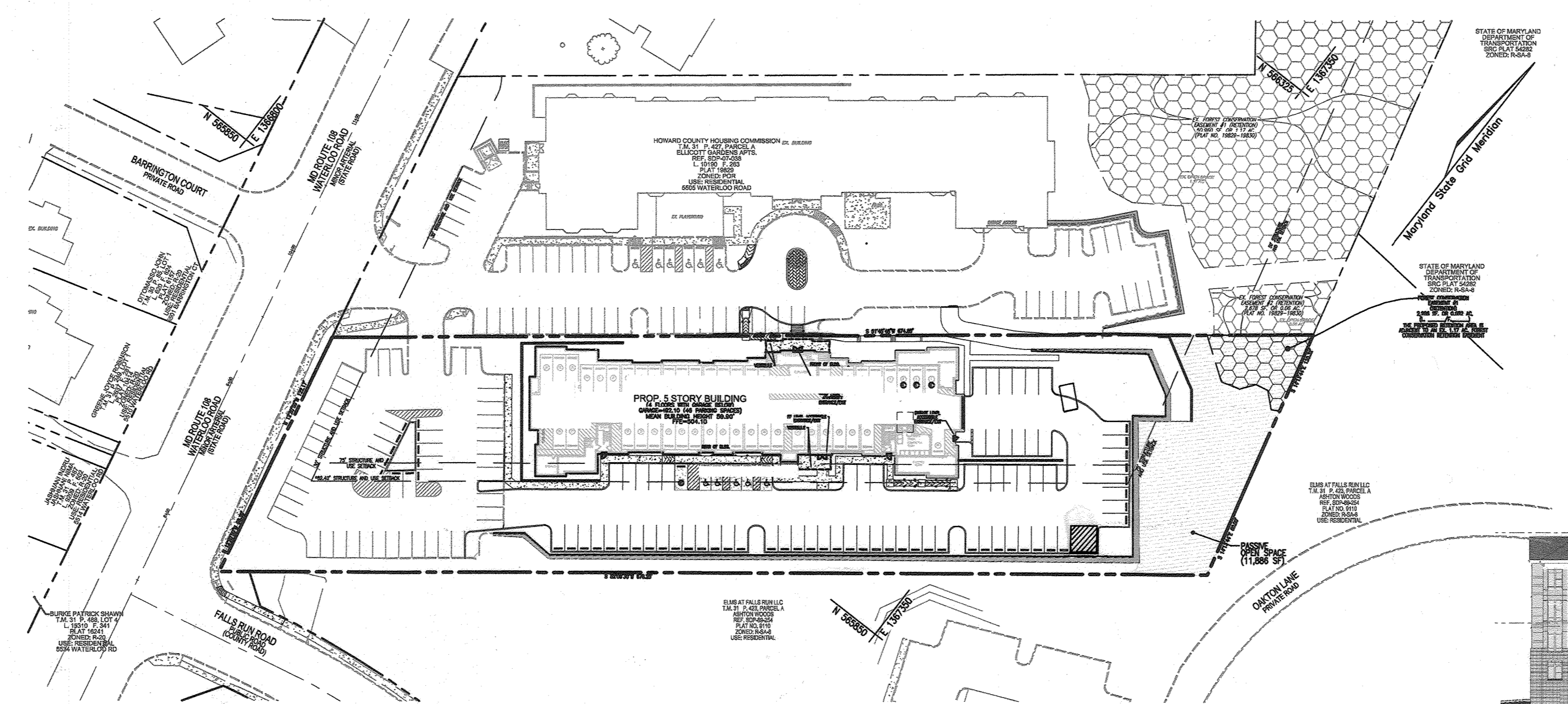


**GENERAL NOTES**

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY STANDARDS AND SPECIFICATIONS. ALL WORK AND MATERIALS SHALL COMPLY WITH O.S.H.A. STANDARDS.
- THE CONTRACTOR SHALL NOTIFY ALL UTILITIES AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
- THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE DAYS BEFORE STARTING WORK ON THESE DRAWINGS:
  - WES UTILITIES: 1-800-743-0033
  - VERIZON: 1-800-252-1133
  - BUREAU OF UTILITIES: 410-531-0033
  - A.G.E. (CONSTRUCTION SERVICES): 410-531-0113
  - A.G.E. (EMERGENCY): 410-531-0123
  - STATE HIGHWAY ADMINISTRATION: 410-531-5533
  - COLUMBIA PIPELINE CO: 410-751-1500
- SITE ANALYSIS:
  - PARCEL AREA: 3.00 AC. (±2.53 AC. DEVELOPABLE). SEE GEN. NOTE #6 FOR INFORMATION ON MINIMUM ACREAGE REQUIREMENTS.
  - ELLICOTT GARDENS II GROSS PROJECT AREA (EXCLUDING RIGHT OF WAY): 2.53 AC.
  - APARTMENT UNITS: 70 UNITS
  - MHIU UNITS REQUIRED: 7 UNITS (10% OF 70) / MHIU UNITS PROVIDED: 7 UNITS
  - OPEN SPACE REQUIRED (25% OF GROSS AREA): 64,469 SF
  - ELLICOTT GARDENS I (3.40 AC. x 43560 x 25%) = 37,026 SF
  - ELLICOTT GARDENS II (2.53 AC. x 43560 x 25%) = 27,443 SF
  - OPEN SPACE PROVIDED: 64,908 SF
  - RECREATIONAL OPEN SPACE REQUIRED (ELLICOTT GARDENS II) (400 SF PER UNIT): 28,000 SF
  - RECREATIONAL OPEN SPACE PROVIDED (ELLICOTT GARDENS II): 49,057 SF (SEE REC. OPEN SPACE CHART THIS SHEET)
  - BUILDING FLOOR SPACE: 103,718 S.F. TOTAL
  - GARAGE LEVEL: ±20.919 S.F.
  - 1ST FLOOR: ±20,896 S.F.
  - 2ND, 3RD AND 4TH FLOOR: ±20,581 S.F.
  - BUILDING COVERAGE: 49,950 SF (1.147 AC. OR 45.34% OF GROSS AREA)
  - PAVED DRIVEWAYS/PARKING LOT: 44,755 (1.03 AC. OR 40.61% OF GROSS AREA)
  - AREA OF LANDSCAPE ISLAND: 1,387 SF (0.10 AC. OR 3.90% OF GROSS AREA)
  - AREA OF WETLANDS ON SITE: 0.00 AC.
  - AREA OF WETLANDS BUFFER ON SITE: 0.01 AC.
  - AREA OF STREAMS AND THEIR BUFFERS ON SITE: 0.02 AC.
  - AREA OF ON-SITE 100 YEAR FLOODPLAIN: 0.00 AC.
  - AREA OF EXISTING FOREST ON SITE: 2.20 AC. (INCLUDES 0.40 AC. CLEARED FROM SDP-10-021)
  - AREA OF WETLANDS/SHOULDER SLOPES (20% OR GREATER): 0.36 AC.
  - AREA OF STEEP SLOPES (25% OR GREATER): 0.22 AC.
  - AREA OF DISTURBED SOILS: 1.59 AC.
  - LIMIT OF DISTURBED AREA: 2.39 AC.
  - CUT: 3,441 CY FILL: 23,495 CY
- PROJECT BACKGROUND:
  - LOCATION: COLUMBIA, MD.
  - TAX MAP: BLOCK 19, PARCEL 428
  - ZONING: FOR SUBDIVISION: ELLICOTT GARDENS
  - SECTION/AREA: N/A
  - DEED REFERENCES: L7994/F.473, L10427/F.313, L20891/F.100 (ADJONDER DEED), L1131/F.61 (PUBLIC ESMITS), L2113/F.72 (PUBLIC ESMITS), L1131/F.78 (FCE)
  - DPZ REFERENCES: BA-08-005-V, BA-08-029-V, BA-15-019-V, AA-20-010 SDP-07-038/F.08-009, F-08-084, SDP-07-137, WF-08-111, SDP-08-006, SDP-10-021, S-19-009, SDP-19-040, WF-20-049, PLAT 2582.1 (PARCEL A), WF-21-124, PLAT 2582.7 (FCE)
- 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 AND DEVELOPER OR A REPRESENTATIVE SHALL HAVE ON THE JOB SITE THE LATEST EDITION OF ALL APPLICABLE STANDARDS AND SPECIFICATIONS INCLUDING BUT NOT LIMITED TO HOWARD COUNTY DESIGN MANUAL VOLUME IV, S.H.A. SPECIFICATION BOOK, LATEST MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
- EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, FIELD SURVEYS, PUBLIC WATER AND SEWER EXTENSION PLANS AND AVAILABLE RECORD DRAWINGS. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTOR'S INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- TRAFFIC CONTROL AND REGULATORY SIGNS SHALL BE INSTALLED BEFORE BASE PAVING IS COMPLETED.
  - A. ALL TRAFFIC CONTROL DEVICES LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND MUST BE FIELD APPROVED BY HOWARD COUNTY TRAFFIC DIVISION (410-313-2430) PRIOR TO THE INSTALLATION OF ANY OF THE TRAFFIC CONTROL DEVICES.
  - B. ALL TRAFFIC CONTROL DEVICES AND THEIR LOCATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
  - C. ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT OF WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL PERFORATED SQUARE POST GALVANIZED AND INSERTED IN TO A 2-1/2" GALVANIZED STEEL PERFORATED SQUARE TUBE. SIGN ASSEMBLIES SHALL BE FABRICATED AND INSTALLED BY HOWARD COUNTY BUREAU OF HIGHWAYS AT THE DEVELOPER'S/OWNER'S EXPENSE. CONTACT HOWARD COUNTY TRAFFIC DIVISION AT 410-313-5752 FOR DETAILS AND COST ESTIMATES.
- ESTIMATES OF TRAFFIC QUANTITIES ARE PROVIDED SOLELY FOR THE PURPOSES OF TRAILING HOWARD COUNTY BUREAU OF HIGHWAYS AT THE DEVELOPER'S/OWNER'S EXPENSE. CONTACT HOWARD COUNTY TRAFFIC DIVISION AT 410-313-5752 FOR DETAILS AND COST ESTIMATES.
- SOIL COMPACTION SPECIFICATIONS, REQUIREMENTS, METHODS AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE PROJECT GEOTECHNICAL ENGINEER TO CONFIRM ACCEPTABILITY OF PROPOSED PAVING SECTION, BASED ON SOIL TEST PRIOR TO CONSTRUCTION.
- THE COORDINATE AND ELEVATION SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM - NAD83(1991). HOWARD COUNTY MONUMENT NUMBERS 3018 AND 3100 WERE USED FOR THE TRAFFIC CONTROL SIGNS.
- THE PROPERTY LINES SHOWN HEREON IS BASED ON A BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC.; DATED NOVEMBER 2004.
- THE TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD TOPOGRAPHICAL SURVEY WITH 2'-FOOT CONTOUR INTERVALS; PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED AUGUST 2004, AND BY VOGEL ENGINEERING + TIMMONS GROUP DATED 07/10/20 AND 01/29/21. OFFICE SURVEY AND FIELD SURVEY DATA FROM HOWARD COUNTY DEEDS.
- GEOTECHNICAL REPORT PREPARED BY EGS MID-ATLANTIC, LLC, DATED NOVEMBER 9, 2019.
- THE GROUNDWATER TABLE SHOWN ON THE PLANS IS BASED ON THE GROUNDWATER MONITORING DATA FROM THE GROUNDWATER MONITORING SYSTEM LOCATED AT THE PROJECT SITE.
- ALL CURB AND GUTTER TO BE HOWARD COUNTY STANDARD DETAIL 3.01 UNLESS OTHERWISE NOTED (DETAILS, SHEET 3).
- WHERE DRAINAGE FLOWS FROM ROW CURB, CONTRACTOR TO RECORD THE EXISTING GROUND SURFACE ELEVATION AT THE CURB AND GUTTER.
- ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
- CONTRACTOR RESPONSIBLE FOR CONSTRUCTING ALL HANDICAP ACCESS IN ACCORDANCE WITH CURRENT ADA REQUIREMENTS.
- ALL REINFORCED CONCRETE FOR STORM DRAIN STRUCTURES SHALL HAVE A MINIMUM OF 28 DAYS STRENGTH OF 3,500 P.S.I.
- ALL STORM DRAIN PIPE BEDDING IS TO BE CLASS "C" AS REQUIRED BY AASHTO-180.
- ALL BUILDINGS SHALL BE CONSTRUCTED WITH SETBACK AND BUFFER REGULATIONS IN EFFECT AT THE TIME OF SUBMISSION OF THE SITE DEVELOPMENT PLAN. ALTERNATIVE COMPLIANCE APPLICATION OR BUILDING/GRADING PERMIT APPLICATIONS.
- THIS PROJECT IS SUBJECT TO COMPLIANCE WITH THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. DEVELOPMENT ON THIS PROPERTY MUST COMPLY WITH SETBACK AND BUFFER REGULATIONS IN EFFECT AT THE TIME OF SUBMISSION OF THE SITE DEVELOPMENT PLAN. ALTERNATIVE COMPLIANCE APPLICATION OR BUILDING/GRADING PERMIT APPLICATIONS.
- A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
- THE SUBJECT PROPERTY IS ZONED FOR PER THE 10/06/2013 COMPREHENSIVE ZONING PLAN.
- THERE IS NO 100-YEAR FLOODPLAIN, STREAMS, WETLANDS LOCATED ON-SITE. HOWEVER, THERE IS A WETLAND AND STREAM BUFFER LOCATED AT THE WESTERN EDGE OF THE PROPERTY. THERE ARE STEEP SLOPES AND SPECIFIC TREES ON-SITE.
- GRADING, REMOVAL OF TREES, PLANTING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE WETLANDS, STREAMS, OR THEIR REQUIRED BUFFERS.
- REFERENCE MDC PERMIT # 20-NIT-3156/202601192 FOR SEWER CONNECTION THROUGH NON-TIDAL WETLAND AND NON-TIDAL WETLAND BUFFER.
- WETLAND AND FOREST STAND DELINEATION PREPARED BY ECO-SCIENCE PROFESSIONALS, INC., DATED 03/04/2019. FOREST STAND DELINEATION APPROVED 04/23/2020.
- THE FOREST CONSERVATION OBLIGATION FOR THIS PROJECT HAS BEEN MET BY THE ON-SITE RETENTION OF 0.052 AC OF EXISTING FOREST (NO SURETY REQUIRED), AND BY THE PURCHASE OF THE EQUIVALENT RESTORATION CREDIT OF 2.7 ACRES FROM AN APPROVED FOREST BANK, ROSHAN PROPERTY - SDP-16-04(1S1), WHICH IS LOCATED OUTSIDE THE WETLANDS.
- THIS PROJECT IS SUBJECT TO PERMITS FROM THE STATE DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES (SDENR) AND THE HOWARD COUNTY DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES (HCDENR). THE PROJECT IS SUBJECT TO THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO REMOVE, SPECIFY AND MEET THE REQUIREMENTS OF THE FOREST CONSERVATION OBLIGATION ON-SITE. APPROVAL SUBJECT TO THE FOLLOWING CONDITIONS:
  - A. ALTERNATIVE COMPLIANCE IS LIMITED TO THE REMOVAL OF SPECIFIC TREES #1 THROUGH #5 AS DEPICTED ON THE MODIFIED ALTERNATIVE COMPLIANCE EXHIBIT. ANY PROPOSAL TO REMOVE ADDITIONAL SPECIFIC TREES WILL REQUIRE A NEW ALTERNATIVE COMPLIANCE EXHIBIT.
  - B. A MINIMUM OF 10 ADDITIONAL NATIVE, 3' DBH TREES SHALL BE PROVIDED ON SITE AS PART OF THE MITIGATION FOR THE SPECIFIC TREE REMOVAL (OR REPLACEMENT). THE MITIGATION WILL BE ADDRESSED WITH THE PROJECT KNOWN AS "ELLICOTT GARDENS II" AND WILL BE IN ADDITION TO ANY REQUIRED LANDSCAPE OR FOREST CONSERVATION PLANNING.
  - C. IT SHALL BE REQUIRED TO RETAIN AS MUCH FOREST POSSIBLE WHILE KEEPING THE DESIGN THAT RECEIVED THAT COMPETITIVE STATE GRANT Viable.
- THE LOCATION OF THE OFF-SITE OBLIGATION SHALL BE IDENTIFIED PRIOR TO RECEIVING A TECHNICALLY COMPLETE ON THE SOP FOR THE PROJECT.
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE, AND THE LANDSCAPE MANUAL APPROVED 04/23/2020.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT FOR THIS SITE DEVELOPMENT PLAN IN THE AMOUNT OF \$28,000.00 FOR THE REQUIRED 59 SHADE TREES, 3 EVERGREEN TREES, 45 SHRUBS, AND 444L OF RETAINING WALL.
- ANY EXISTING STREET TREES DAMAGED OR DESTROYED DURING CONSTRUCTION WILL BE REPLACED BY THE CONTRACTOR.
- FIRE LANES SHOULD BE PROVIDED IN THIS SITE TO ALLOW EMERGENCY VEHICLE ACCESS. EITHER FIRE LANE SIGNAGE SHOULD BE INSTALLED OR THE SIGNAGE TO BE PAINTED IN RED AND STENCILED TO THE ROAD AS A FIRE LANE.
- A FIRE DEPARTMENT CONNECTION FOR FIRE PROTECTION SYSTEMS SHALL BE LOCATED:
  - A. ON THE SIDE OF THE STRUCTURE DISPLAYING THE ADDRESS (UNLESS OTHERWISE APPROVED BY THE AHJ) AND BE CLEARLY VISIBLE TO THE RESPONDING UNITS.
  - B. WITHIN 100 FT. OF A FIRE HYDRANT.
  - C. THE APPROPRIATE SIGN SHALL BE MOUNTED ON THE BUILDING'S WALL BETWEEN 8 AND 12 FEET ABOVE THE FIRE DEPARTMENT CONNECTION.
  - D. A FREE-STANDING FIRE DEPARTMENT CONNECTION SHALL HAVE THE SIGN MOUNTED ON A POLE DIRECTLY BEHIND THE CONNECTION APPROXIMATELY 6 FEET HIGH.
  - E. SIGNS SHALL HAVE A WHITE REFLECTIVE BACKGROUND WITH A RED REFLECTIVE BORDER, RED REFLECTIVE LETTERS AND A RED REFLECTIVE ARROW. THE BORDER SHALL HAVE A 3/8" STROKE, THE LETTERS SHALL BE 6" HIGH WITH A 1" STROKE, THE ARROW SHALL HAVE A STROKE NOT LESS THAN 2". THE OVERALL SIGN MEASUREMENTS SHALL BE 12" BY 18".
  - F. ANY DESTROYED OR REMOVED TREES OR HINDERS ACCESS TO A TCO IS PROHIBITED. A MINIMUM CLEAR SPACE OF 15 FEET (7.5 FEET ON ALL SIDES) SHALL BE MAINTAINED.
  - G. A KNOX BOX IS REQUIRED TO BE PLACED ON THE FRONT OF THE BUILDING. IT SHALL BE LOCATED TO THE RIGHT OF THE MAIN ENTRANCE AT A RANGE OF 4'-5" IN HEIGHT AND NO MORE THAN 6' LATERALLY FROM THE DOOR. ITS LOCATION IS SHOWN ON THESE PLANS. THE BOX SHALL BE ELECTRONICALLY SUPERVISED TO NOTIFY THE OWNER THAT IT IS BEING ACCESS (INTEGRATED WITH THE FIRE ALARM SYSTEM). THE CONTRACTOR SHALL CONTACT THE OFFICE OF THE FIRE MARSHAL PRIOR TO PURCHASING AND INSTALLING KNOX BOXES TO DETERMINE IF ADDITIONAL KNOX BOXES WILL BE REQUIRED, AS WELL AS TO VERIFY THE LOCATION(S) WHERE THEY ARE TO BE MOUNTED.
- THE PROPOSED BUILDING WILL HAVE AN INSIDE METER SETTING, AND AN AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM.
- THIS PROPERTY IS WITHIN THE METROPOLITAN DISTRICT.
- THIS DEVELOPMENT IS SUBJECT TO SECTION 16.129 OF THE HOWARD COUNTY CODE. PUBLIC WATER AND/OR SEWER SERVICE IS TO BE OBTAINED UNDER THE TERMS AND PROVISIONS, THEREOF, EFFECTIVE 09/22/21, ON WHICH DATE DEVELOPER AGREEMENT #14-5126-D WAS FILED AND ACCEPTED THROUGH CONTRACT 14-5126-D, 14-4363-D, AND 14-1976-D.
- PUBLIC WATER AND SEWER SERVICE IS TO BE OBTAINED UNDER THE TERMS AND PROVISIONS, THEREOF, EFFECTIVE 09/22/21, ON WHICH DATE DEVELOPER AGREEMENT #14-5126-D WAS FILED AND ACCEPTED THROUGH CONTRACT 14-5126-D, 14-4363-D, AND 14-1976-D.
- TO THE BEST OF THE OWNER'S KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES LOCATED ON THE SUBJECT PROPERTY OR THE COUNTY'S CEMETERY SITE MAPS.
- THERE IS A HISTORIC SITE NOTED ON PARCEL 428 (H01007), WHICH WAS PREVIOUSLY DEMOLISHED. THERE ARE NO HISTORIC STRUCTURES CURRENTLY ON THE PROPERTY.
- WATERLOO ROAD IS CLASSIFIED AS A MINOR ARTERIAL ROAD. THIS SITE IS NOT LOCATED ON A SCENIC ROAD.
- STREET LIGHT PLACEMENT AND TYPE SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY ZONING REGULATIONS, SECTION 134.0. A MINIMUM OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
- ALL EXTERIOR LIGHTING TO COMPLY WITH THE REQUIREMENTS FOUND IN ZONING SECTION 134 OF THE HOWARD COUNTY ZONING REGULATIONS. LIGHT FIXTURES ON ANY PROPERTY ZONED OR USED FOR RESIDENTIAL PURPOSES SHALL BE LIMITED TO 0.5 FOOT CANDLES.
- EXCEPT FOR SPOTLIGHTS AND LOW INTENSITY LIGHTS AS DEFINED IN SECTION 134.0.C.2 AND 134.0.C.3, OF THE HOWARD COUNTY ZONING REGULATIONS, ALL LIGHT FIXTURES SHALL BE FULLY OR PARTIALLY SHIELDED.
- TRASH AND RECYCLING COLLECTION TO BE PROVIDED IN ACCORDANCE WITH THE HOWARD COUNTY ZONING REGULATIONS.
- STORMWATER MANAGEMENT TO BE DESIGNED IN ACCORDANCE WITH THE 2007 MDC STORMWATER DESIGN MANUAL, CHAPTER 5.
- ENVIRONMENTAL STORMWATER MANAGEMENT IS BEING PROVIDED THROUGH THE INSTALLATION OF IMPERVIOUS SURFACES, THE PRACTICES USED FOR STORMWATER MANAGEMENT (ESD) FOR THIS PROJECT INCLUDE A MICRO-BIOTRENTION FACILITY (M-6), AND A SUBMERGED GRAVEL RETENTION FACILITY (M-2). STORMWATER MANAGEMENT FOR THE REMAINING AREA NEAR STORM IS PROVIDED BY AN UNDERGROUND DETENTION FACILITY. ALL SWM FACILITIES TO BE PROVIDED AND MAINTAINED.

