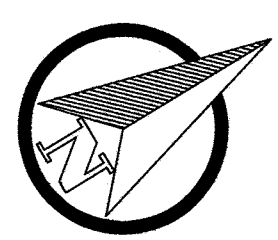
Aldo M. Vitucci, P.E.  
 Date: 11/19/19  
 \*Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed Professional Engineer under the laws of the State of Maryland. License No. 20748, Expiration Date 2-22-21.\*

Children's  
Lighthouse Daycare  
Parcel 'B'  
 8150 MISSION ROAD  
 Mission Place, Phase II, Parcel 'B' (Plat Nos. 19854-19858)  
 Zoned: CAC-CLI  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: November 13, 2019  
 Scale: As Shown  
 Sheet 1 of 7

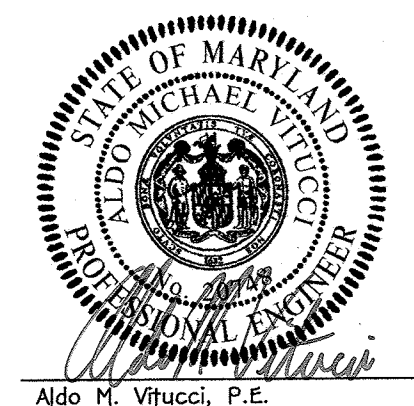
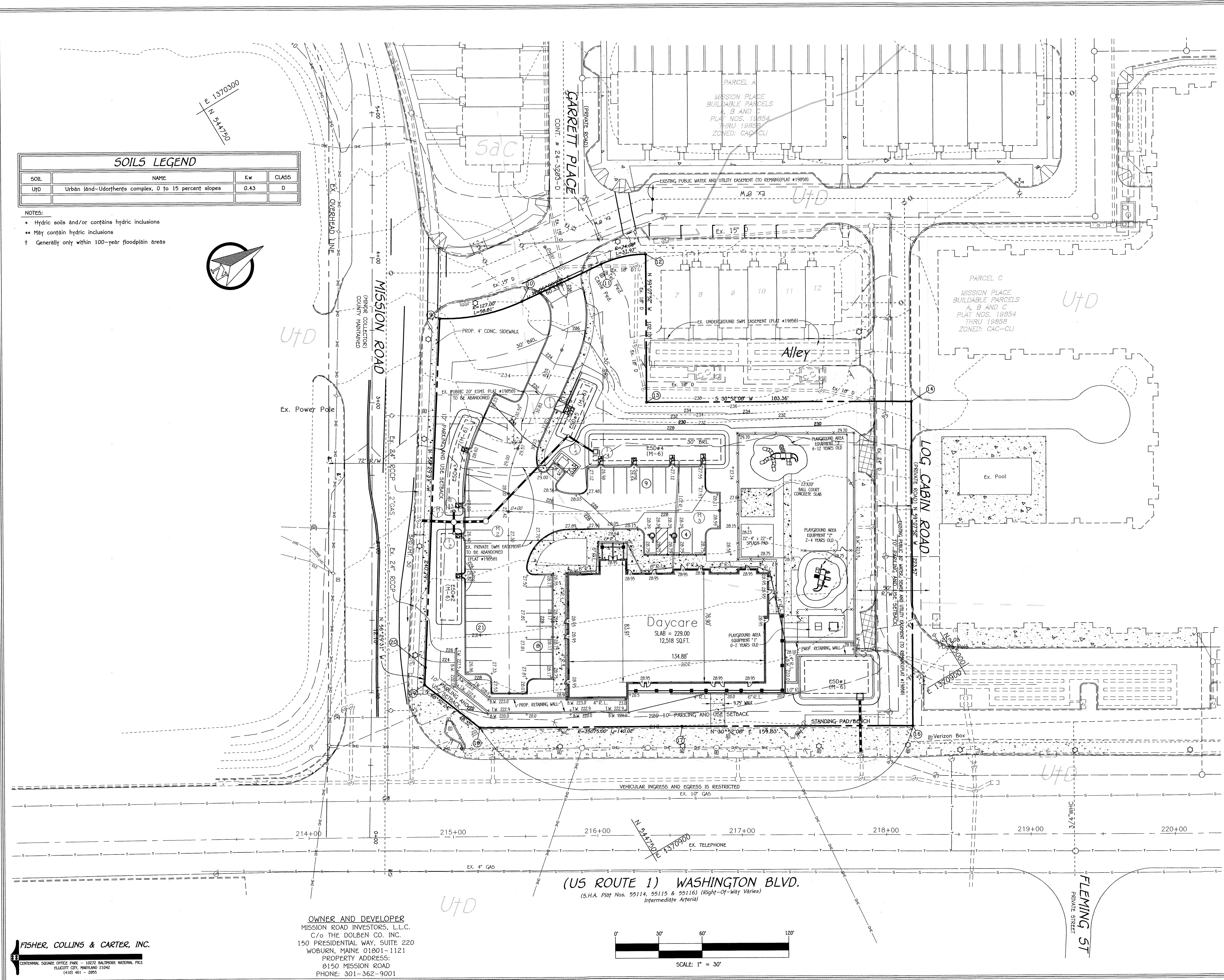


SOILS LEGEND			
SOIL	NAME	Kw	CLASS
UFD	Urban land-Udorthents complex, 0 to 15 percent slopes	0.43	D

NOTES:  
 • Hydric soils and/or contains hydric inclusions  
 \*\* May contain hydric inclusions  
 † Generally only within 100-year floodplain areas



LEGEND	
SYMBOL	DESCRIPTION
---	EXISTING CONTOUR 2' INTERVAL
---	EXISTING CONTOUR 10' INTERVAL
---	PROPOSED CONTOUR 2' INTERVAL
---	PROPOSED CONTOUR 10' INTERVAL
-SF-SF-	SILT FENCE
▬▬▬▬	DRAINAGE LIMITS
L.O.D.	LIMIT OF DISTURBANCE
G	EXISTING GASMAIN
~~~~~	EXISTING TREELINE
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—	STORM DRAIN
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○	PROPOSED STREET TREE
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☆	EXISTING STREET LIGHT



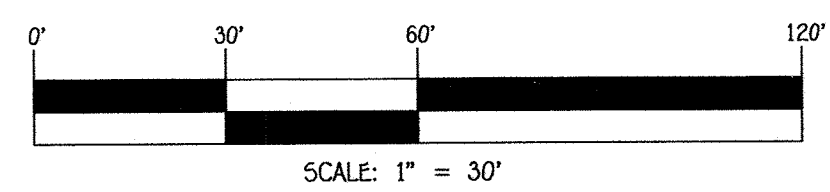
Aldo M. Vitucci, P.E.  
 Date: 11/29/19  
 \*Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly Licensed Professional Engineer under the laws of the State of Maryland, License No. 20748, Expiration Date 2-22-21.\*

ECP Plan  
 Children's  
 Lighthouse Daycare  
 Parcel 'B'

Zoned: CAC-CU  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: October 28, 2019  
 Scale: As Shown  
 Sheet 2 of 7

OWNER AND DEVELOPER  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE COLBEN CO., INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
 WOBURN, MAINE 01801-1121  
 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001

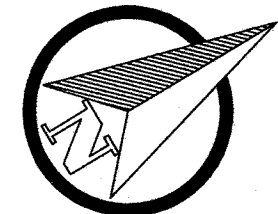
FISHER, COLLINS & CARTER, INC.  