# ELLICOTT GARDENS II HOUSING COMMISSION HOUSING DEVELOPMENT (70 APARTMENTS) TAX MAP 31 - BLOCK 19 PARCEL 428

## SITE DEVELOPMENT PLAN



**LOCATION MAP**  
SCALE: 1"=60'

**GENERAL NOTES (CONTINUED)**

- THE OFFICIAL PRE-SUBMISSION COMMITTEE MEETING FOR THIS PROJECT WAS HELD AT LINDEN HALL, ELLICOTT CITY, MD AT 6:00PM ON 02/06/2019.
- THE SKETCH PLAN ASSOCIATED WITH THIS PROJECT (S-19-009) RECEIVED SIGNATURE APPROVAL ON JUNE 25, 2019. THE ENVIRONMENTAL CONCEPT PLAN ASSOCIATED WITH THIS PROJECT (CP-19-040) RECEIVED SIGNATURE APPROVAL ON JUNE 13, 2019.
- DESIGN ADVISORY PANEL (DAP) IS NOT REQUIRED FOR THIS PROJECT SITE.
- IN ACCORDANCE WITH SDP-10-021, THE PLANNING DIRECTOR HAS DETERMINED THAT THIS SITE AND ADJACENT M PARCEL 427, ELLICOTT GARDENS (SDP-07-038), ARE "PART OF THE SAME DEVELOPMENT" FOR DEVELOPMENT AND ZONING SETBACK PURPOSES PER ZONING REGULATION SECTION 16.116(C).
- THE ZONING OFFICE HAS DETERMINED THAT ELLICOTT GARDENS I AND ELLICOTT GARDENS II WILL BE VIEWED AS A COMPREHENSIVE PROJECT IN TERMS OF MINIMUM DEVELOPMENT SIZE OF 3.00 ACRES PER SECTION 128.0.4.
- BASED ON THE CURRENT PROPOSED LAYOUT AND DESIGN, THE EXISTING USE IN COMMON EASEMENT (F-08-009) WILL NOT REQUIRE REVISIONS.
- IN ACCORDANCE WITH ZONING SECTION 133.D, ALL THE GARAGE PARKING SPACES IN THE BUILDING SHALL BE AVAILABLE FOR USE 24HR, 7 DAYS A WEEK.
- REFERENCE SHARED VEHICULAR AND PEDESTRIAN ACCESS AGREEMENT FOR (L11060/F.306) FOR THIS PARCEL AND ADJACENT M PARCEL 427, ELLICOTT GARDENS (SDP-07-038).
- REFERENCE PARKING NEEDS ANALYSIS PERFORMED BY THE TRAFFIC GROUP, INC., DATED 6/11/19 AND APPROVED BY THE DPZ DIRECTOR TO REDUCE PARKING TO 17 SPACES PER APARTMENT UNIT.
- IN ACCORDANCE WITH SECTION 112.0.G OF THE 10/23/18 COMPREHENSIVE ZONING REGULATIONS, THIS SUBDIVISION IS SUBJECT TO MODERATE INCOME HOUSING UNIT REQUIREMENTS. THE MHIU AGREEMENT AND MHIU COVENANTS IS REQUIRED IN ACCORDANCE WITH SECTION 13.402 OF THE HOWARD COUNTY CODE. THE MODERATE INCOME HOUSING UNIT AGREEMENT FOR THE 7 DWELLING UNITS (10% OF 70 UNITS) WAS RECORDED IN THE HOWARD COUNTY LAND RECORDS ON 12/01/21, BY LIBER 2116, AND FOLIO 321.
- IN ACCORDANCE WITH SECTION 128.0.1.2 OF THE ZONING REGULATIONS, THIS PROJECT SHALL PROVIDE 25% OF GROSS ACREAGE FOR PASSIVE, RECREATIONAL AND/OR AMENITY OPEN SPACE IN PROXIMITY TO THE RESIDENTIAL UNITS, AND IN ACCORDANCE WITH SECTION 16.121(a)(4)(v) OF THE SUBDIVISION REGULATIONS, USABLE OUTDOOR SPACE FOR THIS APARTMENT PROJECT IS 400 SF/UNIT.
- REF. BA-08-042V, APPROVED 01-05-2009 TO REDUCE THE REQUIRED 72' USE SETBACK FROM RESIDENTIAL DISTRICT TO 8.2' FOR PARKING USES AND A RETAINING WALL AND REDUCE THE 30' STRUCTURE AND USE SETBACK FROM A PUBLIC STREET RIGHT OF WAY TO 14.4' FOR PARKING USES.
- REF. BA-19-013V, APPROVED DECEMBER 12, 2019; FOR A VARIANCE TO REDUCE THE 75' STRUCTURE AND USE SETBACK FOR THE RETAINING WALL AND PARKING LOT TO 8.2'.
- REF. AA-20-010, APPROVED NOVEMBER 4, 2020, TO:
  - A. REDUCE THE REQUIRED 75' BUILDING SETBACK TO RESIDENTIAL DISTRICT TO 65.96' (REDUCED BY 9.04').
  - B. INCREASE THE MAXIMUM BUILDING HEIGHT FROM 50 TO 58.20 FEET (INCREASED BY 8.20').
- REF. DMVZ-21-016, APPROVED MAY 4, 2021 TO WAIVE SECTION 3.8.B.2.B.1 OF THE WATER AND SEWER DESIGN MANUAL, VOLUME II, WHICH REQUIRES A WATER SUPPLY MAIN TO BE LOADED WHEN IT IS EITHER LONGER THAN 100 FEET OR SERVES MORE THAN 40 UNITS. APPROVAL IS SUBJECT TO FOLLOWING CONDITIONS:
  - A. DESIGNING THE COUNTY PREFERRED WATER MAIN ALIGNMENT WHICH SHORTEN THE PIPE RUN AND, ALSO ENHANCE THE RELIABILITY OF THE WATER SUPPLY TO PROPOSED ELLICOTT GARDENS II AND EXISTING ELLICOTT GARDENS.
  - B. ABANDONING OF THE WATER MAIN LOCATED JUST SOUTH OF THE NEW TIE IN ON MD ROUTE 108.
- IN ACCORDANCE WITH THE REQUEST, APPROVED 05/21/2021, FOR IMPACT TO STREAMBANK BUFFERS AND WETLAND BUFFERS DEEMED AS "ESSENTIAL OR NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS FOR THE CONSTRUCTION OF PROPOSED SEWER LINE FOR THE ELLICOTT GARDENS II PROJECT. APPROVAL OF THE ABOVE DESCRIBED ESSENTIAL OR NECESSARY DISTURBANCES ARE SUBJECT TO THE FOLLOWING MITIGATION METHODS:
  - A. THE DISTURBANCE IS NECESSARY FOR THE INSTALLATION OF REQUIRED SEWER IN ACCORDANCE WITH THE COUNTY ENGINEERING DESIGN STANDARDS AND IS TO CONNECT TO AN EXISTING SEWER MAIN. THERE ARE NO OTHER MEANS TO ACCESS TO EXISTING SEWER MAIN.
  - B. THE IMPROVEMENTS SHALL ONLY DISTURB 83.5' INTO THE STREAM BUFFER AND 2.6' INTO THE NON-TIDAL WETLAND BUFFER AS STATED IN THE REQUEST AND DELINEATED ON THE SITE DEVELOPMENT PLAN (SDP-20-027). ANY DISTURBANCES TO ENVIRONMENTALLY REGULATED FEATURES BEYOND WHAT HAS BEEN APPROVED ARE NOT PERMITTED UNLESS THE DEVELOPER SUBMITS A FORMAL REQUEST TO DPZ FOR SUCH DISTURBANCES IN ACCORDANCE WITH SECTION 16.116(C).
  - C. THE DISTURBED AREAS NOT IMPROVED SHALL BE RE-VEGETATED WITH NATIVE GRASSES AND NON-WOODY VEGETATION AND RETURNED TO ITS NATURAL CONDITION.
- THIS PROJECT IS SUBJECT TO WF-21-124, APPROVED 06/18/21, TO SECTION 16.147 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO PERMIT THE CONSOLIDATION OF TAX MAP 31, PARCELS 428 AND 467 BY DEED, AND TO RECORD PUBLIC EASEMENTS THROUGH DEEDS OF CONVEYANCE. APPROVAL SUBJECT TO THE FOLLOWING CONDITIONS:
  - A. THE ADJONDER LAND RECORDS OFFICE OF HOWARD COUNTY, MARYLAND WITHIN ONE YEAR FROM THE DATE OF THE APPROVAL LETTER (ON OR BEFORE JUNE 18, 2022), THE ADJONDER DEED SHALL REFERENCE THE ALTERNATIVE COMPLIANCE FILE #11886 SF (PROTECTION OF THE ENVIRONMENT).
  - B. RECORDED COPIES OF THE ADJONDER DEED SHALL BE SUBMITTED TO THIS DEPARTMENT FOR FILE RETENTION WITHIN 30 DAYS OF RECORDATION.
  - C. THIS ALTERNATIVE COMPLIANCE PETITION IS TO REMOVE THE COMMON PARCEL BOUNDARY BETWEEN PARCELS 428 AND 467, AND TO ALLOW EASEMENTS TO BE RECORDED BY DEED. NO OTHER LOTS ARE BEING LEGALLY ENDED. NO ADDITIONAL LOTS ARE BEING CREATED.
  - D. ALL PUBLIC EASEMENTS MUST HAVE A DEED OF EASEMENT THAT WILL BE PROCESS AND RECORDED WITH THE DEVELOPER'S AGREEMENTS FOR THE PUBLIC IMPROVEMENTS.
  - E. PRIOR TO RECORDATION, THE EXHIBIT MUST BE UPDATED TO ADDRESS THE ATTACHED COMMENTS.

DESCRIPTION	QUANTITY	PERCENTAGE
TOTAL NUMBER OF LOTS/UNITS PROPOSED	70 UNITS	
NUMBER OF MHIU REQUIRED	7 UNITS (10% OF 70 UNITS)	
NUMBER OF MHIU PROVIDED ON-SITE (EXEMPT FROM ALLOCATION)	7 UNITS	
NUMBER OF AFFO ALLOCATIONS REQUIRED (REMAINING LOTS/UNITS)	63	
MHIU FEE (N/A) (INDICATE LOT/UNIT NUMBERS)	N/A	

LOT/PARCEL #	FACILITY NAME & NUMBER	PRACTICE TYPE (QUANTITY)	PUBLIC	PRIVATE	MAINTENANCE RESPONSIBILITY
PARCEL 428/467	SWM #1	M-6 Micro-Bioretentation		X	Owner
PARCEL 428/467	SWM #2	M-2 Submerged Gravel Wetland		X	Owner
PARCEL 428/468	SWM #3	Underground Detention Pits		X	Owner

**AS-BUILT CERTIFICATION FOR PSWM**

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

DATE: 11-8-23  
P.E.#: 16193

**NO AS-BUILT INFORMATION ON THIS SHEET**

**OPEN SPACE**  
OPEN SPACE REQUIRED IS 25% OF GROSS AREA FOR PASSIVE, RECREATION AND/OR OPEN SPACE IN PROXIMITY TO THE RESIDENTIAL UNITS FOR THE ENTIRE ELLICOTT GARDENS PROJECT (I & II).

TOTAL OPEN SPACE REQUIRED:	64,469 SF
ELLICOTT GARDENS I: OPEN SPACE REQUIRED (3.40 AC. x 25%) =	37,026 SF
ELLICOTT GARDENS II: OPEN SPACE REQUIRED (2.53 AC. x 25%) =	27,443 SF
TOTAL OPEN SPACE PROVIDED:	64,908 SF
ELLICOTT GARDENS I: OPEN SPACE PROVIDED (SDP-07-038) =	53,579 SF
ELLICOTT GARDENS II: OPEN SPACE PROVIDED =	15,827 SF
11,886 SF (PROTECTION OF THE ENVIRONMENT)	
3,444 SF (AMENITY RECREATION AREA)	
TOTAL OPEN SPACE PROVIDED FOR ELLICOTT GARDENS I AND II =	69,408 SF

**RECREATION OPEN SPACE**  
RECREATION OPEN SPACE REQUIRED: (400 S.F. x 70 APT. UNITS) = 28,000 SF.  
RECREATION OPEN SPACE PROVIDED: 49,057 SF.

RECREATION OPEN SPACE PROVIDED:  
 - OPEN SPACE LAND AREA (ELLICOTT GARDENS II) = 2,900 SF.  
 - RECREATION AMENITIES (6 BENCHES @ 200 SF) = 1,200 SF.  
 - COMMUNITY CENTER (4,344 S.F./10 S.F. x 70 UNITS) = 30,408 SF.  
 (INCLUDES CLUB ROOM, FITNESS ROOM, COMPUTER ROOM)  
 TOTAL RECREATION OPEN SPACE PROVIDED = 49,057 SF.

APPROVED BY PLANNING BOARD OF HOWARD COUNTY

April 1, 2021

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 03-22-21

CHIEF, DEVELOPMENT ENGINEERING DIVISION

CHIEF, DIVISION OF LAND DEVELOPMENT

DATE: 11/21/21

DATE: 12-2-21

APPROVED: FOR PUBLIC WATER AND PUBLIC SEWERAGE SYSTEMS

DATE: 9-

COUNTY HEALTH OFFICER  
HOWARD COUNTY HEALTH DEPARTMENT

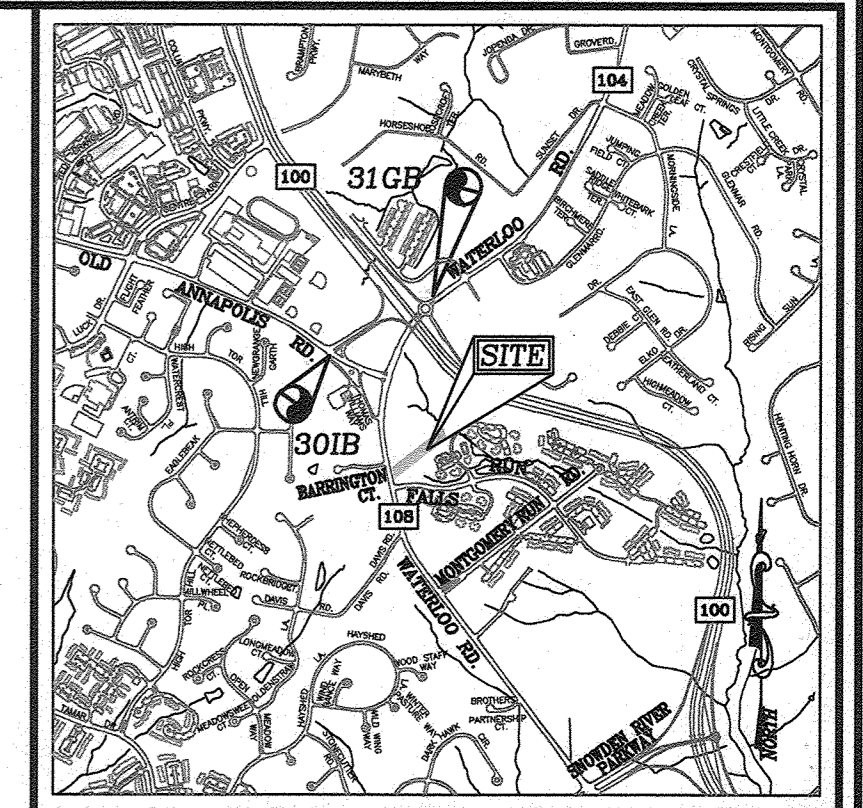
SDP-20-027

**BENCHMARKS**

HOWARD COUNTY BENCHMARK 3018	N 566937.926	E 1366270.705	ELEV. 526.868
HOWARD COUNTY BENCHMARK 3138	N 567567.473	E 1367353.368	ELEV. 512.080

**LEGEND**

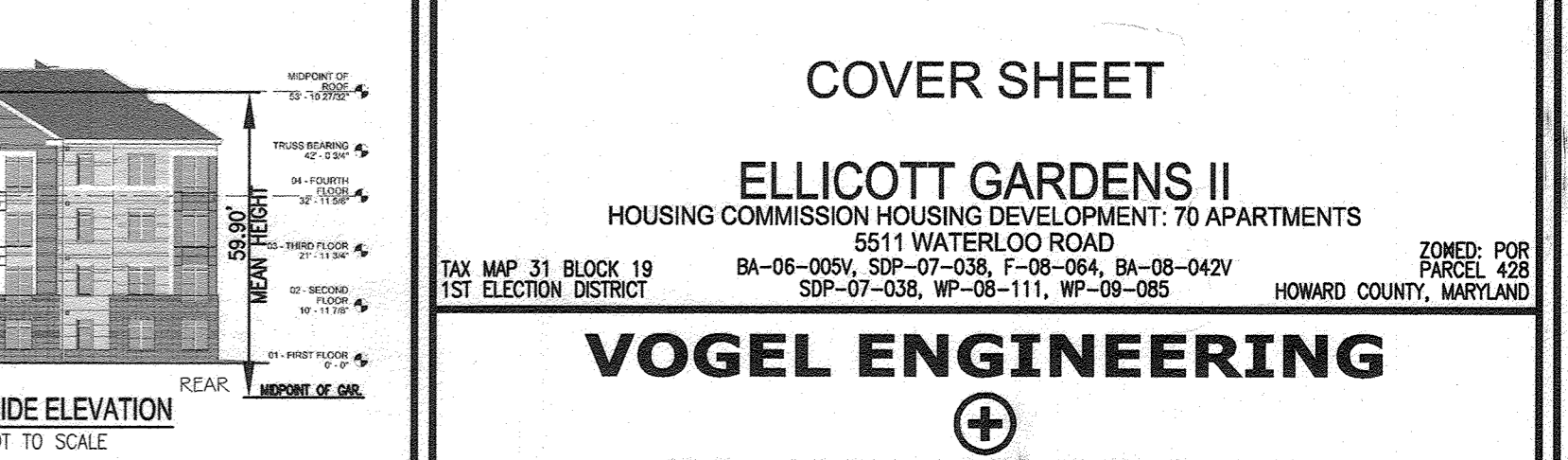
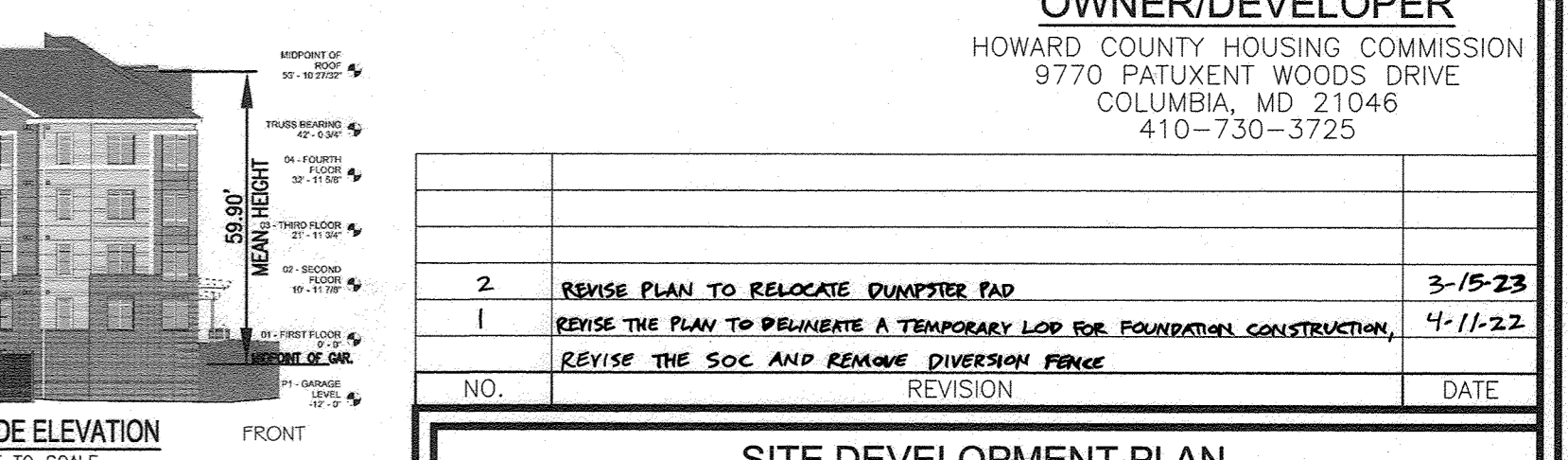
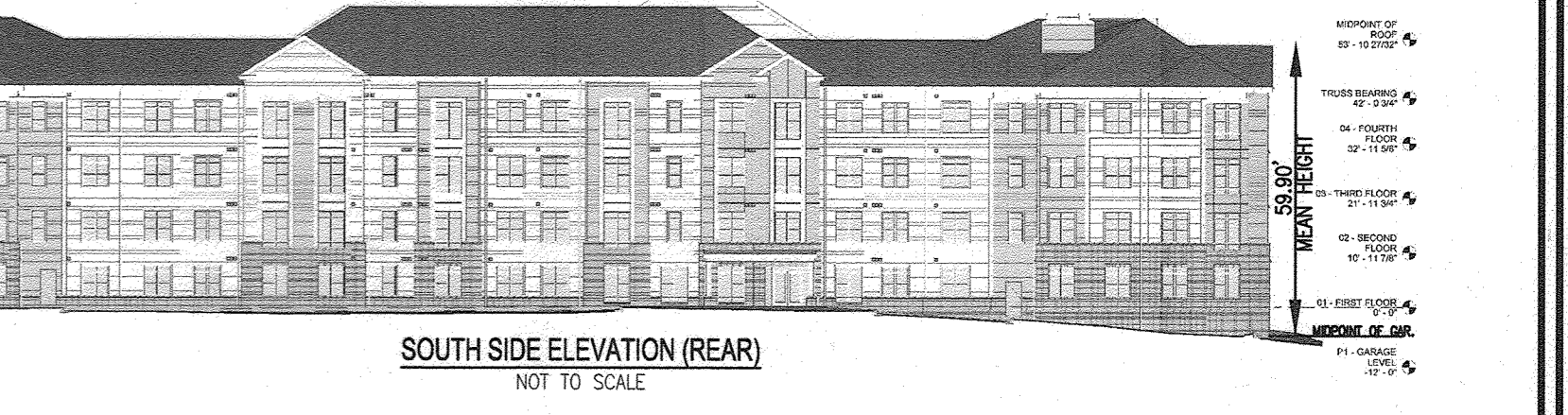
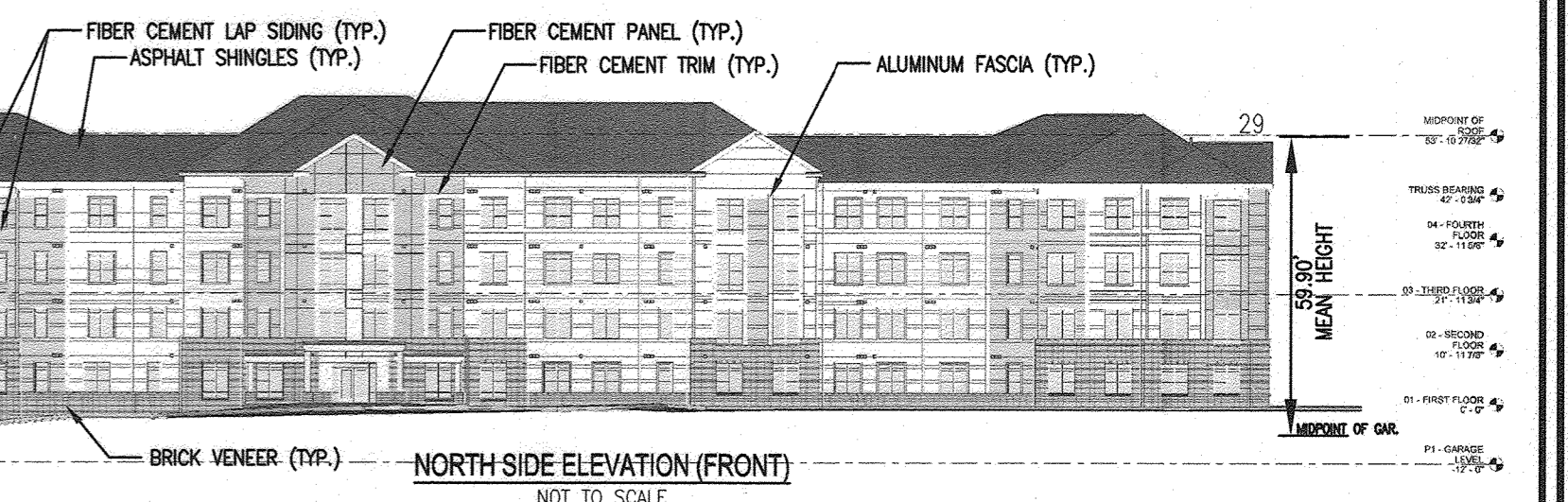
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EXISTING FOREST CONSERVATION EASEMENT
- PROP. SIDEWALK
- OPEN SPACE



**VICINITY MAP**  
SCALE: 1"=2000'  
ADC MAP 27, GRID F8

**SHEET INDEX**

DESCRIPTION	SHEET NUMBER
COVER SHEET	1 OF 28
SITE LAYOUT AND PAVING PLAN	2 OF 28
SITE DETAILS	3 OF 28
GRADING, SEDIMENT AND EROSION CONTROL PLAN AND SOILS MAP	4 OF 28
SEDIMENT AND EROSION CONTROL NOTES AND DETAILS	5 OF 28
STORM DRAIN DRAINAGE AREA MAP	6 OF 28
STORM DRAIN PROFILES	7 OF 28
STORM DRAIN & UTILITY PROFILES	8 OF 28
ESD DRAINAGE AREA MAP	9 OF 28
ESD STORMWATER MANAGEMENT NOTES AND DETAILS	10 OF 28
EXISTING AND PROPOSED 10YR & 100YR SWM DRAINAGE AREA MAP & SOIL BORINGS	11 OF 28
10YR & 100YR SWM NOTES AND DETAILS	12 OF 28
LANDSCAPE PLAN	13 OF 28
FOREST CONSERVATION PLAN	14 OF 28
PHOTOMETRIC PLAN	15 OF 28
RETAINING WALL PLANS, NOTES AND DETAILS	16-28 OF 28



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

NO.	REVISION	DATE
2	REVISE PLAN TO RELOCATE DRAINAGE PIP	3-15-23
1	REVISE THE PLAN TO PERMIT A TEMPORARY LOG FOR FOUNDATION CONSTRUCTION.	4-11-22
	REVISE THE SOC AND REMOVE DIVERSION FENCE	

**SITE DEVELOPMENT PLAN COVER SHEET**

**ELLICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
ZONED: POR  
PARCEL 428

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

**PROFESSIONAL CERTIFICATE**

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. EXPIRATION DATE: 08-27-2023

DESIGN BY: RHV  
DRAWN BY: MP/KG/DZE/AB  
CHECKED BY: RHV  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

1 SHEET OF 28

AS-BUILT SEPTEMBER 2023



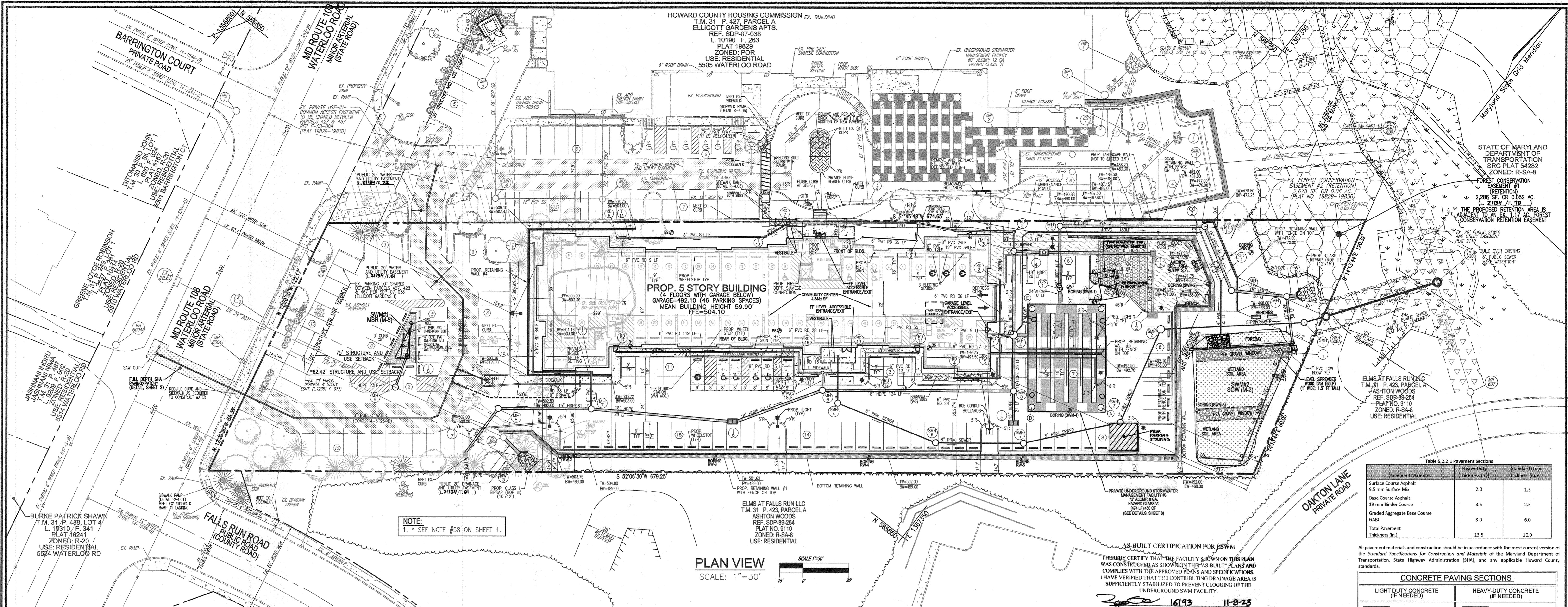


Table S.2.2.1 Pavement Sections

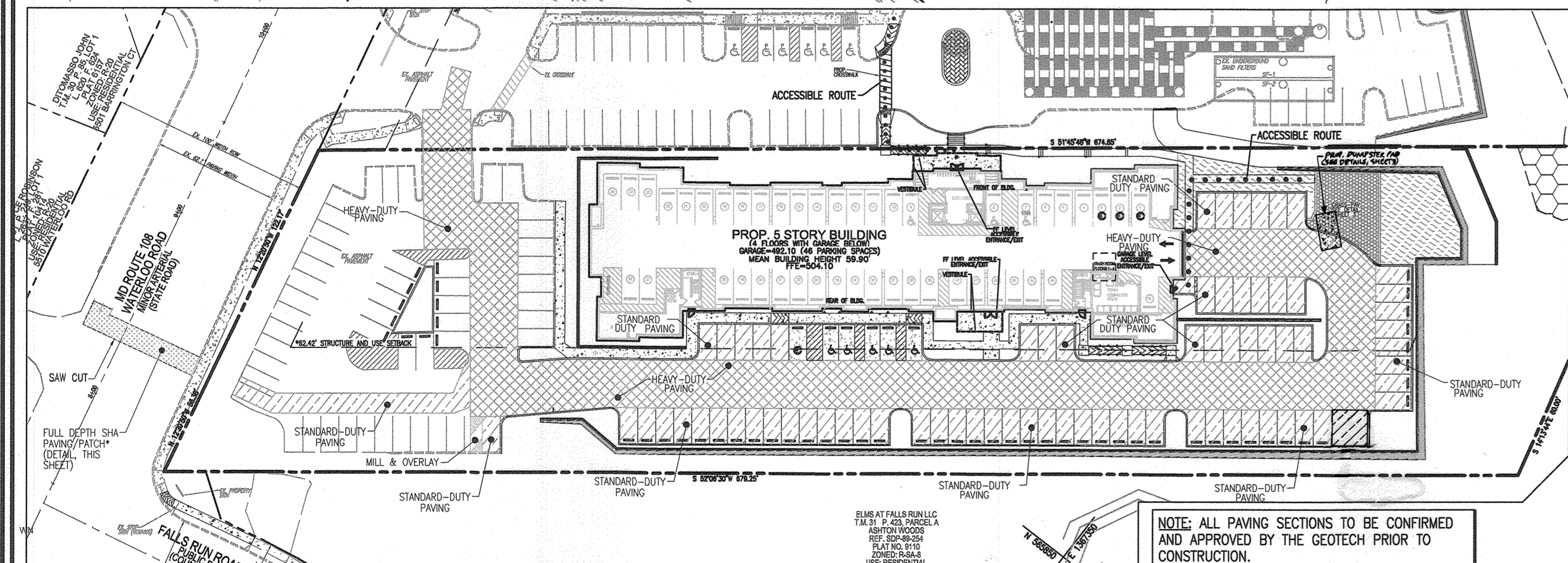
Pavement Materials	Heavy-Duty Thickness (in.)	Standard-Duty Thickness (in.)
Surface Course Asphalt 5.5 mm Surface Mix	2.0	1.5
Base Course Asphalt 19 mm Binder Course	3.5	2.5
Graded Aggregate Base Course GABC	8.0	6.0
Total Pavement Thickness (in.)	13.5	10.0

All pavement materials and construction should be in accordance with the most current version of the Standard Specifications for Construction and Materials of the Maryland Department of Transportation, State Highway Administration (SHA), and any applicable Howard County standards.

CONCRETE PAVING SECTIONS

LIGHT DUTY CONCRETE (IF NEEDED)	HEAVY-DUTY CONCRETE (IF NEEDED)
MIN. 4" AIR-ENTAINED PORTLAND CEMENT CONCRETE (MIN. 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI)	MIN. 4" AIR-ENTAINED PORTLAND CEMENT CONCRETE (MIN. 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI)
MIN. 4" COMPACTED GRANULAR SUBBASE (CR-6 OR GABC)	MIN. 4" COMPACTED GRANULAR SUBBASE (CR-6 OR GABC)

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725



**PAVING/ACCESSIBLE ROUTE LEGEND:**

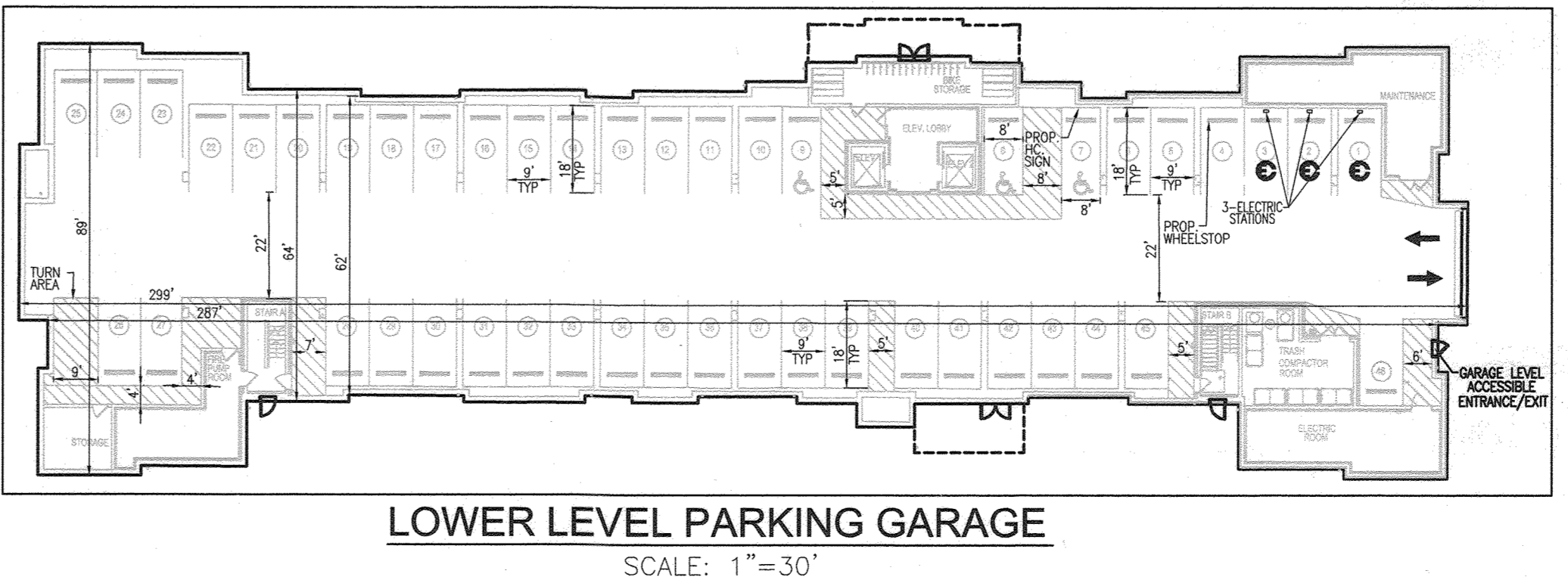
[Pattern]	HEAVY-DUTY PAVING
[Pattern]	STANDARD-DUTY PAVING
[Pattern]	CONCRETE PAVING
[Pattern]	MILL AND OVERLAY
[Pattern]	SHA FULL DEPTH PAVING
[Pattern]	ACCESSIBLE ROUTE

**MD ROUTE 108 (SHA) PAVING SECTION**

[Pattern]	2" SUPERPAVE ASPHALT MIX PG 465-22, LEVEL 2
[Pattern]	7" SUPERPAVE ASPHALT MIX PG 465-22, LEVEL 2 (2 - 3.5" LIFTS)
[Pattern]	6" GRADED AGGREGATE BASE OR 12" CAPPING CURB