 CENTENNIAL SQUARE OFFICE PARK - 10772 BALTIMORE NATIONAL PIKE  
 ELICOTT CITY, MARYLAND 21042  
 (410) 461-2095



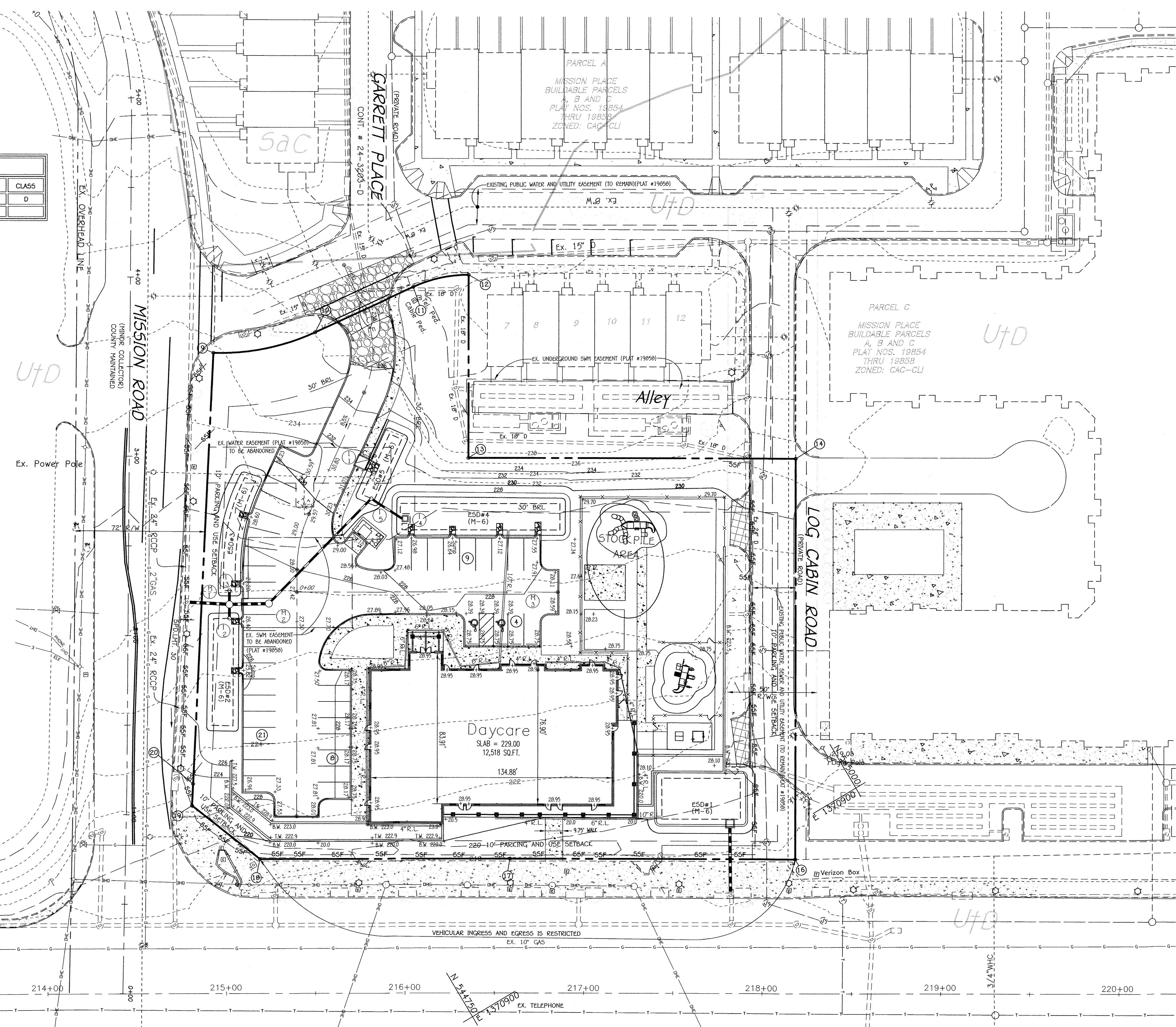


SOILS LEGEND			
SOIL	NAME	Kw	CLASS
UFD	Urban land-Udorthefts complex, 0 to 15 percent slopes	0.43	D

NOTES:  
 \* Hydric soils and/or contains hydric inclusions  
 \*\* May contain hydric inclusions  
 † Generally only within 100-year floodplain areas



LEGEND	
SYMBOL	DESCRIPTION
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---	EXISTING CONTOUR 10' INTERVAL
-102-	PROPOSED CONTOUR 2' INTERVAL
-100-	PROPOSED CONTOUR 10' INTERVAL
-SF-SF-	SILT FENCE
█	DRAINAGE LIMITS
L.O.D.	LIMIT OF DISTURBANCE
G	EXISTING GASMAIN
~	EXISTING TREELINE
---	WETLANDS BUFFER
---	WETLANDS LIMITS
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☆	EXISTING STREET LIGHT



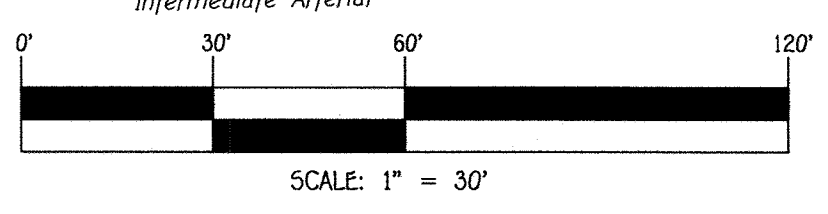
APPROVAL OF THIS ECP DOES NOT PROVIDE APPROVAL OF THE SHOWN SEDIMENT CONTROL PLAN.



Aldo M. Vitucci, P.E.  
 11/25/19 DATE  
 \*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. 20748, Expiration Date 2-22-21.\*

OWNER AND DEVELOPER  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE DOLBEN CO. INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
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 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001

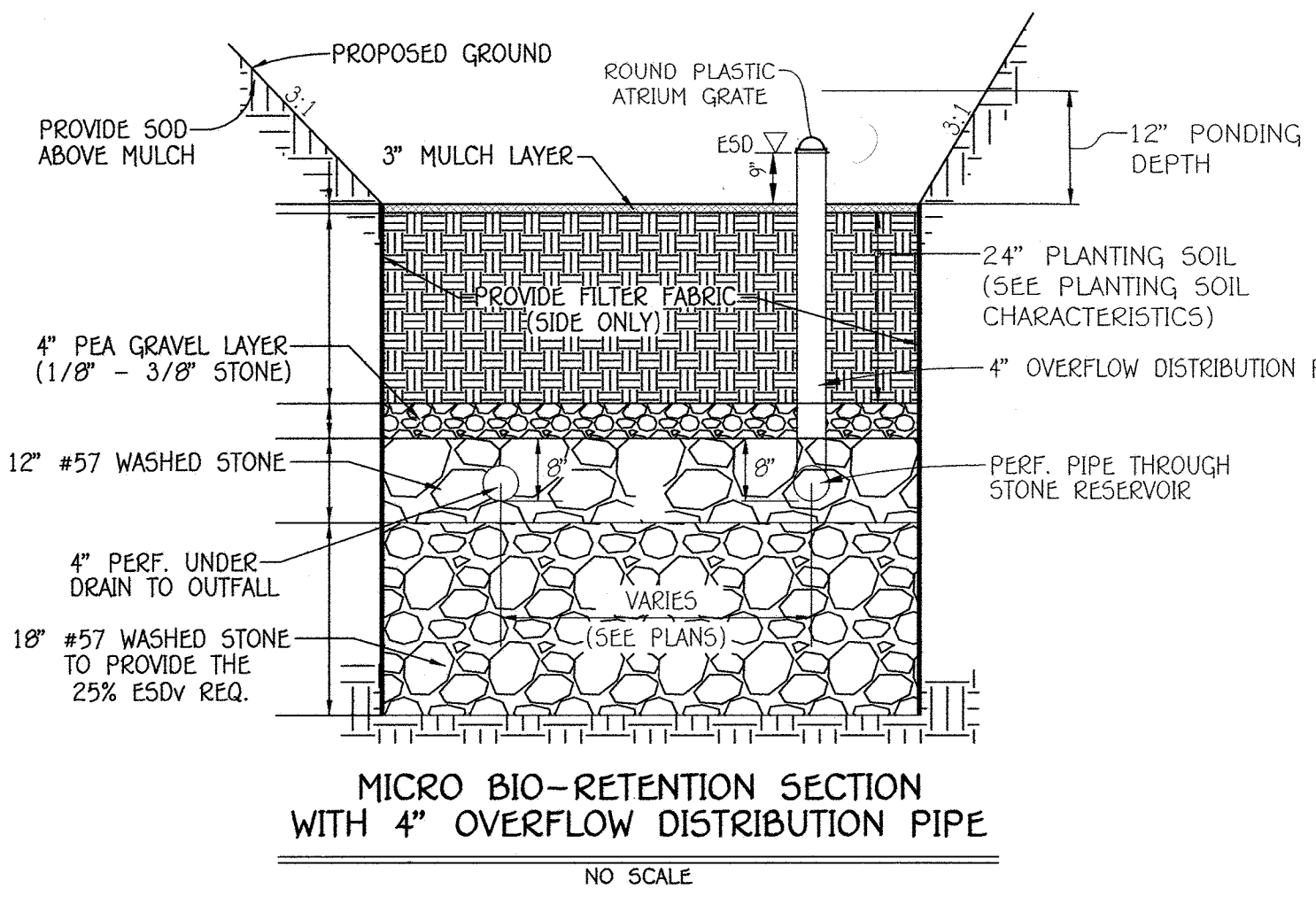
(US ROUTE 1) WASHINGTON BLVD.  