**LEGEND:**

[Symbol]	PROPERTY LINE	[Symbol]	PROPOSED CURB AND GUTTER	[Symbol]	EXISTING 20" PUBLIC SEWER AND UTILITY EASEMENT
[Symbol]	RIGHT-OF-WAY LINE	[Symbol]	PROPOSED SIDEWALK	[Symbol]	EXISTING PRIVATE USE-IN-COMMON EASEMENT
[Symbol]	SETBACKS	[Symbol]	PROPOSED STORM DRAIN	[Symbol]	EXISTING 20" PUBLIC WATER AND UTILITY EASEMENT
[Symbol]	EXISTING CURB AND GUTTER	[Symbol]	PROPOSED STORM DRAIN INLET	[Symbol]	EXISTING FOREST CONSERVATION EASEMENT
[Symbol]	EXISTING UTILITY POLE	[Symbol]	PROPOSED FIRE HYDRANT	[Symbol]	20" PUBLIC WATER AND UTILITY EASEMENT
[Symbol]	EXISTING LIGHT POLE	[Symbol]	PROPOSED WATER TEE & VALVE	[Symbol]	20" PUBLIC DRAINAGE AND UTILITY EASEMENT
[Symbol]	EXISTING MAILBOX	[Symbol]	PROPOSED WATER MAIN	[Symbol]	FOREST CONSERVATION EASEMENT
[Symbol]	EXISTING SIGN	[Symbol]	PROPOSED SEWER MAIN	[Symbol]	
[Symbol]	EXISTING SANITARY MANHOLE	[Symbol]	MICRO-BIORETENTION	[Symbol]	
[Symbol]	EXISTING SANITARY LINE	[Symbol]	SUBMERGED GRAVEL WETLAND	[Symbol]	
[Symbol]	EXISTING CLEANOUT	[Symbol]	GRASS PAVERS	[Symbol]	
[Symbol]	EXISTING FIRE HYDRANT	[Symbol]	PROPOSED LIGHTS	[Symbol]	
[Symbol]	EXISTING WATER LINE	[Symbol]	PROPOSED STREET SIGN	[Symbol]	
[Symbol]	EXISTING FENCE	[Symbol]	ELECTRIC VEHICLE CHARGING STATION	[Symbol]	
[Symbol]	EXISTING TREES	[Symbol]	AMENITY RECREATION AREA	[Symbol]	
[Symbol]	EXISTING TREELINE	[Symbol]		[Symbol]	
[Symbol]	EXISTING WETLAND BUFFER	[Symbol]		[Symbol]	
[Symbol]	EXISTING STREAM BUFFER	[Symbol]		[Symbol]	
[Symbol]	EXISTING STREAM	[Symbol]		[Symbol]	
[Symbol]	EXISTING STREAM BANK	[Symbol]		[Symbol]	
[Symbol]	EXISTING WETLANDS	[Symbol]		[Symbol]	



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division  
 Chief, Division of Land Development  
 Director

DATE: 0-22-21  
 DATE: 11/21/21  
 DATE: 12-2-21

**SITE DEVELOPMENT PLAN**  
**SITE LAYOUT AND PAVING PLAN**  
**ELLICOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 WATERLOO ROAD  
 TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V ZONED: POR PARCEL 428  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

DESIGN BY: RHV  
 DRAWN BY: MP/KG/DZE/AB  
 CHECKED BY: RHV  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

PROFESSIONAL CERTIFICATE  
 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. 16193, EXPIRATION DATE: 06-27-2022

2 SHEET OF 28

AS-BUILT SEPTEMBER 2023



Howard County, Maryland Department of Public Works R-3.01	Howard County, Maryland Department of Public Works R-3.02	Howard County, Maryland Department of Public Works R-3.05	Howard County, Maryland Department of Public Works R-3.07	Howard County, Maryland Department of Public Works R-4.05	Howard County, Maryland Department of Public Works R-4.06	Howard County, Maryland Department of Public Works G-7.42

### US STANDARD GC2 FULLY GRASSED SYSTEM (OR EQUIVALENT)

NOTE: SECTION MUST ACCOMMODATE WEIGHT OF HOWARD COUNTY FIRE TRUCK.

DATE: 03/02/2007

NOTE: 1. STRUCTURE GATES ARE NOT RECOMMENDED. 2. MINIMUM CLEARANCE OF 15'-0\"/>

### TRASH ENCLOSURE GATE DETAIL

NO SCALE

NO AS-BUILT INFORMATION ON THIS SHEET

Howard County, Maryland  
Department of Public Works  
SOLID WASTE Service-Pad  
R-8.03

NOTE: 1. ALL WELDS SHALL HAVE A WELDING TOUGHENED SURFACE FINISH. 2. GATE AREA ADJACENT TO SIDEWALK MUST BE SLOPED TO MEET RAMP. 3. GROUND AREA ADJACENT TO SIDEWALK MUST BE SLOPED TO MEET RAMP.

### GRAVITY RETAINING WALL

NOT TO SCALE

OWNER/DEVELOPER  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

PROFESSIONAL ENGINEER  
STATE OF MARYLAND  
NO. 16193

### PRECAST CONCRETE WHEEL STOP DETAILS

NOT TO SCALE

DATE: 03/02/2007

### HANDICAPPED PARKING SIGNS

(NOT TO SCALE)

### RAMP DETAIL

SCALE: 1"=10'

PROF. CROSSWALK 27' @ 1.3%

SIDEWALK RAMP (DETAIL R-4.05)

RECONSTRUCT CURB WITH RAMP

10' @ 7.4%

5' LEVEL LANDING

8' LEVEL LANDING

6' @ 2.17%

11' @ 1.82%

HANDRAILS BOTH SIDES

### SITE DEVELOPMENT PLAN

#### SITE DETAILS

### ELLICOTT GARDENS II

HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
TAX MAP 31 BLOCK 19  
1ST ELECTION DISTRICT

BA-06-005V, SDP-07-03R, F-08-06A, BA-08-042V  
SDP-07-03R, WP-08-111, WP-08-085

HOARD COUNTY, MARYLAND

### VOGEL ENGINEERING

### TIMMONS GROUP

3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

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DESIGN BY: RHY  
DRAWN BY: MP/KG/DZE/AB  
CHECKED BY: RHY  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

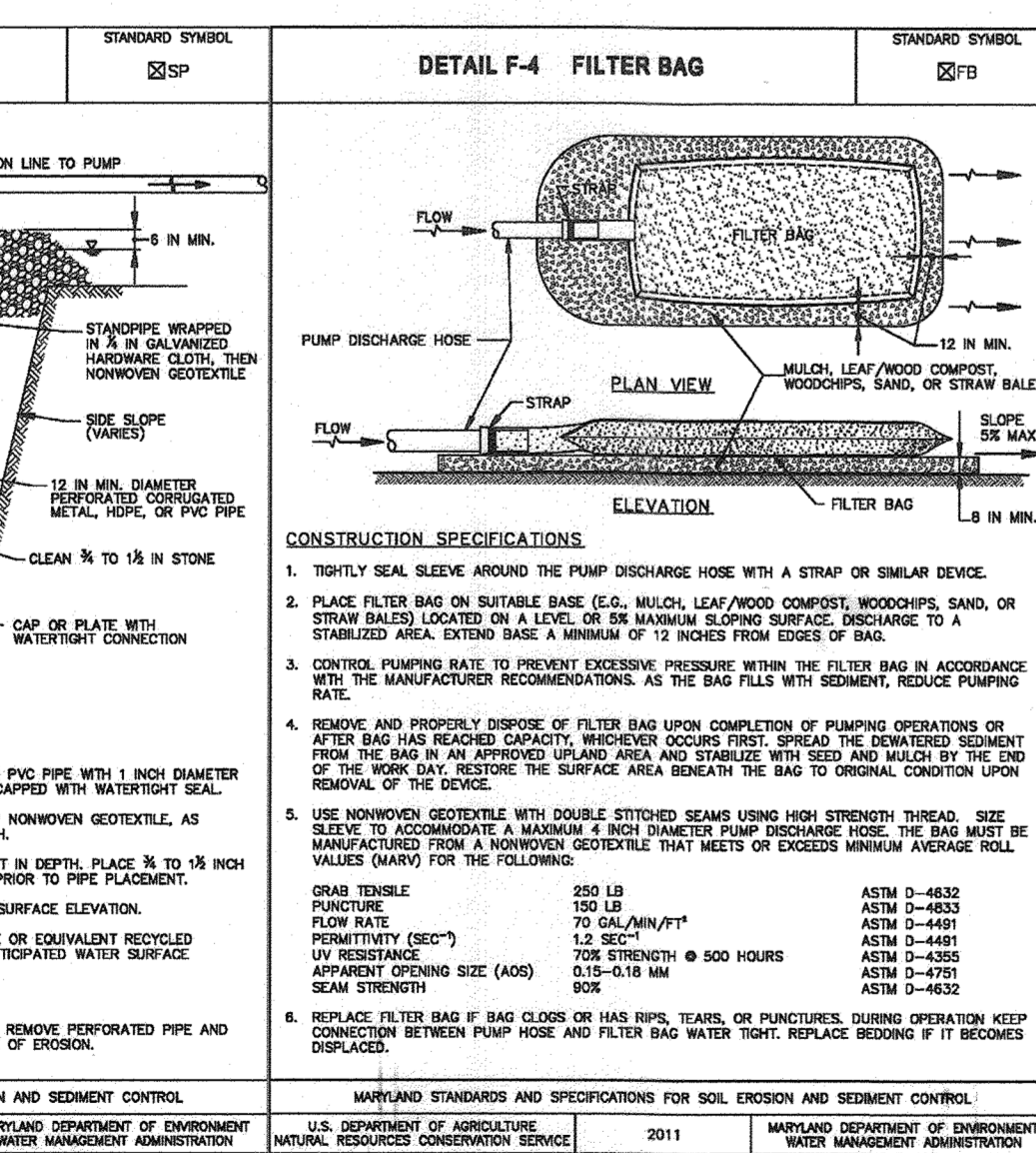
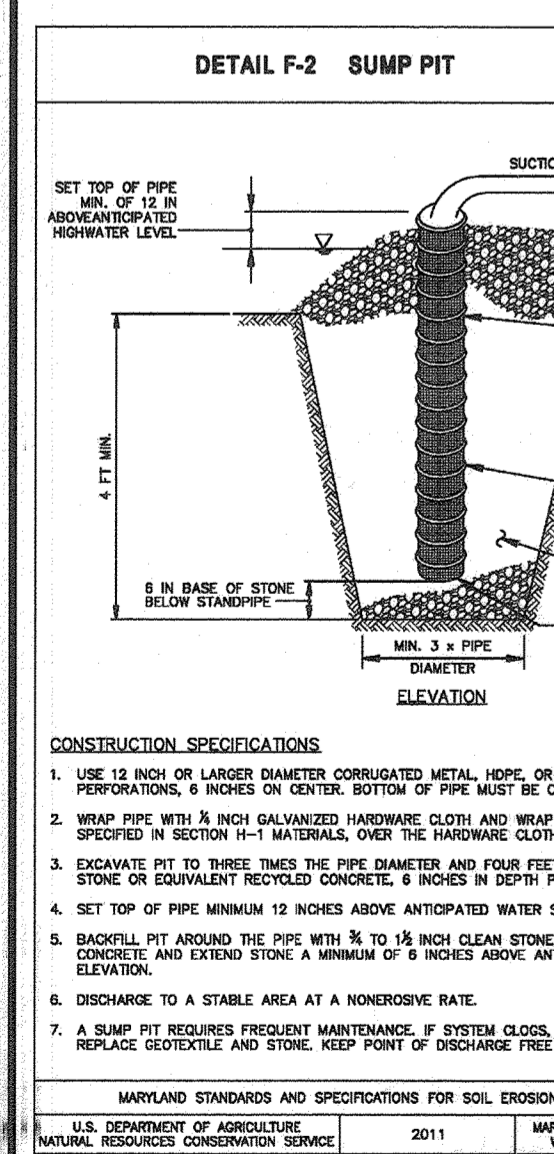
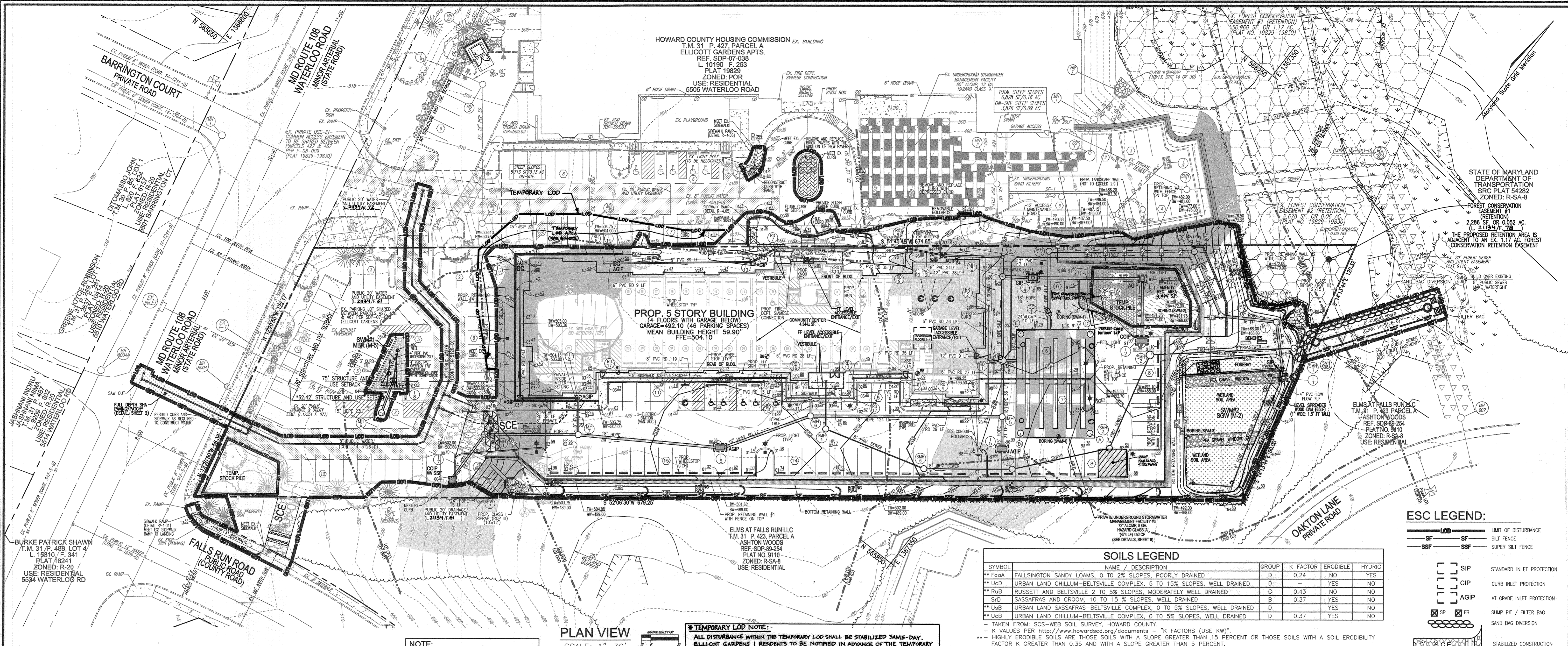
3 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division  
Chief, Division of Land Development  
Director

DATE: 10-22-21  
DATE: 01/15/21  
DATE: 12-2-21



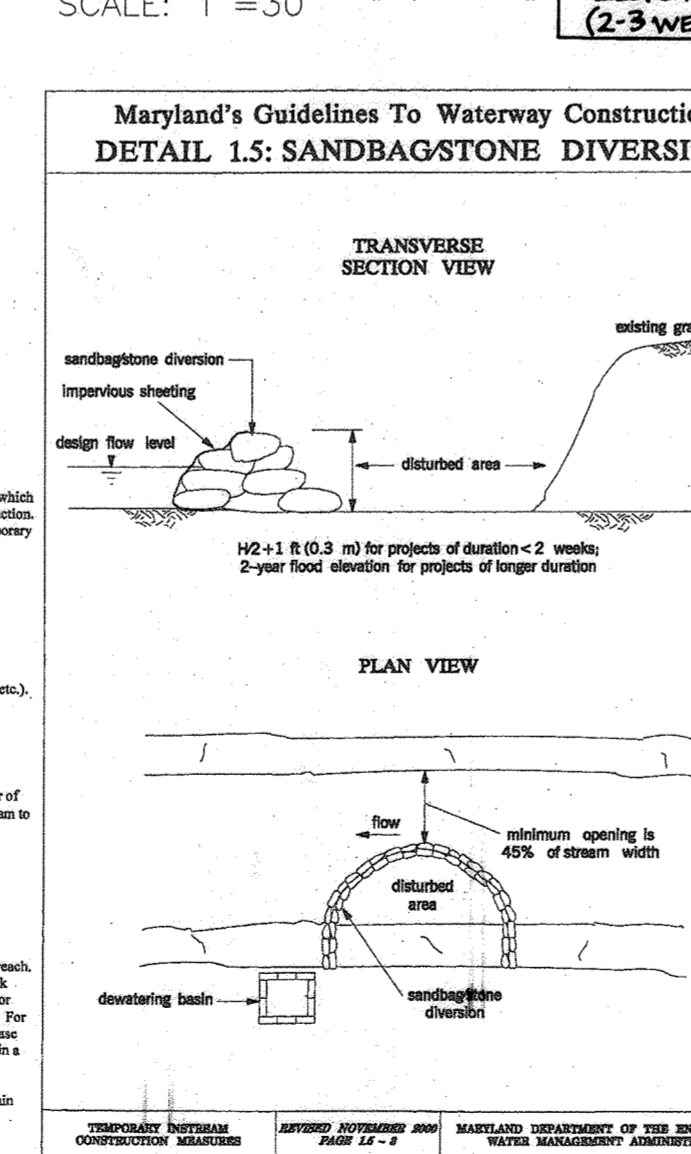


**NOTE:**  
1. \* SEE NOTE #63 ON SHEET 1.

**TEMPORARY LOD NOTE:**  
ALL DISTURBANCE WITHIN THE TEMPORARY LOD SHALL BE STABILIZED SAME-DAY. ALLICOTT GARDENS I RESIDENTS TO BE NOTIFIED IN ADVANCE OF THE TEMPORARY (2-3 WEEK DURATION) REDUCTION/RELOCATION OF PARKING.

**BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS:**

- NO EXCESSIVE FILL, CONSTRUCTION MATERIALS OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF RETENTION AND BACKFILL IS REQUIRED, USE CLEAN MATERIALS FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
- PLACE HEAVY EQUIPMENT ON MATS OR SLITLAYS OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOSS UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
- RECYCLE ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
- ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (LOLIUM MULTIFLORUM), MILLET (SETARIA ITALICA), BARLEY HORDEUM (SP.), OATS (Avena sp.) AND/OR RYE (SECALE CEREALE). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS DIVISION.
- AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, MAKE POST CONSTRUCTION GRADINGS AND ELEVATIONS THE SAME AS THE ORIGINAL GRADINGS AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
- TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM.
- USE I WATER (WITHOUT YELLOW PERCH): IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
- USE II WATER (WITH YELLOW PERCH): IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD FEBRUARY 15 THROUGH JUNE 15, INCLUSIVE DURING ANY YEAR.
- USE III WATER: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THROUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.
- USE IV WATER: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.
- STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
- CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE PASSAGE OF AQUATIC SPECIES. UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.



**MATERIAL SPECIFICATIONS:**

- Flow Stop should be used and have a minimum diameter of 6 inches (6.0 inches).
- Sandbags should consist of clean sand, which is not subject to erosion, heaving, and pumping. Sandbags should be placed in a single layer.
- Flow Stop should be placed in a single layer.

**INSTALLATION GUIDELINES:**

- All erosion and sediment control practices, including diversion basins, should be implemented at the first start of construction activities and maintained until the end of construction.
- The diversion structure should be installed from upstream to downstream.
- The height of the sandbag stone diversion should be a function of the duration of the project in the stream reach. For projects with a duration less than 2 weeks, the height of the diversion should be one half the streambank height measured from the channel bottom. For 2 to 4 weeks or longer, the height should be 75% of the streambank height. For projects with a duration greater than 4 weeks, the height of the diversion should be 50% of the streambank height. For diversion structures with a duration greater than 4 weeks, the structure should be placed on a placement of the base of the streambank in order to ensure a water tight fit. Additionally, it may be necessary to prepare the base in a similar fashion.
- All material should be placed and stabilized in an approved area outside the 100-year floodplain inclusive during any year.
- Bottom-line water from the construction area should be pumped to a diversion basin.

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE	HYDRIC
**FoaA	FALLSINGTON SANDY LOAMS, 0 TO 2% SLOPES, POORLY DRAINED	D	0.24	NO	YES
**UcD	URBAN LAND CHILLUM-BELTSVILLE COMPLEX, 5 TO 15% SLOPES, WELL DRAINED	D	0.37	NO	NO
**RuB	RUSSETT AND CHILLUM, 2 TO 5% SLOPES, MODERATELY WELL DRAINED	C	0.43	NO	NO
SrD	SASSAFRAS AND CROOM, 10 TO 15% SLOPES, WELL DRAINED	B	0.37	NO	NO
**UsB	URBAN LAND SASSAFRAS-BELTSVILLE COMPLEX, 0 TO 5% SLOPES, WELL DRAINED	D	-	YES	NO
**UcB	URBAN LAND CHILLUM-BELTSVILLE COMPLEX, 0 TO 5% SLOPES, WELL DRAINED	D	0.37	YES	NO

- TAKEN FROM: SCS-WEB SOIL SURVEY, HOWARD COUNTY.  
- K VALUES PER <http://www.howardcd.org/documents> - "K FACTORS (USE KW)"  
- HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.

**LEGEND:**

EXISTING CONTOUR	EXISTING TREES	EXISTING FOREST CONSERVATION EASEMENT	AMENITY RECREATION AREA
PROPOSED CONTOUR	EXISTING TREELINE	EXISTING FOREST CONSERVATION EASEMENT	EX. STEEP SLOPES (25%+)
EX. CURB AND GUTTER	EXISTING WETLAND BUFFER	20' PUBLIC WATER AND UTILITY EASEMENT	EX. MODERATE SLOPES (15% - 24.95%)
EX. UTILITY POLE	EXISTING STREAM BUFFER	20' PUBLIC WATER AND UTILITY EASEMENT	
EX. LIGHT POLE	EXISTING STREAM	20' PUBLIC DRAINAGE AND UTILITY EASEMENT	
EX. MAILBOX	EXISTING STREAM BANK	20' PUBLIC DRAINAGE AND UTILITY EASEMENT	
EXISTING SIGN	EXISTING WETLANDS	FOREST CONSERVATION EASEMENT	
EX. SANITARY MH	SOILS BOUNDARY	AMENITY RECREATION AREA	
EX. SANITARY LINE	PROPERTY LINE	PROPOSED CURBS AND GUTTER	
EX. FIRE HYDRANT	RIGHT-OF-WAY LINE	PROPOSED SIDEWALK	
EX. WATER LINE	SETBACKS	PROPOSED SIDEWALK RAMP	
EX. FENCE	PROPOSED CURBS AND GUTTER	PROPOSED TREETRUNK	
	PROPOSED SIDEWALK	PROPOSED STORM DRAIN	
	PROPOSED SIDEWALK RAMP	PROPOSED STORM DRAIN INLET	
	PROPOSED TREETRUNK	PROPOSED FIRE HYDRANT	
	PROPOSED STORM DRAIN	PROPOSED WATER TEE & VALVE	
	PROPOSED STORM DRAIN INLET	PROPOSED WATER MAIN	
		PROPOSED SEWER MAIN	
		PROPOSED LIGHTS	
		PROPOSED STREET SIGN	
		SOIL BORING	
		ELECTRIC VEHICLE CHARGING STATION	

**ESC LEGEND:**

---	LIMIT OF DISTURBANCE
---	SILT FENCE
---	SUPER SILT FENCE
---	SIP
---	CIP
---	AGIP
---	SUMP PIT / FILTER BAG
---	SAND BAG DIVERSION
---	STABILIZED CONSTRUCTION ENTRANCE

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

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P: 410.461.7666 F: 410.461.8961 www.timmsons.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 02-22-21

DATE: 01/19/21

DATE: 12-2-21

**OWNER/DEVELOPER CERTIFICATION:**  
I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROGRAM HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (DHE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I CERTIFY THAT ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD COUNTY CONSERVATION DISTRICT AND/OR MDC.

DATE: 8/31/21

DATE: 8-25-21

**DESIGNER CERTIFICATION:**  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY CONSERVATION DISTRICT.

DATE: 08/30/21

**AS-BUILT CERTIFICATION FOR BSWM**

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THIS PLAN AND THAT ALL CONSTRUCTION COMPLIES WITH THE DESIGN AND CONSTRUCTION SPECIFICATIONS AND STANDARDS. I HAVE VERIFIED THAT THE FACILITY IS SUFFICIENTLY STABLE TO BE USED FOR ITS INTENDED PURPOSE AND THAT THERE IS NO SIGNIFICANT CLOGGING OF THE UNDERGROUND STORAGE FACILITY.

DATE: 11-8-23

**PROFESSIONAL CERTIFICATE**

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. MY LICENSE NO. IS 11-8-23. EXPIRATION DATE: 08-27-2022

DATE: 11-8-23

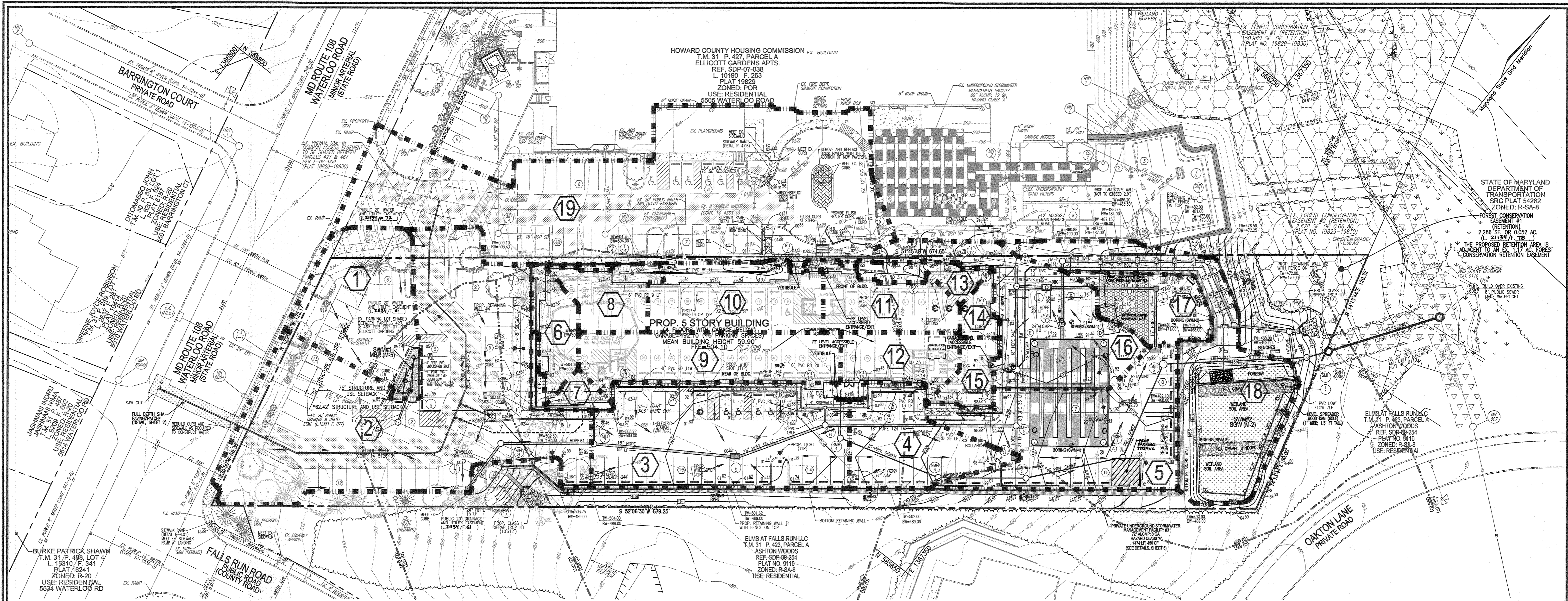
DATE: 06-01/

4 SHEET OF 28

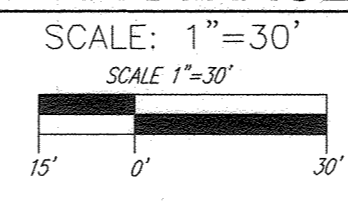








**STORM DRAIN DRAINAGE AREA MAP**



**SD Drainage Area Chart**

DRAINAGE AREA	AREA AC	C	IMP %
1	0.16	0.68	70%
2	0.53	0.79	88%
3	0.26	0.80	91%
4	0.11	0.79	90%
5	0.22	0.76	86%
6	0.05	0.72	79%
7	0.02	0.52	51%
8	0.05	0.75	100%
9	0.13	0.86	100%
10	0.11	0.72	80%
11	0.07	0.86	100%
12	0.06	0.86	100%
13	0.03	0.46	42%
14	0.02	0.86	100%
15	0.03	0.86	100%
16	0.17	0.71	78%
17	0.07	0.16	0%
18	0.22	0.40	35%
19	0.51	0.76	85%

**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EX. CURB AND GUTTER
- EX. UTILITY POLE
- EX. LIGHT POLE
- EX. MAILBOX
- EXISTING SIGN
- EX. SANITARY MH
- EX. SANITARY LINE
- EX. CLEANOUT
- EX. FIRE HYDRANT
- EX. WATER LINE
- EX. FENCE
- EXISTING TREES
- EXISTING TREELINE
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EXISTING STREAM
- EX. STREAM BANK
- EXISTING WETLANDS
- SOILS BOUNDARY
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SETBACKS
- PROPOSED CURB AND GUTTER
- PROPOSED SIDEWALK
- PROPOSED SIDEWALK RAMP
- PROPOSED TREELINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- PROPOSED FIRE HYDRANT
- PROPOSED WATER TEE & VALVE
- PROPOSED WATER MAIN
- PROPOSED SEWER MAIN
- PROPOSED LIGHTS
- PROPOSED STREET SIGN
- SOIL BORING
- ELECTRIC VEHICLE CHARGING STATION
- MICRO-BIORETENTION
- SUBMERGED GRAVEL WETLAND
- GRASS PAVERS
- EXISTING 20' PUBLIC SEWER AND UTILITY EASEMENT
- 20' PUBLIC WATER AND UTILITY EASEMENT
- 20' PUBLIC DRAINAGE AND UTILITY EASEMENT
- EXISTING PRIVATE USE-IN-COMMON EASEMENT
- EXISTING 20' PUBLIC WATER AND UTILITY EASEMENT
- EXISTING FOREST CONSERVATION EASEMENT
- FOREST CONSERVATION EASEMENT
- DRAINAGE DIVIDE
- DRAINAGE DESIGNATION

STORMWATER MANAGEMENT FACILITY TO BE PRIVATELY OWNED AND MAINTAINED

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division: *[Signature]* 10-22-21

Chief, Division of Land Development: *[Signature]* 11/14/21

Director: *[Signature]* 12-2-21

**AS-BUILT CERTIFICATION FOR PSWM**

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

*[Signature]* 1693 11-8-23

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

**SITE DEVELOPMENT PLAN**

**STORM DRAIN DRAINAGE AREA MAP**

**ELLICOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 WATERLOO ROAD  
 TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V ZONED: POR PARCEL 428  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-08-085 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**

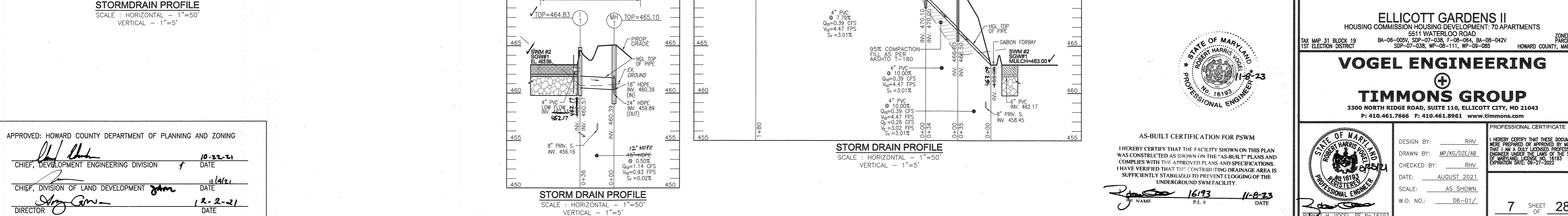
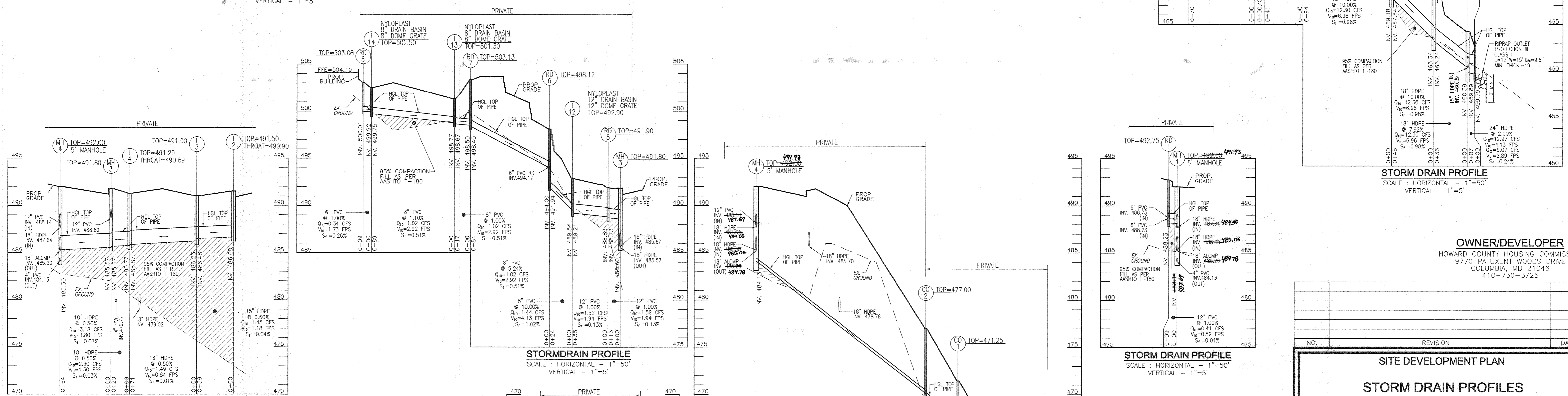
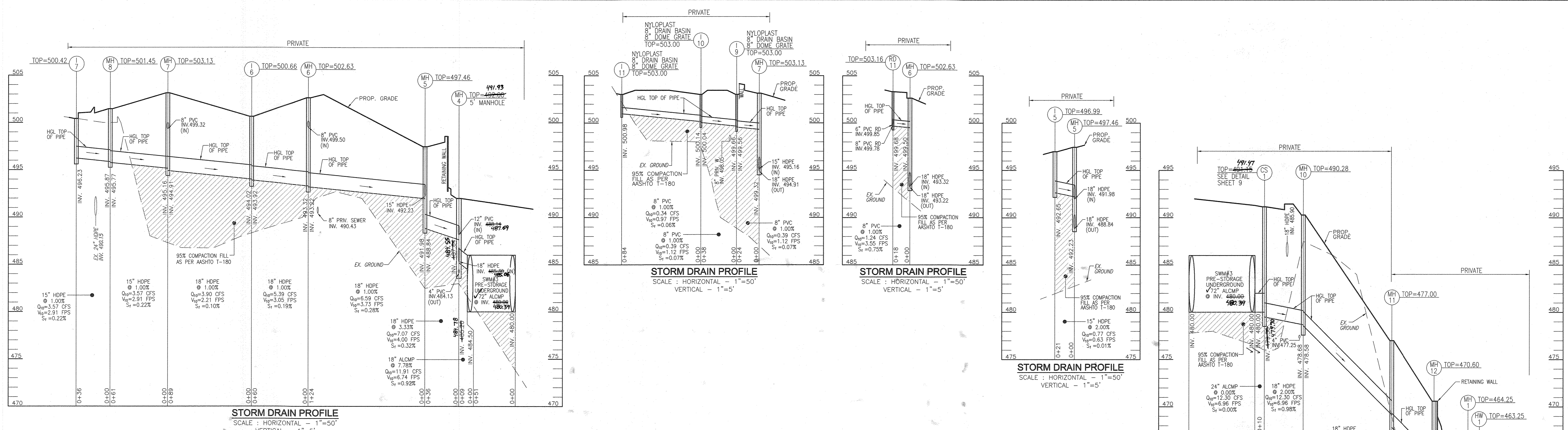
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7656 F: 410.461.8961 www.timmons.com

REVISION: 2. REVISE PLAN TO RELOCATE DUMPSTER PAD REVISION DATE: 3-15-23

DESIGN BY: RHY  
 DRAWN BY: MP/KG/DZE/AR  
 CHECKED BY: RHY  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

6 SHEET OF 28





APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

10-22-21  
DATE

11/16/21  
DATE

12-2-21  
DATE

AS-BUILT CERTIFICATION FOR PSWM

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

16193  
P.E. #

11-8-23  
DATE

OWNER/DEVELOPER  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

NO.	REVISION	DATE

**SITE DEVELOPMENT PLAN**

**STORM DRAIN PROFILES**

**ELLICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V ZONED: POR  
1ST ELECTION DISTRICT SDP-07-039, WP-08-111, WP-08-085 HOWARD COUNTY, MARYLAND PARCEL 428