 (S.H.A. Plat Nos. 55114, 55115 & 55116) (Right-of-Way Varies)  
 Injunctive Arterial



Sediment Control Plan  
 Children's  
 Lighthouse Daycare  
 Parcel 'B'

Zoned: CAC-CLI  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: October 28, 2019  
 Scale: As Shown  
 Sheet 3 of 7





**Infiltration and Filter System Construction Specifications**

Infiltration and filter systems either take advantage of existing permeable soils or create a permeable medium such as sand for WC1, and for V. In some instances where permeability is great, these facilities may be used for Qp as well. The most common systems include infiltration trenches, infiltration basins, sand filters, and organic filters.

When properly planted, vegetation will thrive and enhance the functioning of these systems. For example, pre-treatment buffers will trap sediments that often are bound with phosphorus and metals. Vegetation planted in the facility will aid in nutrient uptake and water storage. Additionally, plant roots will provide arteries for stormwater to permeate soil for groundwater recharge. Finally, successful plantings provide aesthetic value and wildlife habitat making these facilities more desirable to the public.

- Design Constraints:**
- > Planting buffer strips of at least 20 feet will cause sediments to settle out before reaching the facility, thereby reducing the possibility of clogging.
  - > Determine areas that will be saturated with water and water table depth so that appropriate plants may be selected (hydrology will be similar to bioretention facilities, see figure A.5 and Table A.4 for planting material guidance).
  - > Plants known to send down deep taproots should be avoided in systems where filter fabric is used as part of facility design.
  - > Test soil conditions to determine if soil amendments are necessary.
  - > Plants should be located so that access is possible for structure maintenance.
  - > Stabilize heavy flow areas with erosion control mats or sod.
  - > Temporarily divert flows from seeded areas until vegetation is established.
  - > See Table A.5 for additional design considerations.

**Bio-retention**

**Soil Bed Characteristics**  
 The characteristics of the soil for the bioretention facility are perhaps as important as the facility location, size, and treatment volume. The soil must be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop. In addition, much of the nutrient pollutant uptake (nitrogen and phosphorus) is accomplished through absorption and microbial activity within the soil profile. Therefore, soils must balance their chemical and physical properties to support biotic communities above and below ground.

The planting soil should be a sandy loam, loamy sand, loam (USDA), or a loam/sand mix (should contain a minimum 35 to 60% sand, by volume). The clay content for these soils should be less than 25% by volume (Environmental Quality Resources (EQR), 1996; Engineering Technology Inc. and Biohabitats, Inc. (ETAB), 1993). Soils should fall within the SM, ML, SC classifications or the Unified Soil Classification System (USCS). A permeability of at least 1.0 feet per day (0.57/hr) is required (a conservative value of 0.5 feet per day is used for design). The soil should be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds (e.g., Johnson Grass, Mugwort, Nutcase, and Canada Thistle or other noxious weeds as specified under COMAR 15.08.01.05.) should not be present in the soils. Placement of the planting soil should be in 12 to 18 lifts that are loosely compacted (tamped lightly with a backhoe bucket or traversed by dozer tracks). The specific characteristics are presented in Table A.3.

Table A.3 Planting Soil Characteristics

Parameter	Value
pH range	5.2 to 7.00
Organic matter	1.5 to 4.0% (by weight)
Magnesium	35 lbs. per acre, minimum
Phosphorus (phosphate - P2O5)	75 lbs. per acre, minimum
Potassium (potash - K2O)	85 lbs. per acre, minimum
Soluble salts	500 ppm
Clay	0 to 5%
Silt	30 to 55%
Sand	35 to 60%

**Mulch Layer**  
 The mulch layer plays an important role in the performance of the bioretention system. The mulch layer helps maintain soil moisture and avoids surface sealing, which reduces permeability. Mulch helps prevent erosion, and provides a microenvironment suitable for soil biota at the mulch/soil interface. It also serves as a pretreatment layer, trapping the finer sediments, which remain suspended after the primary pretreatment.

The mulch layer should be standard landscape style, single or double shredded hardwood mulch or chips. The mulch layer should be well aged (stockpiled or stored for at least 12 months), uniform in color, and free of other materials, such as weed seeds, soil, roots, etc. The mulch should be applied to a maximum depth of three inches. Grass clippings should not be used as a mulch material.

**Planting Guidance**  
 Plant material selection should be based on the goal of simulating a terrestrial forested community of native species. Bioretention simulates an upland-species ecosystem. The community should be dominated by trees, but have a distinct community of understory trees, shrubs and herbaceous materials. By creating a diverse, dense plant cover, a bioretention facility will be able to treat stormwater runoff and withstand urban stresses from insects, disease, drought, temperature, wind, and exposure.

The proper selection and installation of plant materials is key to a successful system. There are essentially three zones within a bioretention facility (Figure A.5). The lowest elevation supports plant species adapted to standing and fluctuating water levels. The middle elevation supports plants that like drier soil conditions, but can still tolerate occasional inundation by water. The outer edge is the highest elevation and generally supports plants adapted to drier conditions. A sample of appropriate plant materials for bioretention facilities are included in Table A.4. The layout of plant material should be flexible, but should follow the general principals described in Table A.5. The objective is to have a system, which resembles a random, and natural plant layout, while maintaining optimal conditions for plant establishment and growth. For a more extensive bioretention plan, consult ETAB, 1993 or Clayton and Schueler, 1997.

**B.4.C Specifications for Micro-Bioretention, Landscape Infiltration & Infiltration Berms**

1. Material Specifications
2. The allowable materials to be used in these practices are detailed in Table B.4.1.
3. Filtering Media or Planting Soil

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches. No other materials or substances shall be mixed or dumped within the micro-bioretention practice that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

- The planting soil shall be tested and shall meet the following criteria:
- Soil Component - Loamy Sand or Sandy Loam (USDA Soil Textural Classification)
  - Organic Content - Minimum 10% by dry weight (ASTM D 2974). In general, this can be met with a mixture of loamy sand (60%-65%) and compost (35% to 40%) or sandy loam (30%), coarse sand (30%), and compost (40%).
  - Clay Content - Media shall have a clay content of less than 5%.
  - pH Range - Should be between 5.5 - 7.0. Amendments (e.g., lime, iron sulfate plus sulfur) may be mixed into the soil to increase or decrease pH.