**VOGEL ENGINEERING**

**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

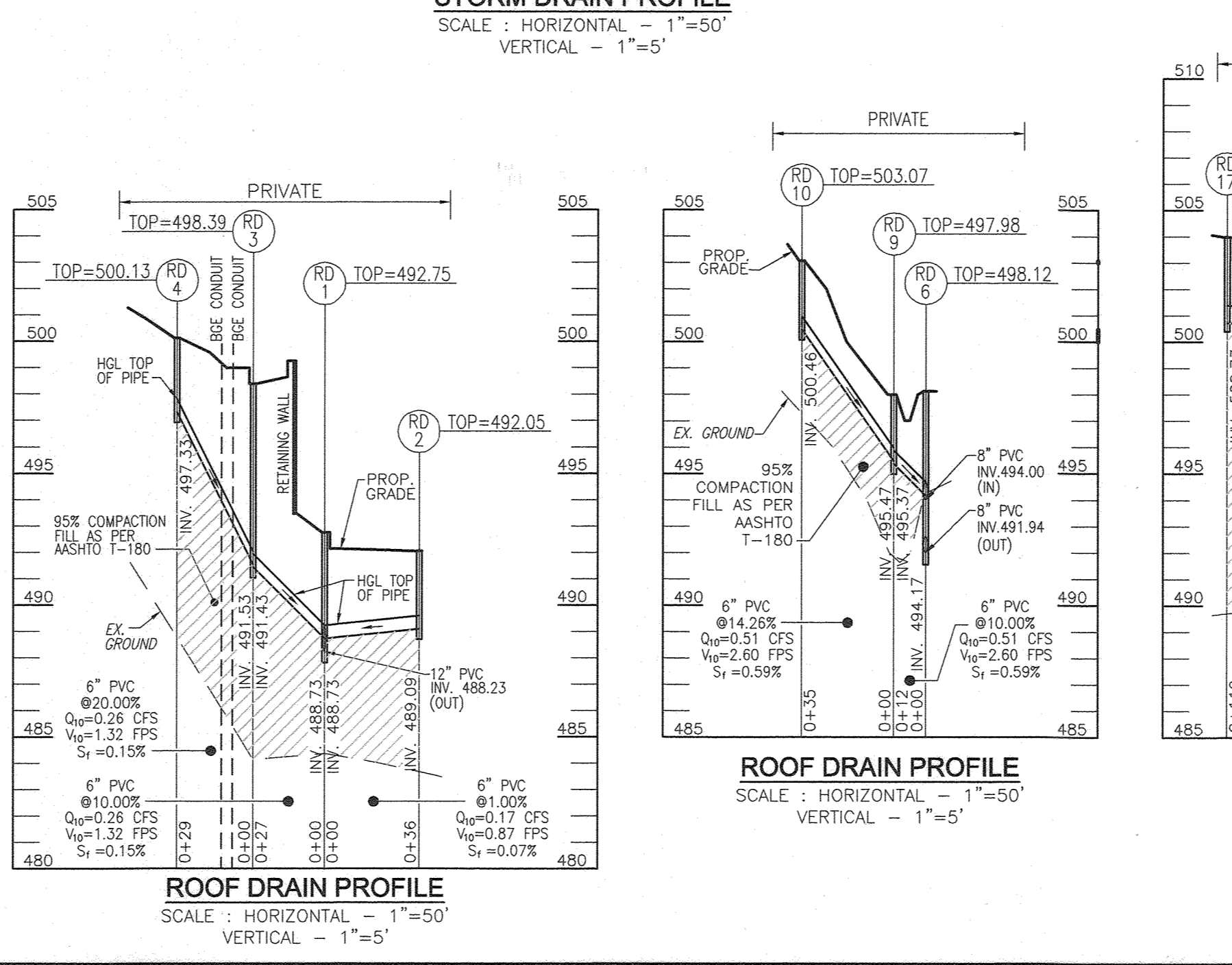
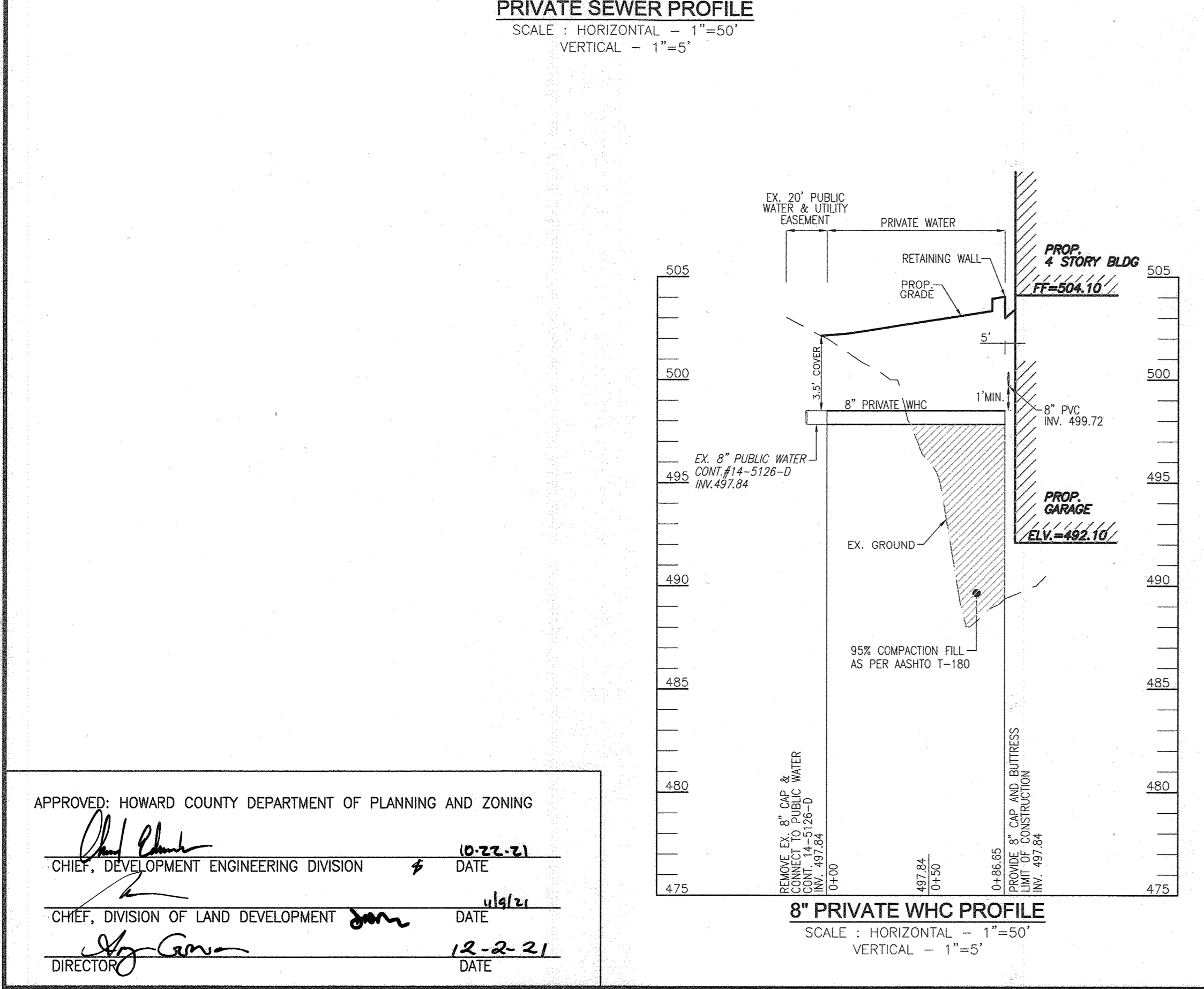
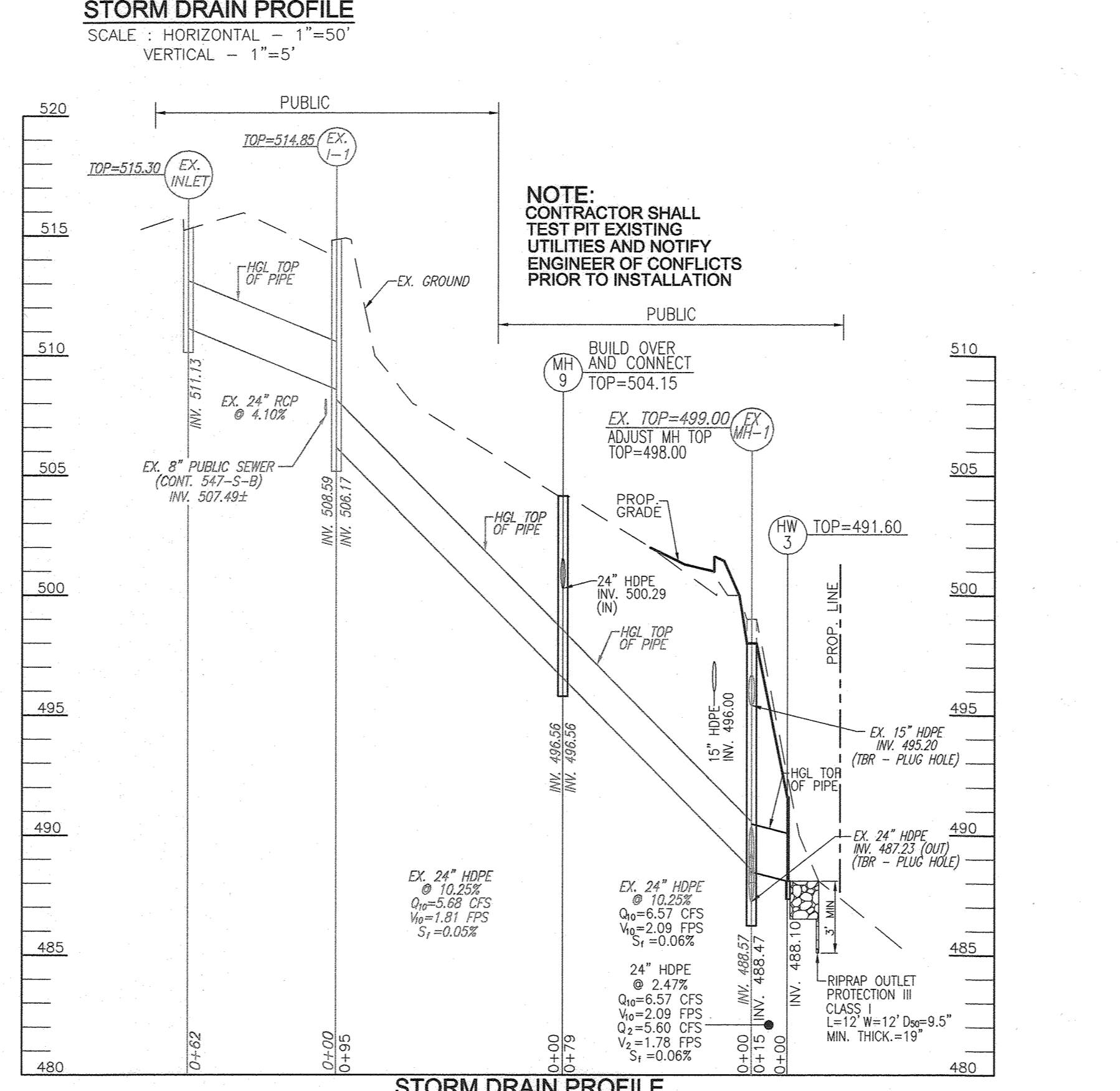
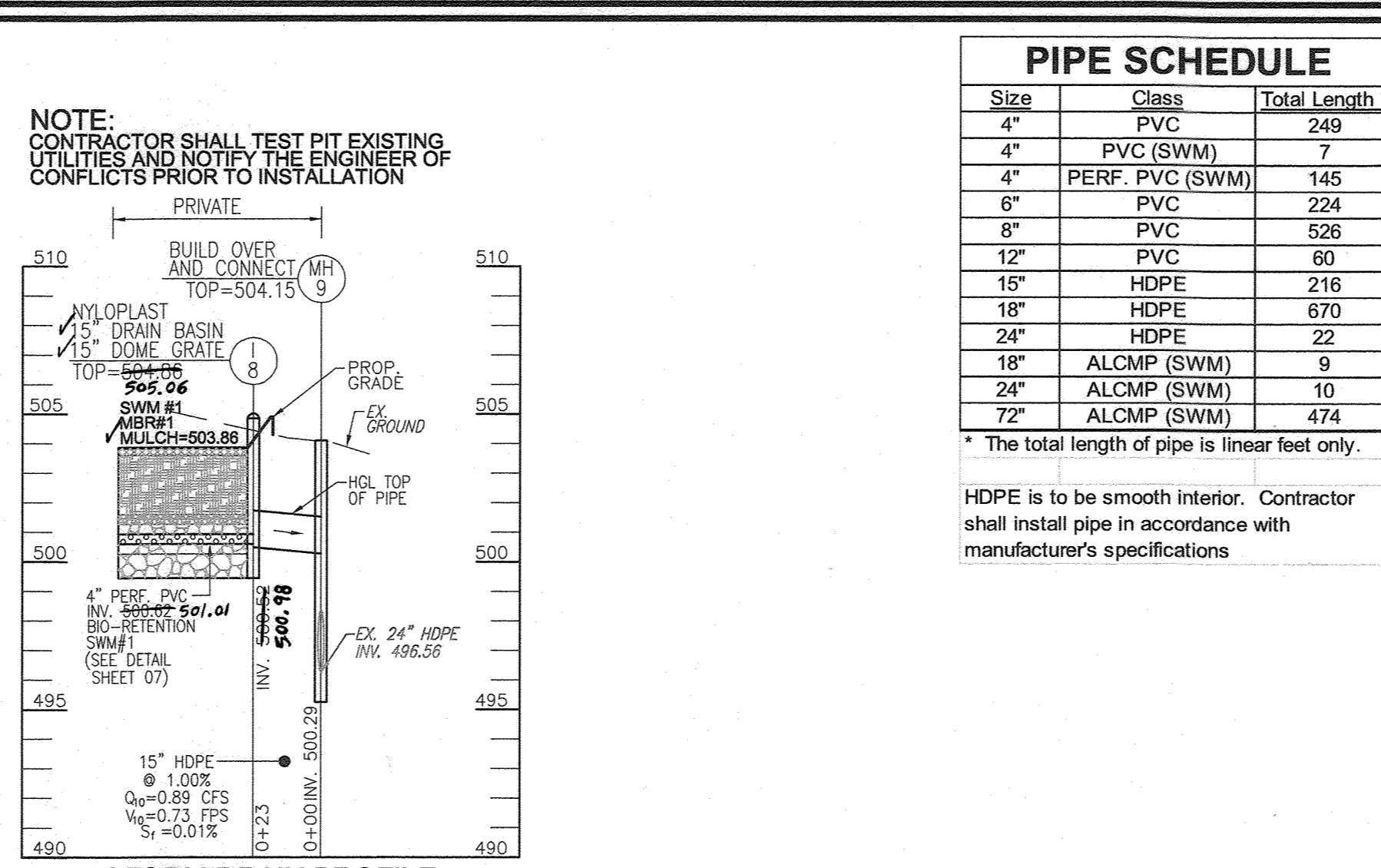
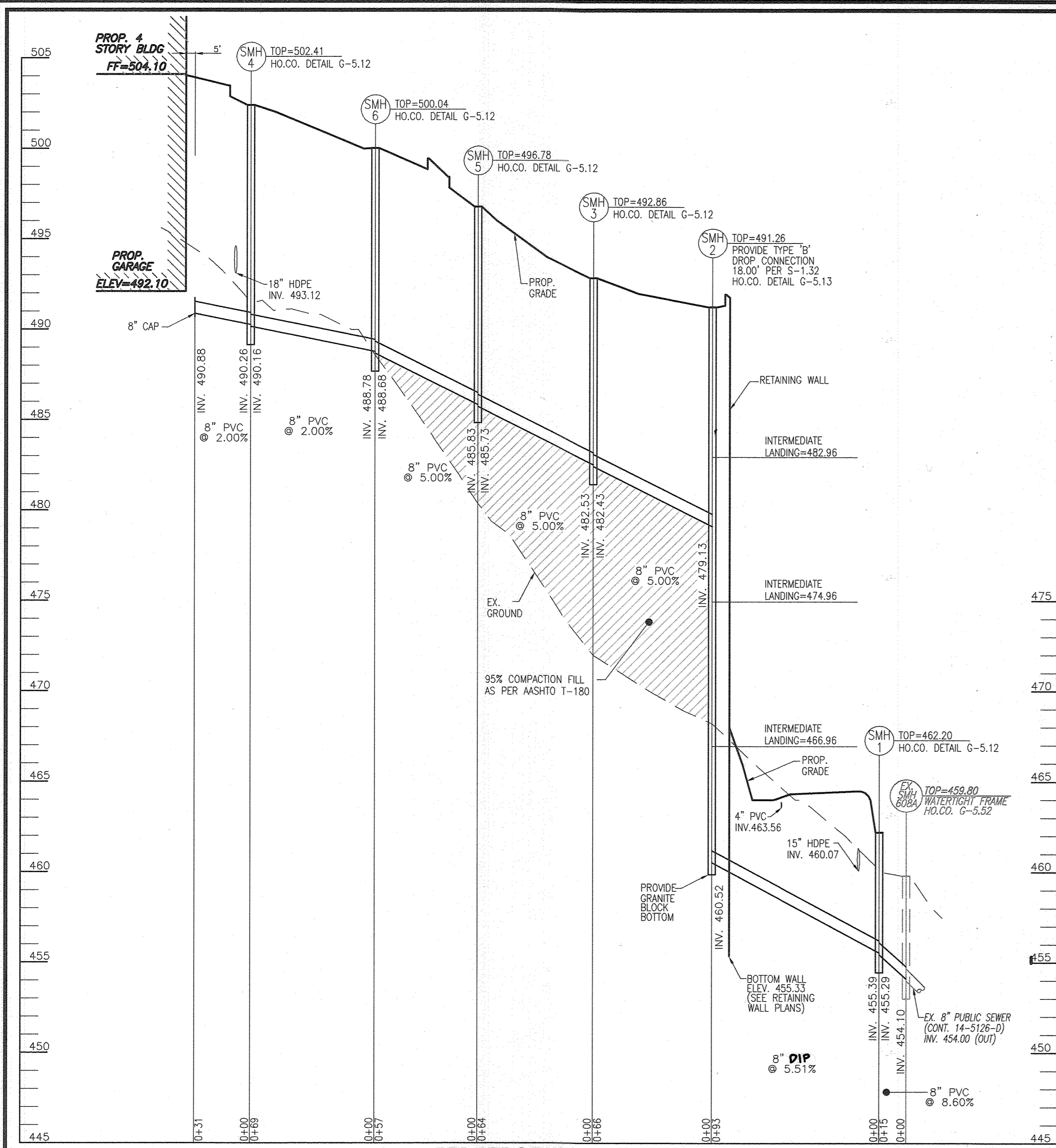
PROFESSIONAL CERTIFICATE

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. 16193. EXPIRATION DATE: 08-27-2022

DESIGN BY: RHV  
DRAWN BY: MP/KG/DZE/AB  
CHECKED BY: RHV  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

7  
SHEET  
OF  
28





**PIPE SCHEDULE**

Size	Class	Total Length
4"	PVC	249
4"	PVC (SWM)	7
4"	PERF. PVC (SWM)	145
8"	PVC	224
8"	PVC	526
12"	PVC	60
15"	HDPE	216
18"	HDPE	670
24"	HDPE	22
24"	ALCMP (SWM)	9
24"	ALCMP (SWM)	10
72"	ALCMP (SWM)	474

\* The total length of pipe is linear feet only.

HDPE is to be smooth interior. Contractor shall install pipe in accordance with manufacturer's specifications

**STRUCTURE SCHEDULE**

STR #	TYPE	LOCATION	TOP	INV. IN	INV. OUT	DETAIL	PUBLIC/PRIVATE	REMARKS
HW-1	24" HEADWALL	N 566131.43 E 1367455.32	463.25	-	459.75	D-5.11	PRIVATE	
HW-3	24" HEADWALL	N 565741.98 E 1367111.39	491.60	-	488.10	D-5.11	PUBLIC	
I-1	D-INLET	N 566096.90 E 1367472.73	464.83	462.09	460.57	D-4.10	PRIVATE	SWM #2 SGW
I-2	DBL WR INLET	N 566064.16 E 1367388.62	491.50	-	486.68	D-4.31	PRIVATE	
I-3	S-INLET	N 566094.94 E 1367364.82	491.00	486.48	486.23	D-4.24	PRIVATE	
I-4	A-5	N 566051.80 E 1367308.44	491.29	-	485.87	D-4.02	PRIVATE	
I-5	DBL S' INLET	N 565952.48 E 1367360.96	496.99	-	492.65	D-4.25	PRIVATE	
I-6	DBL S' INLET	N 565839.90 E 1367216.30	500.66	494.02	493.92	D-4.25	PRIVATE	
I-7	SINGLE WR INLET	N 565717.22 E 1367092.08	500.42	-	496.23	D-4.32	PRIVATE	
I-8	15" NYLOPLAST DRAIN BASIN	N 565744.74 E 1367025.09	494.06	505.06	500.52	-	PRIVATE	15" NYLOPLAST DOME GRATE
I-9	8" NYLOPLAST DRAIN BASIN	N 565809.51 E 1367124.56	503.00	499.66	499.66	-	PRIVATE	8" NYLOPLAST DOME GRATE
I-10	8" NYLOPLAST DRAIN BASIN	N 565786.92 E 1367095.27	503.00	500.14	500.04	-	PRIVATE	8" NYLOPLAST DOME GRATE
I-11	8" NYLOPLAST DRAIN BASIN	N 565851.95 E 1367043.64	503.00	-	500.98	-	PRIVATE	8" NYLOPLAST DOME GRATE
I-12	12" NYLOPLAST DRAIN BASIN	N 566027.29 E 1367254.02	492.90	489.54	489.21	-	PRIVATE	12" NYLOPLAST DOME GRATE
I-13	8" NYLOPLAST DRAIN BASIN	N 565948.06 E 1367159.75	501.30	498.77	498.67	-	PRIVATE	8" NYLOPLAST DOME GRATE
I-14	8" NYLOPLAST DRAIN BASIN	N 565892.91 E 1367090.82	502.50	499.92	499.75	-	PRIVATE	8" NYLOPLAST DOME GRATE
RD-1	CLEAN OUT	N 565991.19 E 1367319.41	492.75	488.73/488.73	488.23	S-2.22	PRIVATE	
RD-2	CLEAN OUT	N 566019.85 E 1367297.07	492.05	-	489.09	S-2.22	PRIVATE	
RD-3	CLEAN OUT	N 565969.83 E 1367336.09	498.39	491.53	491.43	S-2.22	PRIVATE	
RD-4	CLEAN OUT	N 565951.75 E 1367312.87	500.13	-	497.33	S-2.22	PRIVATE	
RD-5	CLEAN OUT	N 566050.21 E 1367284.81	491.90	488.83	488.73	S-2.22	PRIVATE	
RD-6	CLEAN OUT	N 566016.14 E 1367232.21	498.12	494.17/494.00	491.94	S-2.22	PRIVATE	
RD-7	CLEAN OUT	N 565963.88 E 1367165.92	503.13	498.50	498.40	S-2.22	PRIVATE	
RD-8	CLEAN OUT	N 565887.86 E 1367084.36	503.08	-	500.01	S-2.22	PRIVATE	
RD-9	CLEAN OUT	N 566006.69 E 1367238.66	497.98	495.47	495.37	S-2.22	PRIVATE	
RD-10	CLEAN OUT	N 565986.72 E 1367209.75	503.07	-	500.46	S-2.22	PRIVATE	
RD-11	CLEAN OUT	N 565901.64 E 1367243.39	503.16	499.78 / 499.85	499.68	S-2.22	PRIVATE	
RD-12	CLEAN OUT	N 565918.78 E 1367265.37	503.35	500.09	499.99	S-2.22	PRIVATE	
RD-13	CLEAN OUT	N 565929.09 E 1367257.35	503.45	500.26	500.16	S-2.22	PRIVATE	
RD-14	CLEAN OUT	N 565950.21 E 1367284.48	502.02	-	500.44	S-2.22	PRIVATE	
RD-15	CLEAN OUT	N 565892.01 E 1367231.07	502.68	499.96	499.86	S-2.22	PRIVATE	
RD-16	CLEAN OUT	N 565902.36 E 1367222.98	502.88	500.13	500.03	S-2.22	PRIVATE	
RD-17	CLEAN OUT	N 565829.28 E 1367129.09	503.98	-	500.73	S-2.22	PRIVATE	
CO-1	CLEAN OUT	N 566108.08 E 1367410.43	471.25	466.60	466.50	-	PRIVATE	
CO-2	CLEAN OUT	N 566124.72 E 1367380.79	477.00	470.10	470.00	-	PRIVATE	
MH-1	STD. 4' PRECAST MANHOLE	N 566126.39 E 1367450.33	465.10	460.39/460.39	459.89	G 5.12	PRIVATE	
MH-3	STD. 4' PRECAST MANHOLE	N 566039.75 E 1367292.99	491.80	488.60/485.67	485.67	G 5.12	PRIVATE	
MH-4	STD. 5' PRECAST MANHOLE	N 565997.48 E 1367325.95	492.90	489.14/487.04/486.90	484.13/485.20	G 5.13	PRIVATE	5' MANHOLE
MH-5	STD. 4' PRECAST MANHOLE	N 565968.83 E 1367348.24	497.46	492.23/491.98	488.84	G 5.12	PRIVATE	
MH-6	STD. 4' PRECAST MANHOLE	N 565892.67 E 1367250.38	502.63	499.50/493.32	493.22	G 5.12	PRIVATE	
MH-7	STD. 4' PRECAST MANHOLE	N 565790.54 E 1367139.32	503.13	499.32/495.16	494.91	G 5.12	PRIVATE	
MH-8	STD. 4' PRECAST MANHOLE	N 565753.39 E 1367091.58	501.46	495.87	495.77	G 5.12	PRIVATE	
MH-9	STD. 4' PRECAST MANHOLE	N 565725.88 E 1367040.69	504.15	500.29/496.56	496.56	G 5.12/5.14	PUBLIC	BUILD OVER & CONNECT
MH-10	STD. 4' PRECAST MANHOLE	N 566071.65 E 1367306.11	490.28	478.68	478.58	G 5.12	PRIVATE	
MH-11	STD. 4' PRECAST MANHOLE	N 566129.41 E 1367380.44	477.00	469.18	467.84	G 5.12	PRIVATE	
MH-12	STD. 4' PRECAST MANHOLE	N 566107.42 E 1367419.73	470.60	463.34	463.24	G 5.12	PRIVATE	
CS-1	48 DIAM PRECAST MANHOLE	N 566039.66 E 1367330.98	494.15/491.17	480.00	479.77/479.60	MD 384.01	PRIVATE	SEE DETAIL SHEET 12

**STRUCTURE SCHEDULE**

STR #	TYPE	LOCATION	TOP	INV. IN	INV. OUT	REMARKS
EX. SMH 608 A	STD. PRECAST MANHOLE (G-5.12)	N 566131.88 E 1367478.34	459.80	454.14	454.00	
SMH-1	STD. PRECAST MANHOLE (G-5.12)	N 566120.07 E 1367469.66	462.20	455.39	455.29	
SMH-2	STD. PRECAST MANHOLE (G-5.13)	N 566059.31 E 1367399.00	491.26	479.13	460.52	TYPE 'B' DROP MANHOLE, GRANITE BOTTOM
SMH-3	STD. PRECAST MANHOLE (G-5.12)	N 565995.64 E 1367415.59	492.86	482.53	482.43	
SMH-4	STD. PRECAST MANHOLE (G-5.12)	N 565892.16 E 1367263.34	502.41	490.25	490.16	
SMH-5	STD. PRECAST MANHOLE (G-5.12)	N 565946.18 E 1367374.22	496.78	485.83	485.73	
SMH-6	STD. PRECAST MANHOLE (G-5.12)	N 565911.12 E 1367329.18	500.04	488.78	488.68	

**PRIVATE WATER AND SEWER PIPE SCHEDULE**

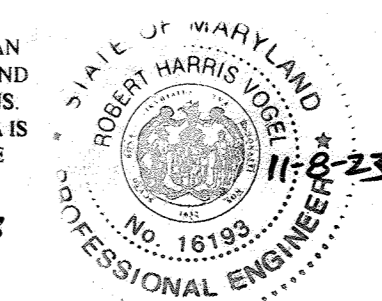
SIZE	TYPE / CLASS	TOTAL LENGTH
8 (WHC)	PVC	87
8 (SHC)	PVC	302
8 (SHC)	DIP	93

THE TOTAL LENGTH OF PIPE IS LINEAR FEET ONLY.  
CONTRACTOR SHALL INSTALL PIPE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

AS-BUILT CERTIFICATION FOR PWSM

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

DATE: 11-8-23  
P.E.#: 16193



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 12-22-21

DATE: 12-22-21

DATE: 12-22-21

**SITE DEVELOPMENT PLAN**  
**STORM DRAIN AND UTILITY PROFILES**

**ELICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-0059, SDP-07-038, F-08-064, BA-08-042V ZONED: POR  
SOP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND PARCEL 428

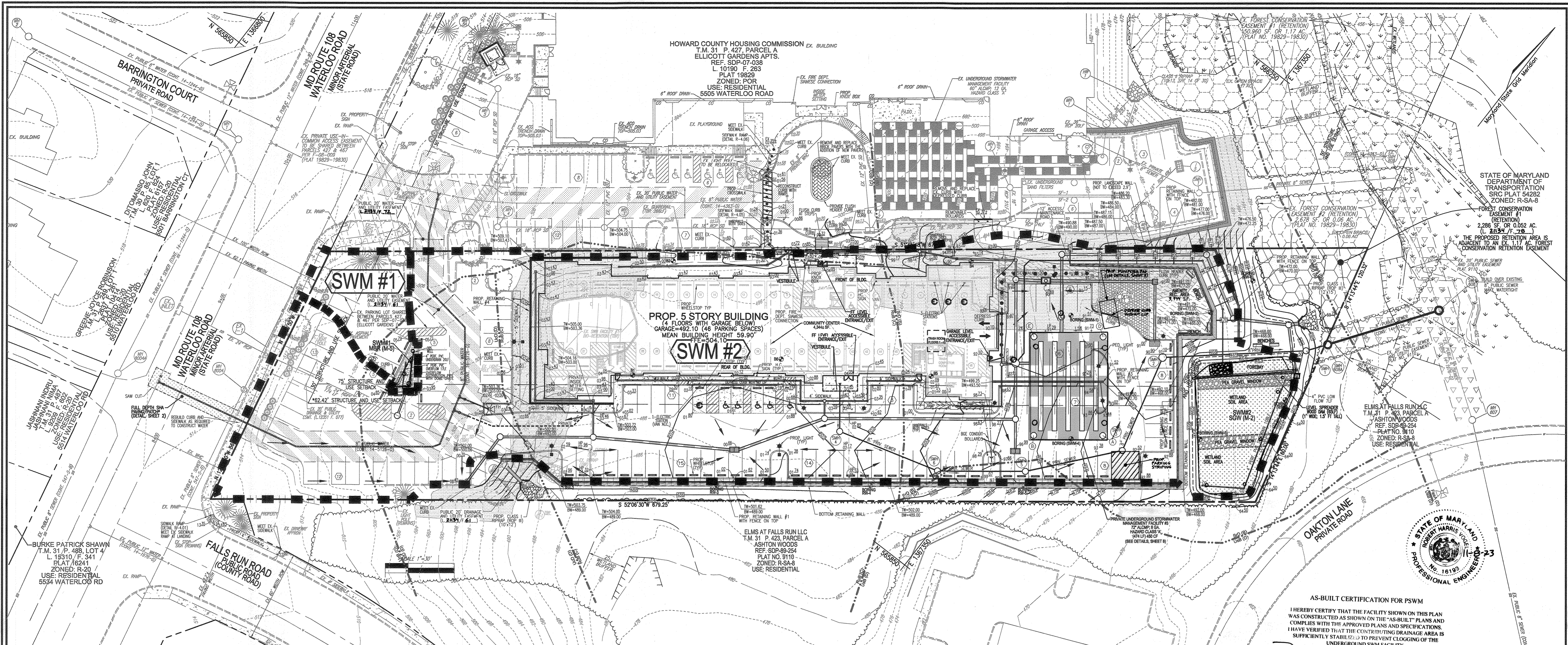
**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

DESIGN BY: RHV  
DRAWN BY: MP/KS/DZE/AB  
CHECKED BY: RHV  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

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. EXPIRATION DATE: 06-27-2022

8 SHEET OF 28





ENVIRONMENTAL SITE DESIGN DRAINAGE AREA MAP

SCALE: 1" = 30'

Site Target $P_e$ =	1.00 USE PE = 1.00"; 10&100yr Quantity Management also provided
Target Site ESDv =	4,992
Rev Required =	854 c.f.
Soil Specific Recharge Factor (S) =	0.17 in.
Rev=(S)(Rv)(A)/12	
ESDv=(PexRvxA)/12	
Rv=0.05+0.009xI	
Vmin 1yr rainfall = 1"	(1.0x0.95KA)/12
Vmax 1yr rainfall = 2.6"	(2.6x0.95KA)/12

SWM PRACTICE	PRACTICE DA (SF)	PRACTICE DA (AC)	IMPERV (SF)	PERV (AC)	PERV AREA % IMPERV	PRACTICE Rv	MIN PRACTICE SITE TARGET $P_e$	MAX PRACTICE VOLUME (2.6")	TOTAL PRACTICE VOLUME PROVIDED	Rev REQUIRED	Rev PROVIDED	REMARKS	
												CF	SF
SWMF#1 MBR (M-6)	4,339	0.10	2,930	0.07	1,410	0.03	68	0.66	238	618	123	123	MICROSCALE MICRO-BIO RETENTION (M-6) 491 368 Surface Area of MBR @ 1.0 ponding (75% above) 123 368 Stone Below MBR (includes REV) (Rev Recharge Vol Req. = 25% of total volume; provide below MBR) 0 368 ADDITIONAL STONE
SWMF#2 SGW (M-2)	93,770	2.15	69,170	1.59	24,600	0.56	74	0.71	5,578	14,504	1,396	1,396	MICROSCALE GRAVEL WETLAND 5,585 4,189 Surface Area of SGW @ 1.0 ponding (75% above) 1,396 4,189 Stone Below SGW (includes REV) (Rev Recharge Vol Req. = 25% of total volume; provide below SGW) 0 4,189 ADDITIONAL STONE
<b>TOTALS</b>	<b>98,110</b>	<b>2.25</b>	<b>72,100</b>	<b>1.66</b>	<b>26,010</b>	<b>0.60</b>			<b>6,076</b>	<b>15,119</b>	<b>1,519</b>	<b>1,519</b>	<b>TOTALS ESDv PROVIDED :</b>

Note: Each individual practice ESDv provided must be between the minimum of 1" rainfall and up to the maximum of 2.6" rainfall (1-year rainfall)

**LEGEND:**

- EX. CONTOUR
- PROP. CURB AND GUTTER
- EX. UTILITY POLE
- EX. LIGHT POLE
- EX. MAILBOX
- EXISTING SIGN
- EX. SANITARY MH
- EX. SANITARY LINE
- EX. CLEANOUT
- EX. FIRE HYDRANT
- EX. WATER LINE
- EX. FENCE
- EXISTING TREES
- EXISTING TREELINE
- EX. WETLAND BUFFER
- EX. STREAM BUFFER
- EXISTING STREAM
- EX. STREAM BANK
- EXISTING WETLANDS
- SOILS BOUNDARY
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SETBACKS
- CURB AND GUTTER
- SIDEWALK
- SIDEWALK RAMP
- TREELINE
- STORM DRAIN
- STORM DRAIN INLET
- FIRE HYDRANT
- WATER TEE & VALVE
- WATER MAIN
- SEWER MAIN
- ESD DRAINAGE DIVIDE

- MICRO-BIORETENTION
- SUBMERGED GRAVEL WETLAND
- EXISTING 20' PUBLIC SEWER AND UTILITY EASEMENT
- 20' PUBLIC WATER AND UTILITY EASEMENT
- 20' PUBLIC DRAINAGE AND UTILITY EASEMENT
- EXISTING PRIVATE USE-IN-COMMON EASEMENT
- EXISTING 20' PUBLIC WATER AND UTILITY EASEMENT
- EXISTING FOREST CONSERVATION EASEMENT
- EX. MDE STEEP SLOPES (20%+)
- PROPOSED LIGHTS
- PROPOSED STREET SIGN
- SOIL BORING

AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT LOGGING OF THE UNDERGROUND SWM FACILITY.

J.E. NAME: **1693** P.E.# **11-8-23** DATE  
**ROBERT H. VOGEL** PROFESSIONAL ENGINEER  
 STATE OF MARYLAND PROFESSIONAL ENGINEER NO. 16193

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

**SITE DEVELOPMENT PLAN**  
**ESD DRAINAGE AREA MAP**  
**ELLICOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 WATERLOO ROAD  
 TAX MAP 31 BLOCK 19 BA-06-0059, SDP-07-038, F-08-084, BA-08-042V ZONED: POR  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-08-085 HOWARD COUNTY, MARYLAND PARCEL 428

**VOGEL ENGINEERING**  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 P: 410.461.7666 F: 410.461.8961 www.timmons.com

DESIGN BY: RHV  
 DRAWN BY: MP/KG/DZE/AB  
 CHECKED BY: RHV  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 08-27-2022