There shall be at least one soil test per project. Each test shall consist of both the standard soil test for pH, and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stocked topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the topsoil was excavated.

3. Compaction
- It is very important to minimize compaction of both the base of bioretention practices and the required backfill. When possible, use excavation hoes to remove original soil. If practices are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to restructure the soil profile through the 12 inch compaction zone. Subsoiler methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfilling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soil and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. Plant Material
5. Plant Installation

Compost is a better organic material source, is less likely to float, and should be placed in the lowest and other low areas. Mulch should be placed in surrounding to a uniform thickness of 2" to 3". Shredded or chipped hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Rootstock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8 th of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.

The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers, debris, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet.

6. Underdrains

Underdrains should meet the following criteria:  
 Pipe - Should be 670 670 diameter, slotted or perforated rigid plastic pipe (ASTM F 750, Type PS 20, or AASHTO M-270) in a gravel layer. The preferred material is slotted, 4" rigid pipe (e.g., PVC or HDPE).

Perforations - If perforated pipe is used, perforations should be 3/8" diameter located 6" on center with a minimum of four holes per row. Pipe shall be wrapped with a 1/4" (No. 4 or 4x) galvanized hardware cloth.

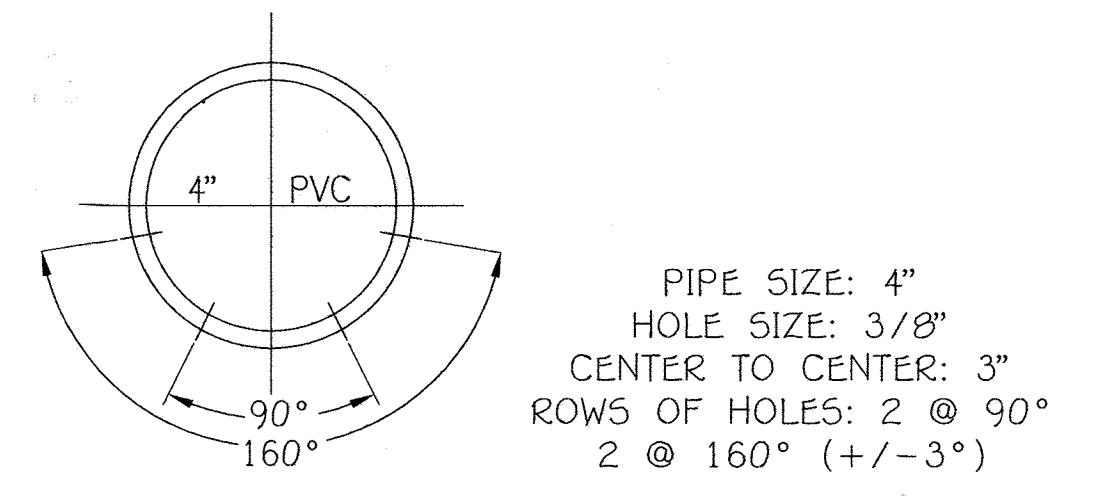
Gravel - The gravel layer (No. 57 stone preferred) shall be at least 3" thick above and below the underdrain.

The main collector pipe shall be at a minimum 0.5% slope.  
 A rigid, non-perforated observation well must be provided (one per every 1,000 square feet) to provide a clean-out port and monitor performance of the filter.

A 4" layer of pea gravel (1/4" to 3/8" stone) shall be located between the filter media and underdrain to prevent migration of fines into the underdrain. This layer may be considered part of the filter bed when bed thickness exceeds 2".

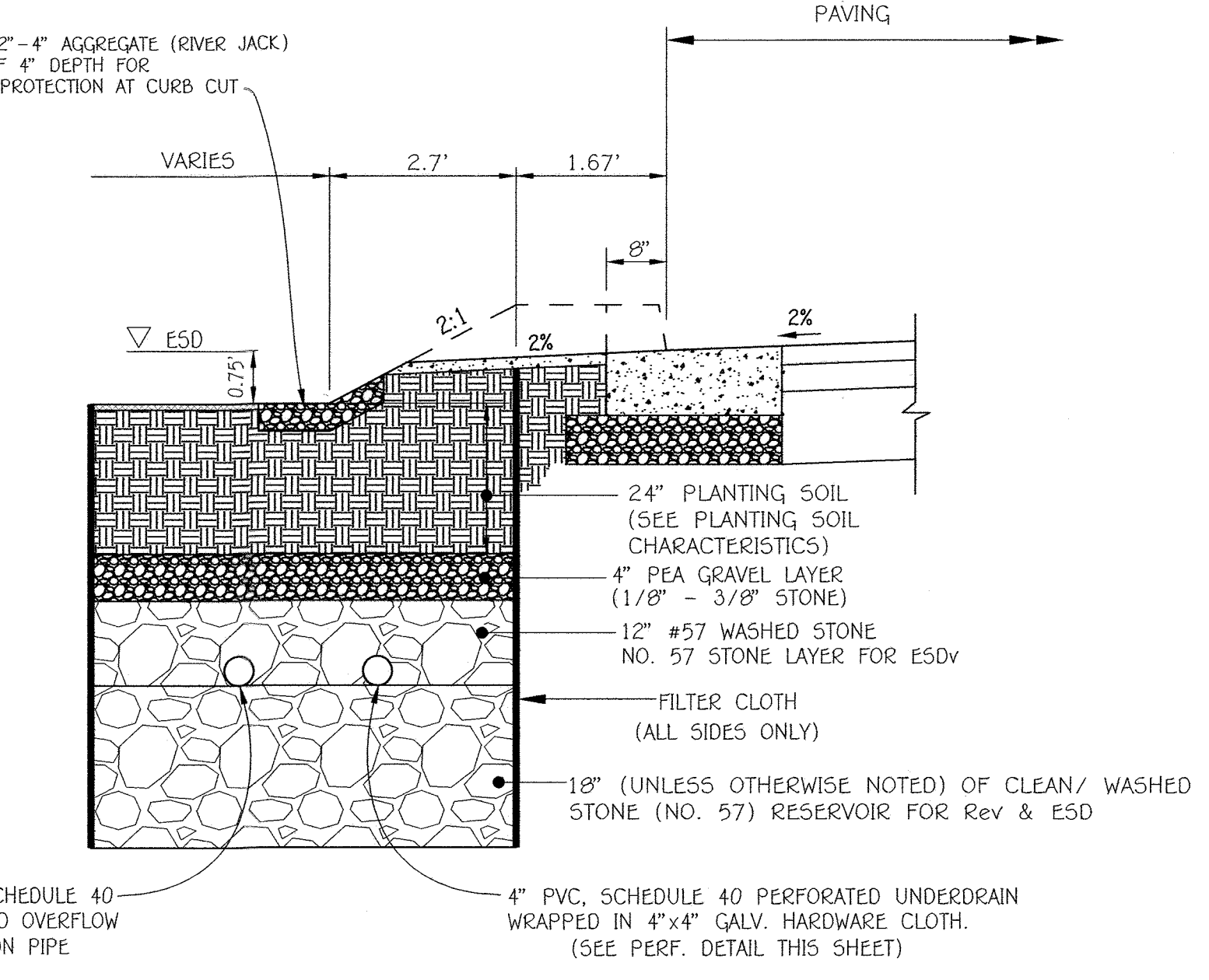
The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

7. Miscellaneous
- These practices may not be constructed until all contributing drainage area has been stabilized.

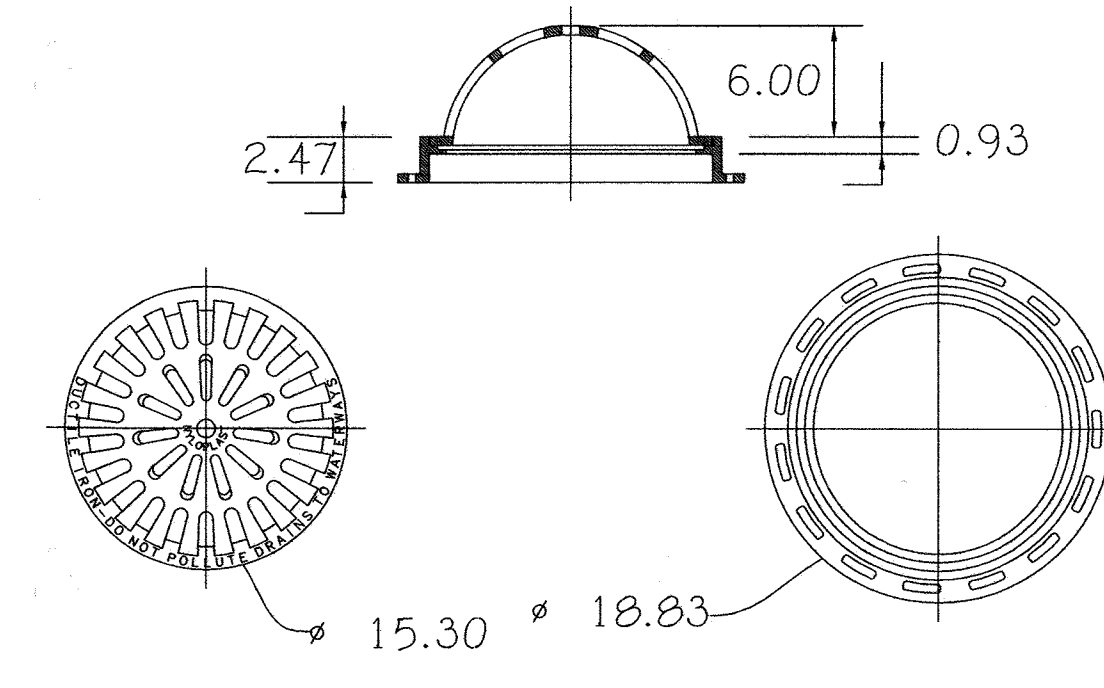


NOTE: WRAP PERFORATED PVC w/ 4x4 GALVANIZED HARDWARE CLOTH

**SCH 40 PVC PERFORATED UNDERDRAIN PIPE DETAIL FOR HORIZONTAL DRAIN PIPE**  
 NO SCALE



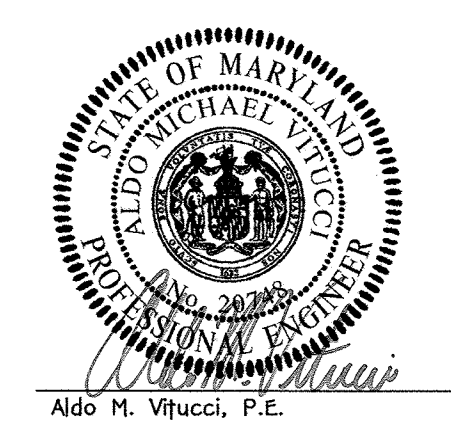
TYPICAL BIO-RETENTION (M-B) ADJACENT TO ROADWAY @ CURB CUT AND/OR SIDEWALK  
 NO SCALE



ALL DIMENSIONS IN INCHES UNLESS NOTED OTHERWISE  
 QUALITY: MATERIAL SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
 PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT LOKING DEVICE AVAILABLE UPON REQUEST  
 SEE DRAWING NO. 7001-110-230

**Nyloplast**  
 3130 VERONA AVE  
 BUFORD, GA 30518  
 PHN (770) 932-2443  
 FAX (770) 932-2490  
 www.nyloplast-us.com

**15" DOME GRATE ASSEMBLY**  
 NYLOPLAST OR EQUAL

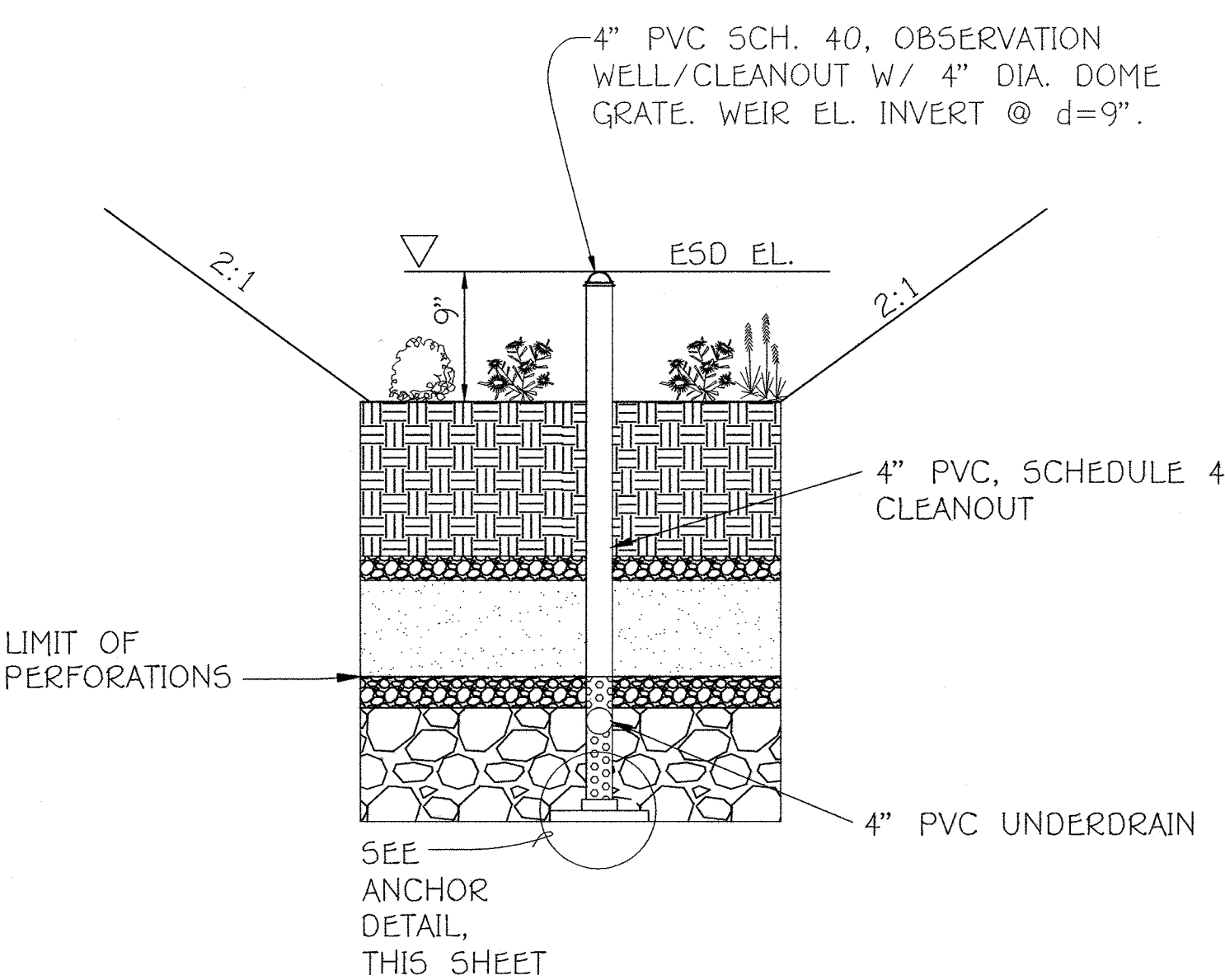


11/19/19  
 Date

\*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. 20748, Expiration Date 2-22-21.\*

**Operation And Maintenance Schedule For Commercial Association Owned & Maintained Bio-Retention Areas (M-B)**

1. The owner shall maintain the plant material, mulch layer and soil layer annually, maintenance of mulch and soil is limited to correcting areas of erosion or wash out. Any mulch replacement shall be done in the spring. Plant material shall be checked for disease and insect infestation and maintenance will address dead material and pruning. Acceptable replacement plant material is limited to the following: 2000 Maryland stormwater design manual volume II, table A.4.1 and 2.
2. The owner shall perform a plant in the spring and in the fall each year. during the inspection, the owner shall remove dead and diseased vegetation considered beyond treatment, replace dead plant material with acceptable replacement plant material. Treat diseased trees and shrubs and replace all deficient stakes and wires.
3. The owner shall inspect the mulch each spring. The mulch shall be replaced every two to three years. The previous mulch layer shall be removed before the new layer is applied.
4. The owner shall correct soil erosion on an as needed basis, with a minimum of once per month and after each heavy storm.
5. The owner shall maintain all observation wells, clean-outs and perforated underdrains.
6. Filter material must be replaced when water remains on the surface of the filter bed for more than 24 hours following a 1 or 2 year storm event or more than 48 hours following a 10 year storm event.



SECTION @ OBSERVATION WELL LOCATION  
 NOT TO SCALE

**FISHER, COLLINS & CARTER, INC.**  
 CENTENNIAL SQUARE OFFICE PARK - 10272 BENTON NATIONAL PIKE  
 ELKLOTT CITY, MARYLAND 21042  
 (410) 461-2000

**OWNER AND DEVELOPER**  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE DOLBEN CO. INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
 WOBURN, MAINE 01801-1121  
 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001

**SWM DETAIL SHEET**  
**Children's Lighthouse Daycare**  
 Parcel 'B'

Zoned: CAC-CU  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: October 28, 2019  
 Scale: As Shown  
 Sheet 4 of 7

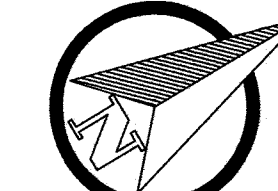






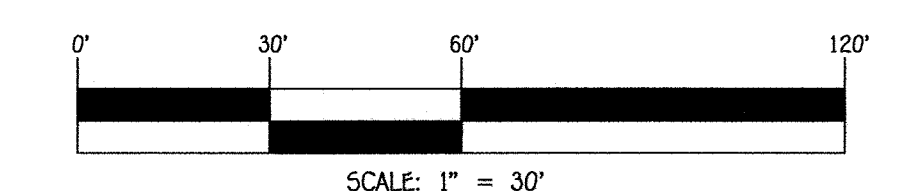
SOILS LEGEND			
SOIL	NAME	Kw	CLASS
UFD	Urban land-Udorthents complex, 0 to 15 percent slopes	0.43	D

NOTES:  
 \* Hydric soils and/or contains hydric inclusions  
 \*\* May contain hydric inclusions  
 † Generally only within 100-year floodplain areas



LEGEND	
SYMBOL	DESCRIPTION
---	EXISTING CONTOUR 2' INTERVAL
---	EXISTING CONTOUR 10' INTERVAL
---	PROPOSED CONTOUR 2' INTERVAL
---	PROPOSED CONTOUR 10' INTERVAL
- SF - SF -	SILT FENCE
---	DRAINAGE LIMITS
---	LIMIT OF DISTURBANCE
G	EXISTING GASMAIN
---	EXISTING TREE LINE
---	WETLANDS BUFFER
---	WETLANDS LIMITS
FP	FLOODPLAIN LIMITS
ESD #21	STORMWATER MANAGEMENT DEVICE
---	STORM DRAIN
B-33	BORING LOCATION
○	PROPOSED STREET TREE
○	EXISTING STREET TREE
☆	PROPOSED STREET LIGHT
☆	EXISTING STREET LIGHT

SWM DRAINAGE AREA SUMMARY TABLE							
DRAINAGE AREA	AREA AC. ±	REQ. PVD. Pe	IMP. AREA AC. ±	FILTER AREA	SURFACE STORAGE	REMARKS	
A	0.24	1.80	2.00	0.19	1000 SQ.FT.	1099 CU.FT. ESD#1-M-6	
B	0.387	1.80	2.00	0.13	680 SQ.FT.	763 CU.FT. ESD#2-M-6	
C	0.233	1.80	2.00	0.08	420 SQ.FT.	486 CU.FT. ESD#3-M-6	
D	0.407	1.80	1.90	0.27	1283 SQ.FT.	1395 CU.FT. ESD#4-M-6	
E	0.151	1.80	2.10	0.05	275 SQ.FT.	329 CU.FT. ESD#5-M-6	



Aldo M. Vitucci, P.E.  
 Date: 11/25/19  
 "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. 20748, Expiration Date 2-22-21."

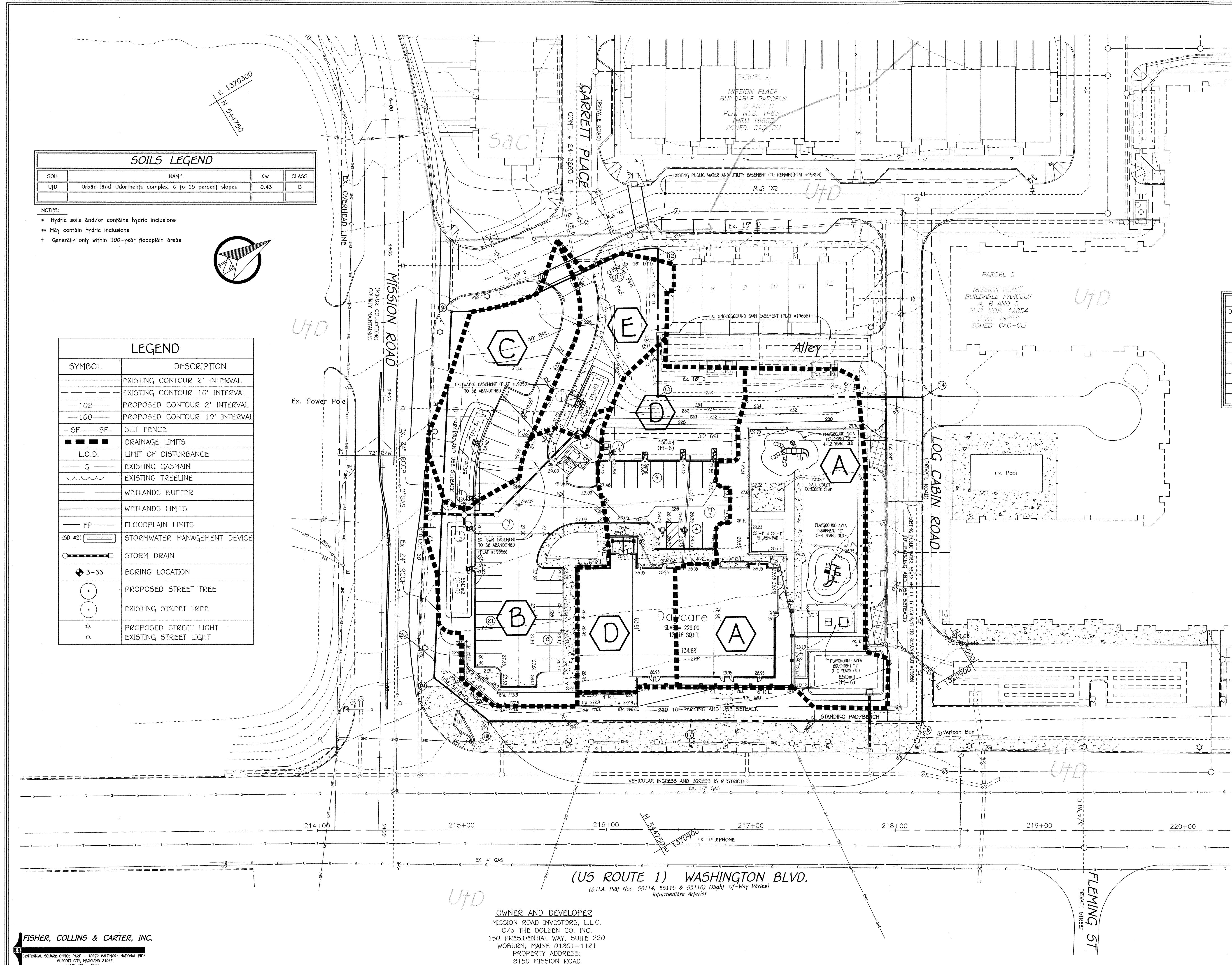
STORM WATER MANAGEMENT  
 DRAINAGE AREA MAP  
 Children's  
 Lighthouse Daycare  
 Parcel 'B'

Zoned: CAC-CLU  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: October 28, 2019  
 Scale: As Shown  
 Sheet 6 of 7

FISHER, COLLINS & CARTER, INC.  
 CENTENNIAL SQUARE OFFICE PARK - 10272 BALTIMORE NATIONAL PLACE  
 ELICOTT CITY, MARYLAND 21114  
 (410) 461-2095

OWNER AND DEVELOPER  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE DOLBEN CO. INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
 WOBURN, MAINE 01801-1121  
 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001

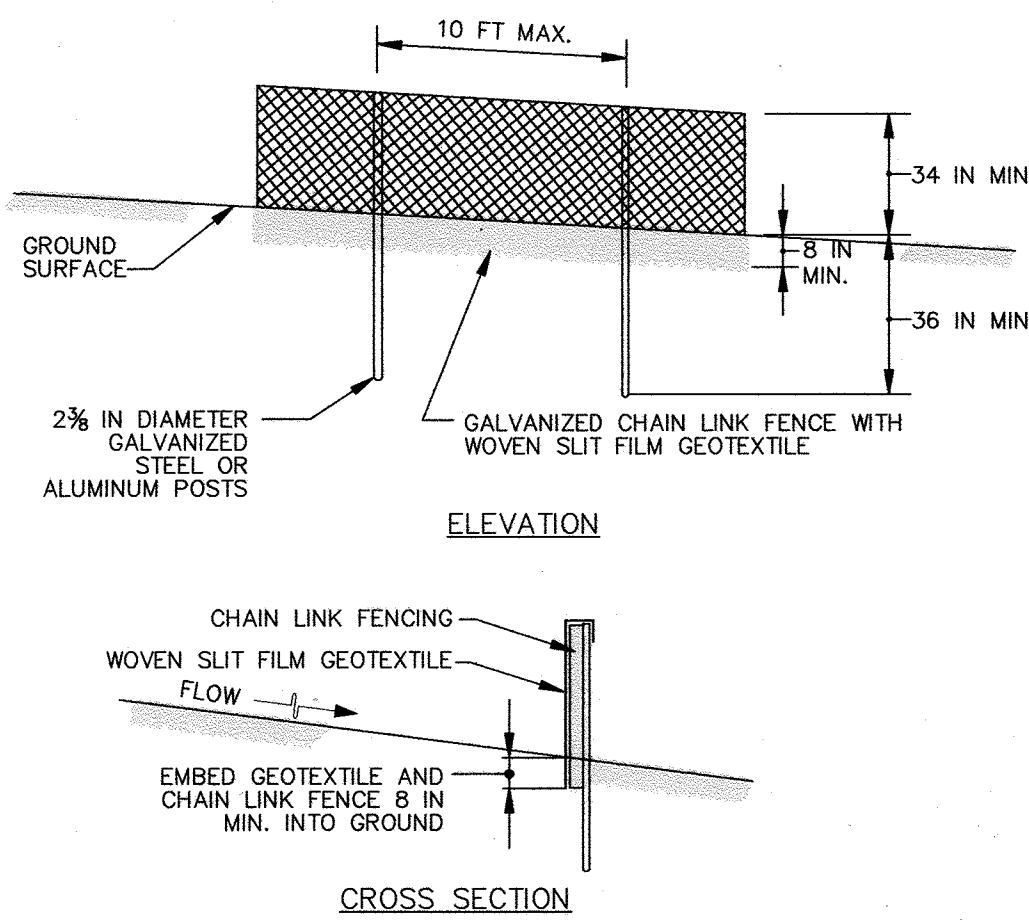
(US ROUTE 1) WASHINGTON BLVD.  
 (S.H.A. Plat Nos. 55114, 55115 & 55116) (Right-Of-Way Varies)  
 Intermediate Arterial





DETAIL E-3 SUPER SILT FENCE

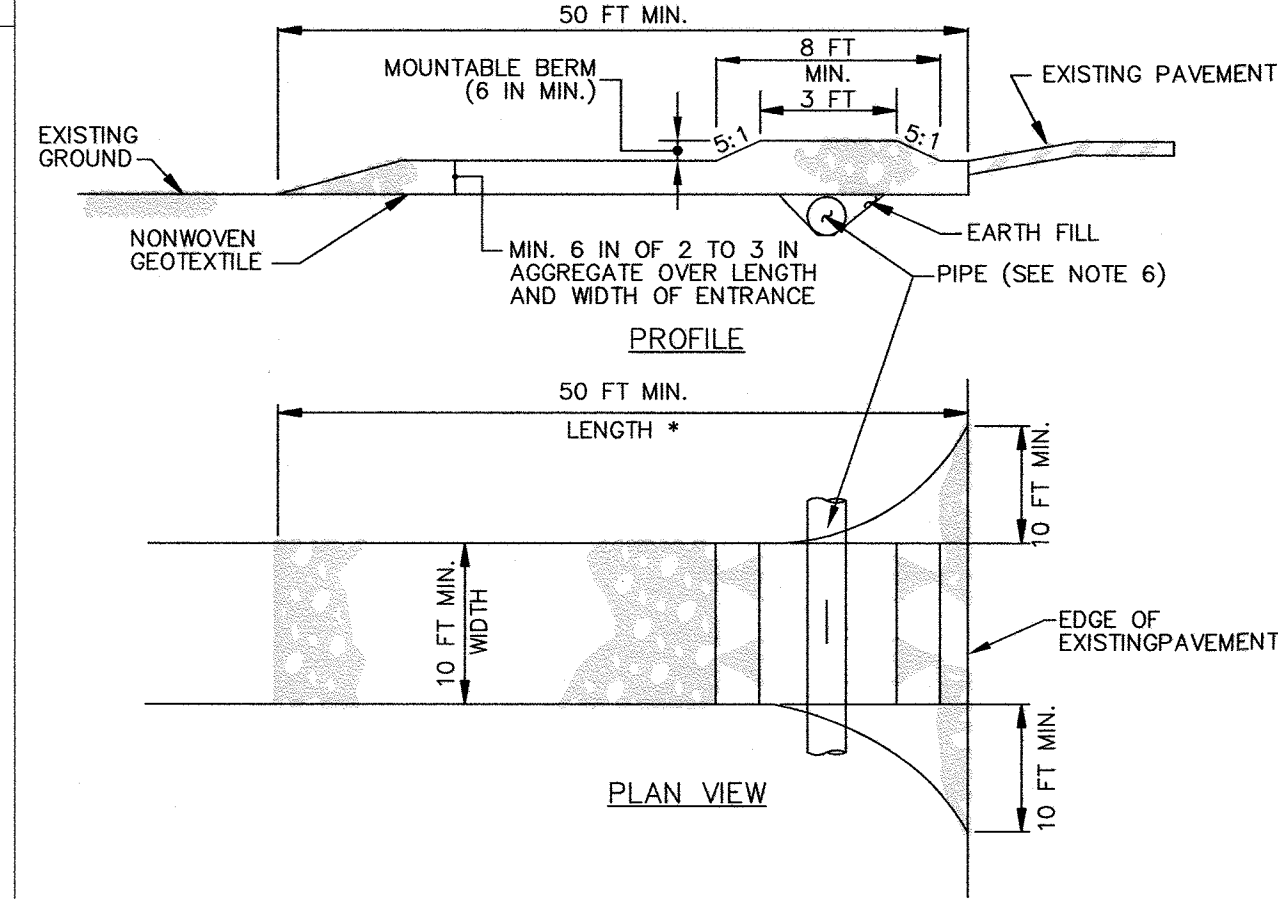
STANDARD SYMBOL  
SSF



- CONSTRUCTION SPECIFICATIONS**
- INSTALL 2 3/8 INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
  - FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2 3/8 INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
  - FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
  - WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
  - EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
  - PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
  - REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

DETAIL B-1 STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL  
SCE



- CONSTRUCTION SPECIFICATIONS**
- PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM 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. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. 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 SCE IS NOT LOCATED AT A HIGH SPOT.
  - PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
  - 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.

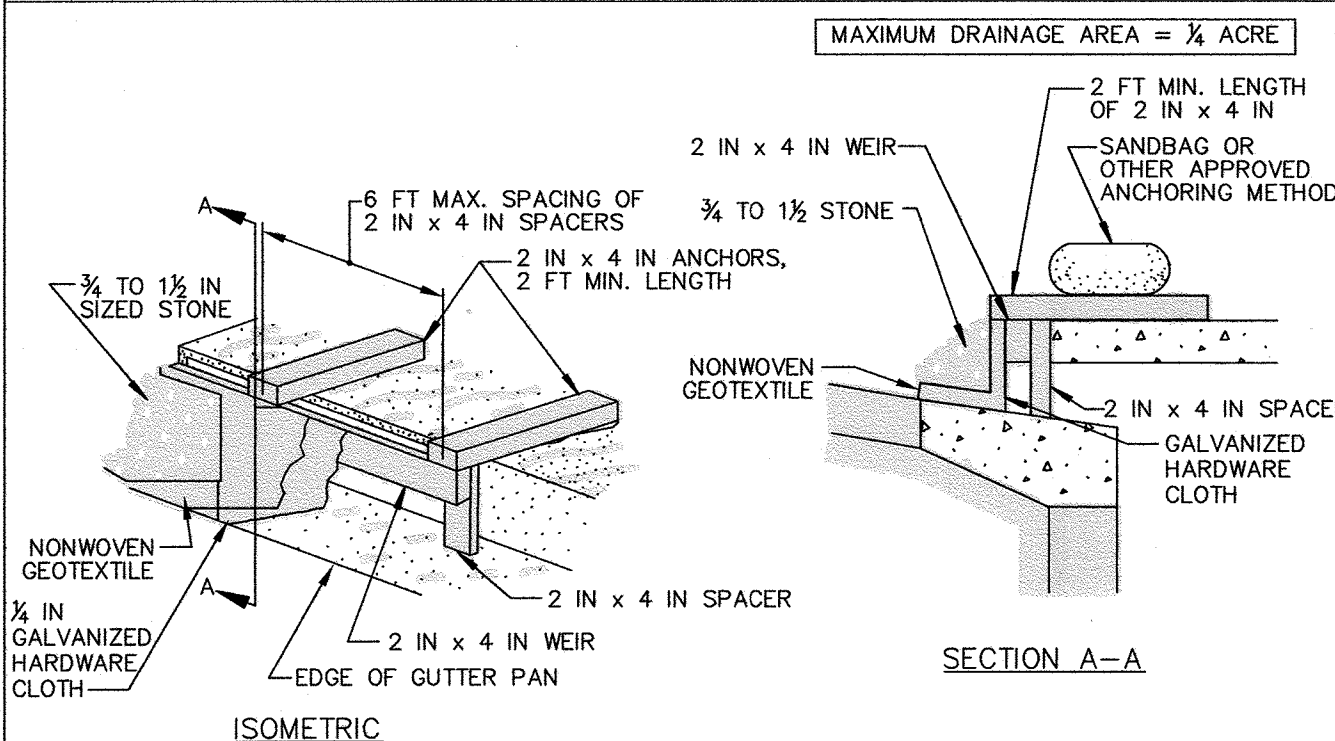
B-4-8 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

- Definition**  
A mound or pile of soil protected by appropriately designed erosion and sediment control measures.
- Purpose**  
To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.
- Conditions Where Practice Applies**  
Stockpile areas are utilized when it is necessary to salvage and store soil for later use.
- Criteria**
- The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
  - The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
  - Runoff from the stockpile area must drain to a suitable sediment control practice.
  - Access the stockpile area from the upslope side.
  - Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
  - Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
  - Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
  - If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.
- Maintenance**  
The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

APPROVED: DEPARTMENT OF PLANNING AND ZONING  
 Chief, Division of Land Development  
 11/25/19  
 DATE  
 11-27-19  
 DATE  
 Chief, Development Engineering Division JP

DETAIL E-9-3 CURB INLET PROTECTION

STANDARD SYMBOL  
CIP



- CONSTRUCTION SPECIFICATIONS**
- USE NOMINAL 2 INCH x 4 INCH LUMBER
  - USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
  - NAIL THE 2x4 WEIR TO 9 INCH LONG VERTICAL SPACERS (MAXIMUM 6 FEET APART).
  - ATTACH A CONTINUOUS PIECE OF 3/4 INCH GALVANIZED HARDWARE CLOTH, WITH A MINIMUM WIDTH OF 30 INCHES AND A MINIMUM LENGTH OF 4 FEET LONGER THAN THE THROAT OPENING, TO THE 2x4 WEIR, EXTENDING IT 2 FEET BEYOND THROAT ON EACH SIDE.
  - PLACE A CONTINUOUS PIECE OF NONWOVEN GEOTEXTILE OF THE SAME DIMENSIONS AS THE HARDWARE CLOTH OVER THE HARDWARE CLOTH AND SECURELY ATTACH TO THE 2x4 WEIR.
  - PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2x4 ANCHORS (MINIMUM 2 FEET LENGTH). EXTEND THE ANCHORS ACROSS THE INLET TOP AND HOLD IN PLACE BY SANDBAGS OR OTHER APPROVED ANCHORING METHOD.
  - INSTALL END SPACERS A MINIMUM OF 1 FOOT BEYOND THE ENDS OF THE THROAT OPENING.
  - FORM THE HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND FACE OF CURB TO SPAN THE INLET OPENING. COVER THE HARDWARE CLOTH AND GEOTEXTILE WITH CLEAN 3/4 TO 1 1/2 INCH STONE OR EQUIVALENT RECYCLED CONCRETE.
  - AT NON-SUMP LOCATIONS, INSTALL A TEMPORARY SANDBAG OR ASPHALT BERM TO PREVENT INLET BYPASS.
  - STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL  
 U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE 2011  
 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

OWNER AND DEVELOPER  
 MISSION ROAD INVESTORS, L.L.C.  
 C/O THE DOLBEN CO. INC.  
 150 PRESIDENTIAL WAY, SUITE 220  
 WOBURN, MAINE 01801-1121  
 PROPERTY ADDRESS:  
 8150 MISSION ROAD  
 PHONE: 301-362-9001



Aldo M. Vrucci, P.E.  
 11/19/19  
 "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. 20746, Expiration Date 2-22-21."

SEDIMENT CONTROL  
 DETAIL SHEET  
 Children's  
 Lighthouse Daycare  
 Parcel 'B'

Zoned: CAC-CL1  
 Tax Map: 43, Grid: 14, Parcel: 214  
 Sixth Election District - Howard County, Maryland  
 Date: October 28, 2019  
 Scale: As Shown  
 Sheet 7 of 7