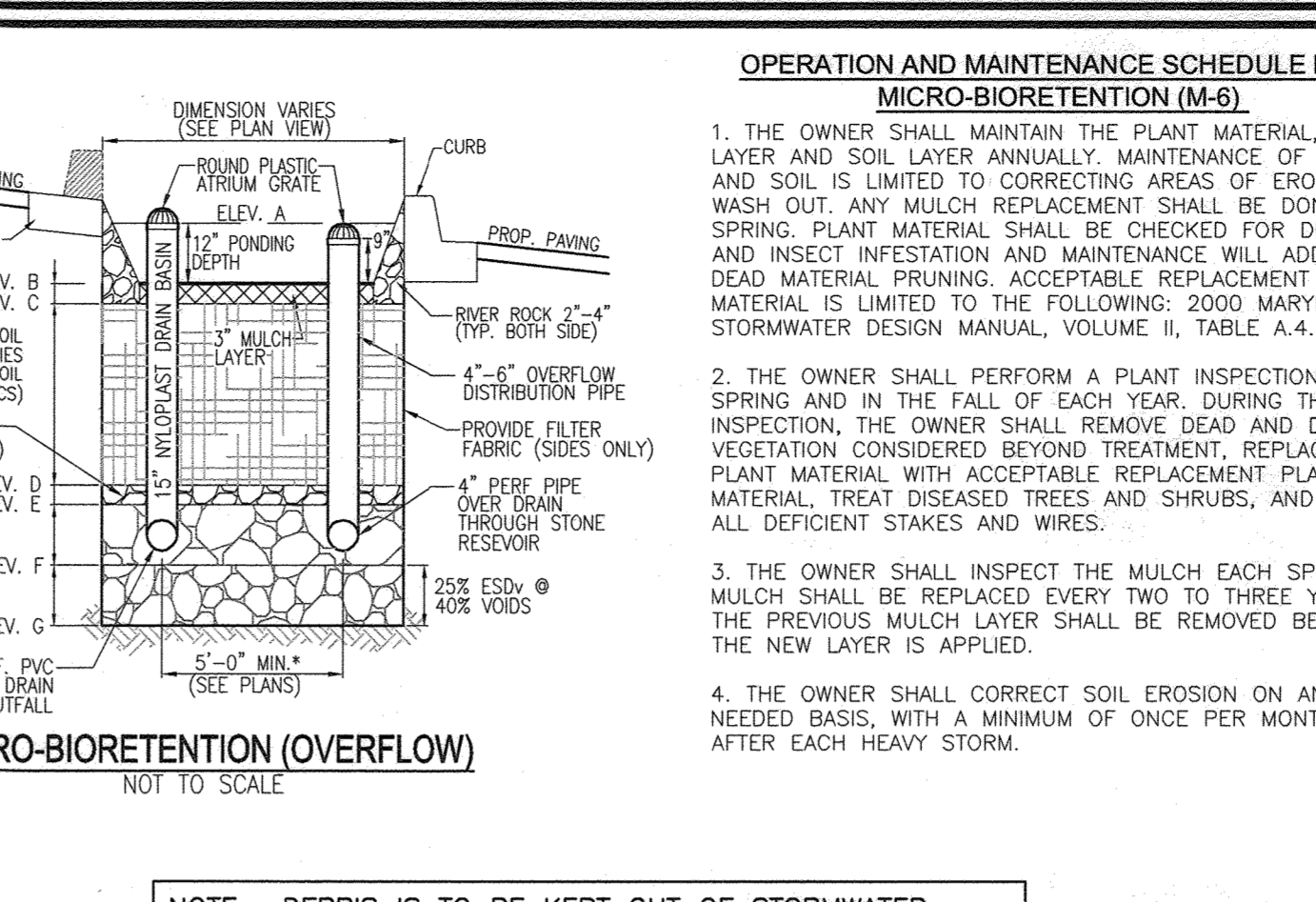
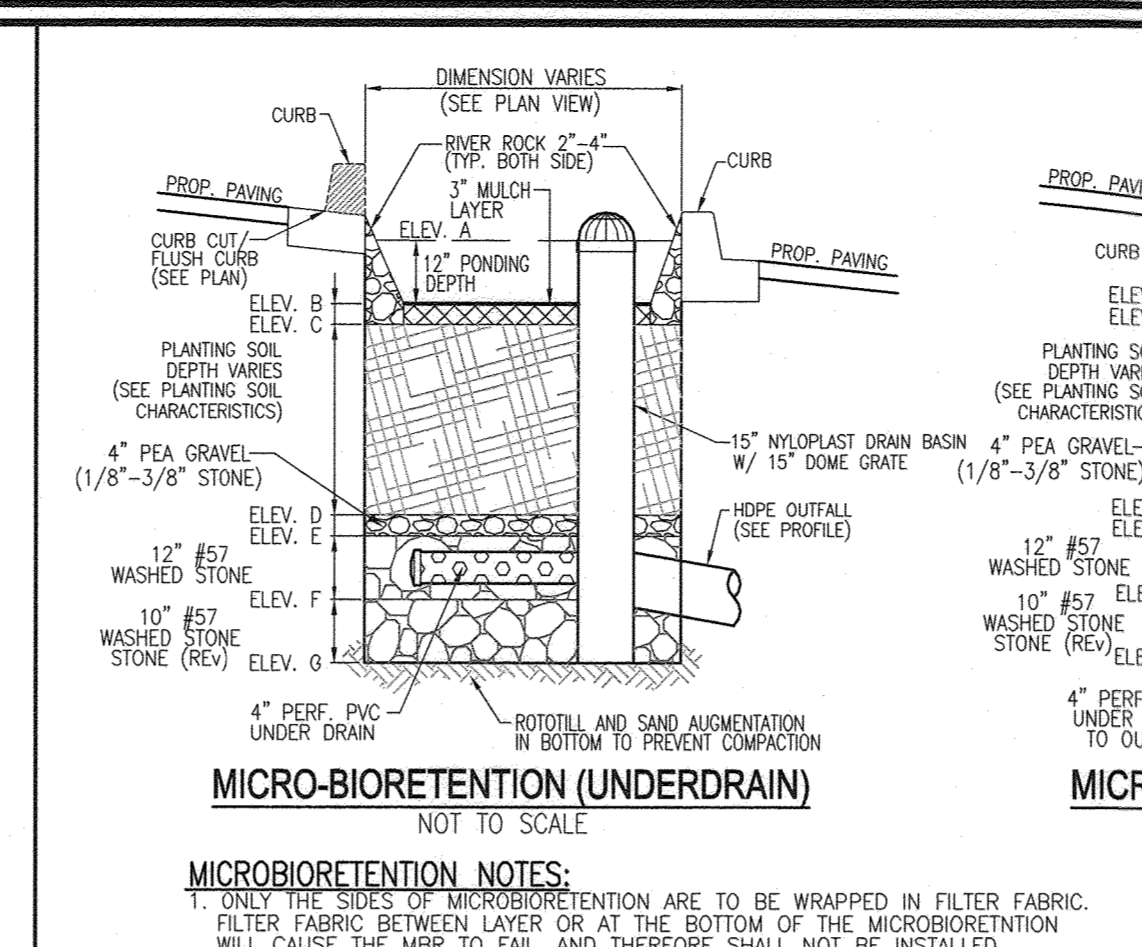
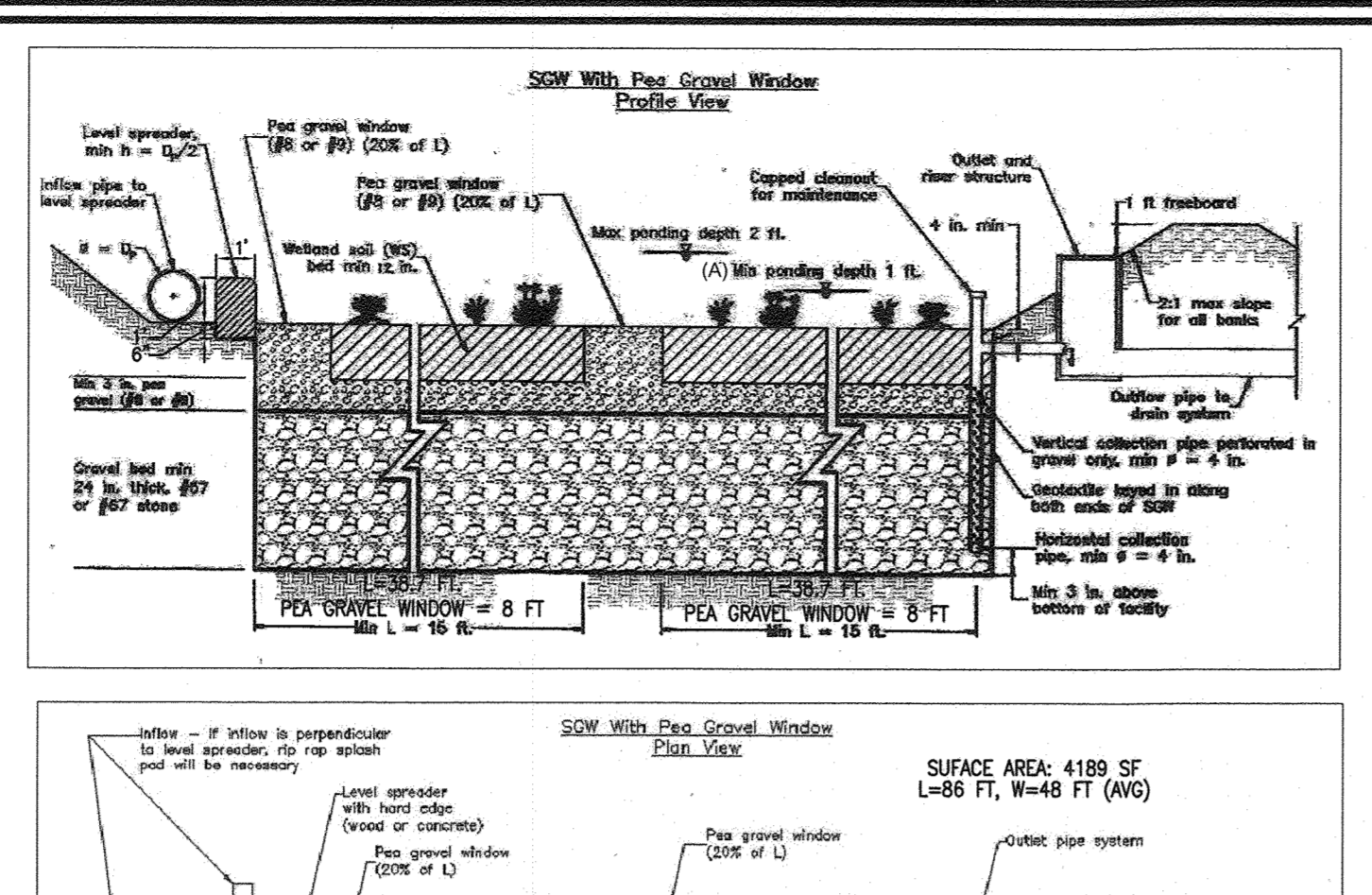
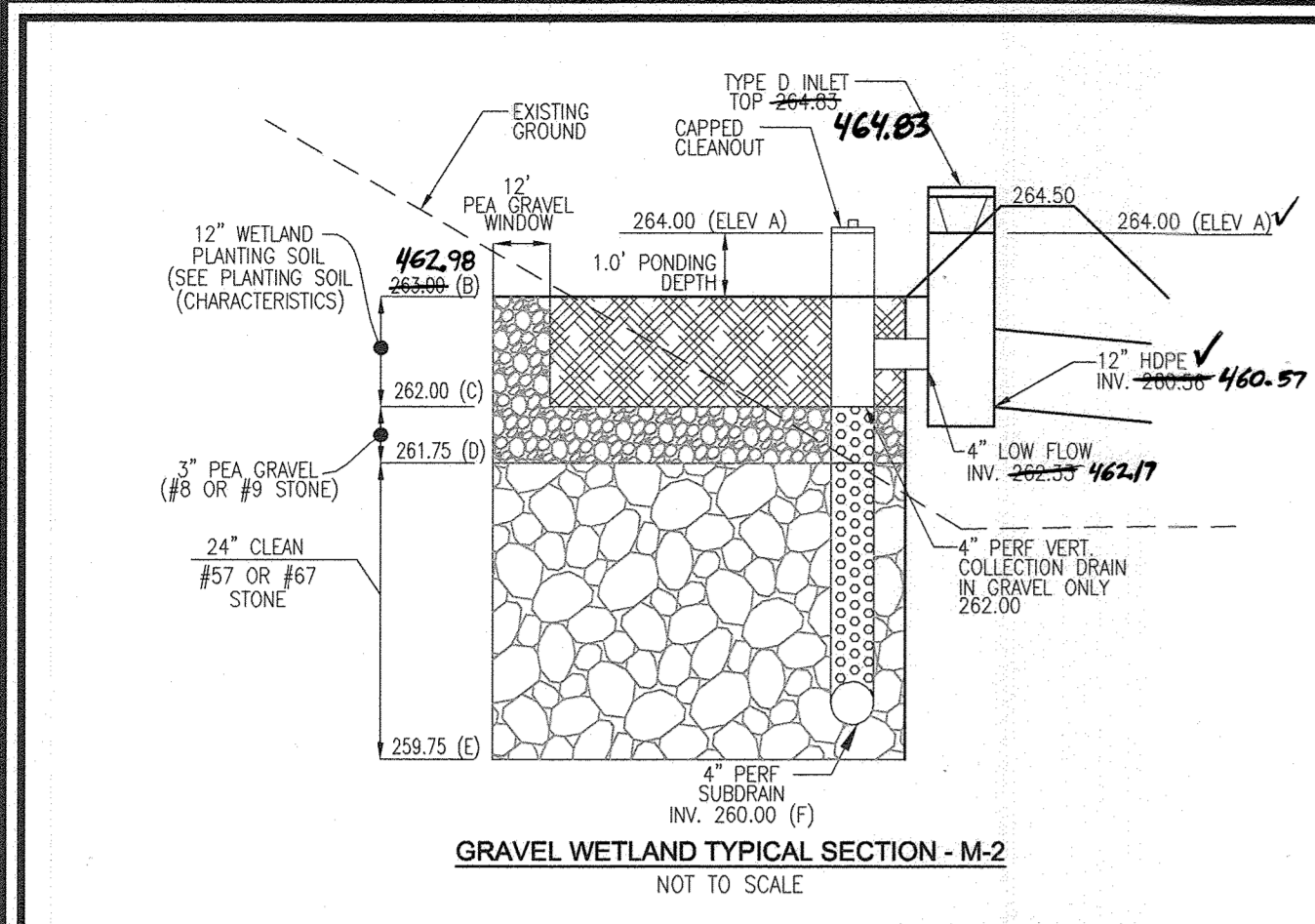
9 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DIRECTOR

STORMWATER MANAGEMENT FACILITY TO BE PRIVATELY OWNED AND MAINTAINED

SEE SHEETS 11 AND 12 FOR Q10 AND Q100 STORMWATER MANAGEMENT DRAINAGE AREA MAP, NOTES, DETAILS AND RUNOFF SUMMARY TABLE





**OPERATION AND MAINTENANCE SCHEDULE FOR MICRO-BIORETENTION (M-6)**

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 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 INSPECTION IN THE SPRING AND IN THE FALL OF 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.

**APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS**

**1. MATERIAL SPECIFICATIONS**

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

**2. FILTERING MEDIA OR PLANTING SOIL**

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 2 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 HINDERANCE 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 COMPOST. 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 (50%), 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 IN TO 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 STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURAL 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 LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR MASH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE 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 CHISEL, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO RESTRUCTURE THE SOIL PROFILE THROUGHOUT THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL TO 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIMAL SAND LAYER. FROM ANY POINDED WATER BEFORE PREPARING (ROTOTILL) 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\"/>

**SUBMERGED GRAVEL WETLAND DATA CHART**

MBR Facility	Facility Type	Ponding Elevation (ELEV. A)	Ponding Depth (ft)	Top of Wetland Soil (ELEV. B)	Bottom of Wetland Soil (ELEV. C)	Pea Gravel (ELEV. D)	Depth of Stone (ft)	Bottom of Stone (ELEV. E)	Invert of Subdrain (ELEV. F)	Invert of Low Flow (ELEV. H)
SWM #2	SWG (M-2)	464.00	1.00	462.00	462.00	461.75	2.00	459.75	460.00	462.33

**WETLAND SOIL SPECIFICATIONS**

THE SURFACE INFILTRATION RATES OF THE GRAVEL WETLAND SOIL SHOULD BE SIMILAR TO A LOW HYDRAULIC CONDUCTIVITY WETLAND SOIL (0.1-0.01 FT/DAY = 3.5 X 10<sup>-5</sup> CM/SEC TO 3.5 X 10<sup>-6</sup> CM/SEC). THIS SOIL CAN BE MANUFACTURED USING COMPOST, SAND, AND SOME FINE SOILS TO BLEND TO A HIGH % ORGANIC MATTER CONTENT SOIL (>15% ORGANIC MATTER). AVOID USING CLAY CONTENTS IN EXCESS OF 15% BECAUSE OF POTENTIAL MIGRATION OF FINES INTO SUBSURFACE GRAVEL LAYER. DO NOT USE GEOTEXTILES BETWEEN THE HORIZONTAL LAYERS OF THIS SYSTEM AS THEY WILL CLOG DUE TO FINES AND MAY RESTRICT ROOT GROWTH.

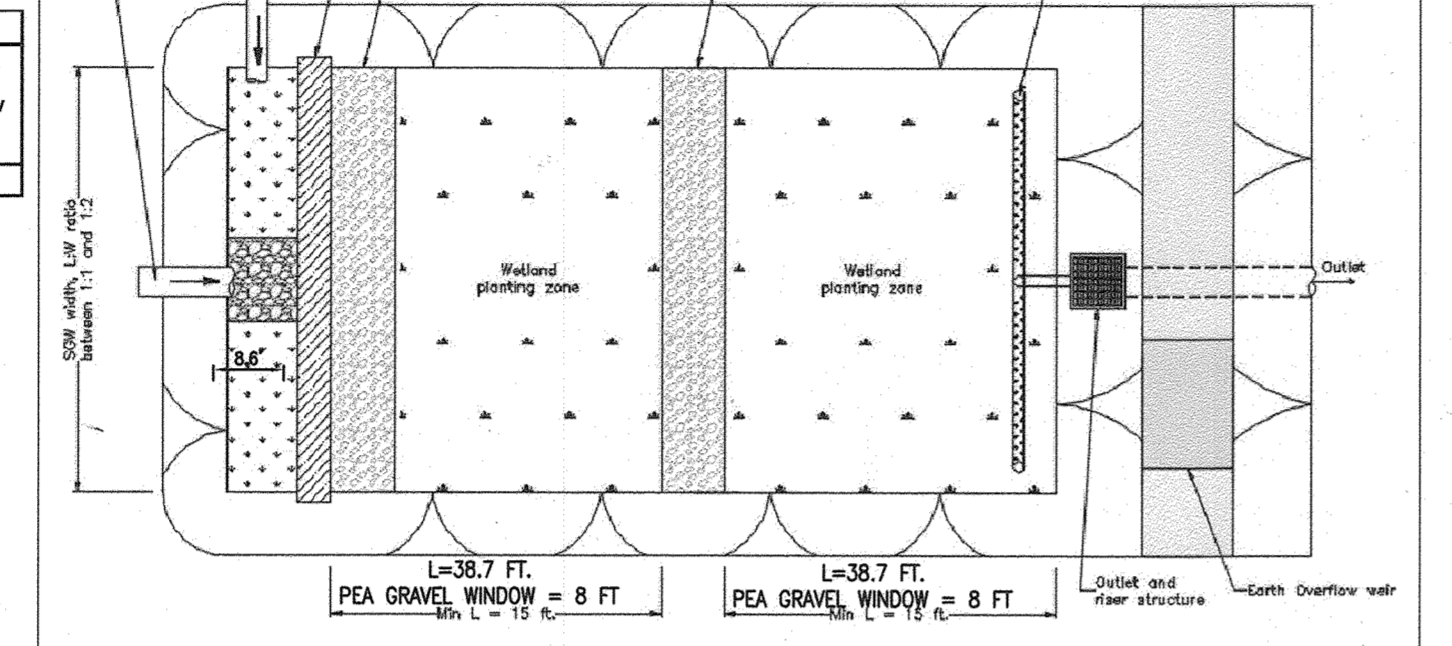
**IMPERVIOUS LINER:**

IF NATIVE A LOW HYDRAULIC CONDUCTIVITY NATIVE SOIL IS NOT PRESENT BELOW THE GRAVEL LAYER, A LOW PERMEABILITY LINER OR SOIL SHOULD BE USED TO:

- MINIMIZE INFILTRATION
- PREVENT HORIZONTAL FLOW IN THE GRAVEL
- MAINTAIN THE WETLAND PLANTS.

IF GEOTECHNICAL TESTS CONFIRM THE NEED FOR A LINER, ACCEPTABLE OPTIONS INCLUDE:

- (A) 6 TO 12 INCHES (15 - 30 CM) OF CLAY SOIL (MINIMUM 15% PASSING THE #200 SIEVE AND A MINIMUM PERMEABILITY OF 1 X 10<sup>-5</sup> CM/SEC).
- (B) A 30 MIL HOPE LINER.
- (C) BENTONITE.
- (D) USE OF CHEMICAL ADDITIVES (SEE NRCS AGRICULTURAL HANDBOOK NO. 386, DATED 1961, OR ENGINEERING FIELD MANUAL).
- (E) A DESIGN PREPARED BY A PROFESSIONAL ENGINEER.



**MICRO-BIORETENTION DATA CHART**

MBR Facility	Facility Type	Ponding Elevation (ELEV. A)	Ponding Depth (ft)	Top of Mulch (ELEV. B)	Bottom of Mulch (ELEV. C)	Depth of Plant Mix (ft)	Bottom of Plant Mix (ELEV. D)	Bottom of Pea Gravel or Sand (ELEV. E)	Depth of Stone (ft)	Invert of 4\"/>
SWM #1	MBR (M-6)	504.66	1.00	503.66	503.61	2.00	501.61	501.28	1.00	500.68

**Appendix B.4. Construction Specifications for Environmental Site Design Practices**

**Table B.4.1 Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration-**

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2\"/>			

**Appendix A. Landscaping Guidance for Stormwater BMPs..... Specific Landscaping Criteria**

**Table A.4 Commonly Used Species for Bioretention Areas**

Trees	Shrubs	Herbaceous Species
<i>Acer rubrum</i>	<i>Arctostaphylos</i>	<i>Andropogon virginicus</i>
<i>Red Maple</i>	<i>Bottlebrush Buckeye</i>	<i>Bromus ciliaris</i>
<i>Rhale nigra</i>	<i>Capillaria occidentalis</i>	<i>Diarrhena perennis</i>
<i>River Birch</i>	<i>Hamamelis virginiana</i>	<i>Joe Pye Weed</i>
<i>Juniperus virginiana</i>	<i>Hemlock</i>	<i>Scirpus pungens</i>
<i>Eastern Red Cedar</i>	<i>Witch Hazel</i>	<i>Three Square Balm</i>
<i>Chionodoxa virginiana</i>	<i>Vaccinium corymbosum</i>	<i>Iris versicolor</i>
<i>Fraxino-tree</i>	<i>Highbush Blueberry</i>	<i>Blue Flag</i>
<i>Nyssa sylvatica</i>	<i>Ilex glabra</i>	<i>Lobelia cardinalis</i>
<i>Black Gum</i>	<i>Hamamelis virginiana</i>	<i>Cardinal Flower</i>
<i>Diagnos virginiana</i>	<i>Ilex verticillata</i>	<i>Panicum virgatum</i>
<i>Persea</i>	<i>Winterberry</i>	<i>Switgrass</i>
<i>Platanus occidentalis</i>	<i>Viburnum dentatum</i>	<i>Dichanthium scoparium</i>
<i>Quercus palustris</i>	<i>Aronia</i>	<i>Broom Panic Grass</i>
<i>White Oak</i>	<i>Lindera benzoin</i>	<i>Andropogon laevis</i>
<i>Black willow</i>	<i>Spiraea</i>	<i>Tall Cocksfoot</i>
	<i>Myrica pennsylvanica</i>	<i>Scirpus cespitosus</i>
	<i>Bayberry</i>	<i>Woolgrass</i>
	<i>Yucca rostrata</i>	<i>Yucca rostrata</i>

Note 1: For more options on plant selections for bioretention, consult Bioretention Manual (ET&R, 1999) or the Design of Stormwater Filtering Systems (Clayton and Schuler, 1997).

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SUBMERGED GRAVEL WETLANDS (M-2)**

- During the first year of operation, the Owner shall inspect the facility after every heavy storm and replace vegetation as needed.
- The Owner shall remove sediment accumulated in the pretreatment areas as necessary.
- Signs of uneven flow within the wetland may mean that the gravel or underdrain is clogged. The gravel or underdrain shall be removed, cleaned, and replaced, as needed.
- The Owner shall ensure a dense stand of wetland vegetation is maintained throughout the life of the facility and replace vegetation as needed.
- The Owner shall ensure the inlets and outlets to each gravel wetland cell are free from debris.
- The Owner shall repair erosion at inflow points and ensure flow splitters are functional to prevent storm water from bypassing the facility.

**SUBMERGED GRAVEL WETLAND GENERAL NOTES:**

1. SUBDRAIN PIPE PERFORATE HORIZONTAL SECTIONS OF PIPE ONLY. SEE DETAIL FOR REQUIRED PERFORATED SECTION IN VERTICAL PIPE.
2. RISER SOLID PIPES SHALL BE CAPPED AT ELEV 263.00.
3. REFER TO SHEET 19 TABLE B.4.1. FOR PIPE SPECIFICATIONS.
4. WETLAND SOIL: THE SURFACE INFILTRATION RATES OF THE GRAVEL WETLAND SOIL SHOULD BE SIMILAR TO A LOW HYDRAULIC CONDUCTIVITY WETLAND SOIL (0.1-0.01 FT/DAY = 3.5 X 10<sup>-5</sup> CM/SEC TO 3.5 X 10<sup>-6</sup> CM/SEC). THIS SOIL CAN BE MANUFACTURED USING COMPOST, SAND, AND SOME FINE SOILS TO BLEND TO A HIGH % ORGANIC MATTER CONTENT SOIL (>15% ORGANIC MATTER). AVOID USING CLAY CONTENTS IN EXCESS OF 15% BECAUSE OF POTENTIAL MIGRATION OF FINES INTO SUBSURFACE GRAVEL LAYER. DO NOT USE GEOTEXTILES BETWEEN THE HORIZONTAL LAYERS OF THIS SYSTEM AS THEY WILL CLOG DUE TO FINES AND MAY RESTRICT ROOT GROWTH. WETLAND MULCH CAN BE SUBSTITUTED FOR WETLAND SOIL.
5. PLANTINGS MAY BE SUBSTITUTED WITH NATIVE WETLAND PLANT STOCK OBTAINED FROM A LOCAL AQUATIC PLANT NURSERY.

**MICRO-BIORETENTION PLANTING REQUIREMENTS**

MBR #	AREA	STEMS REQUIRED (0.0229)	STEMS PROVIDED
1	91	3	3
TOTALS	91	3	3

BIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT)

**MICRO-BIORETENTION (M-6) PLANTING SCHEDULE**

**PERENNIALS/GROUNDCOVER PLANTING SCHEDULE**

LEGEND	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
3	MERTENSIA VIRGINICA VIRGINIA BLUEBELLS	4\"/>	

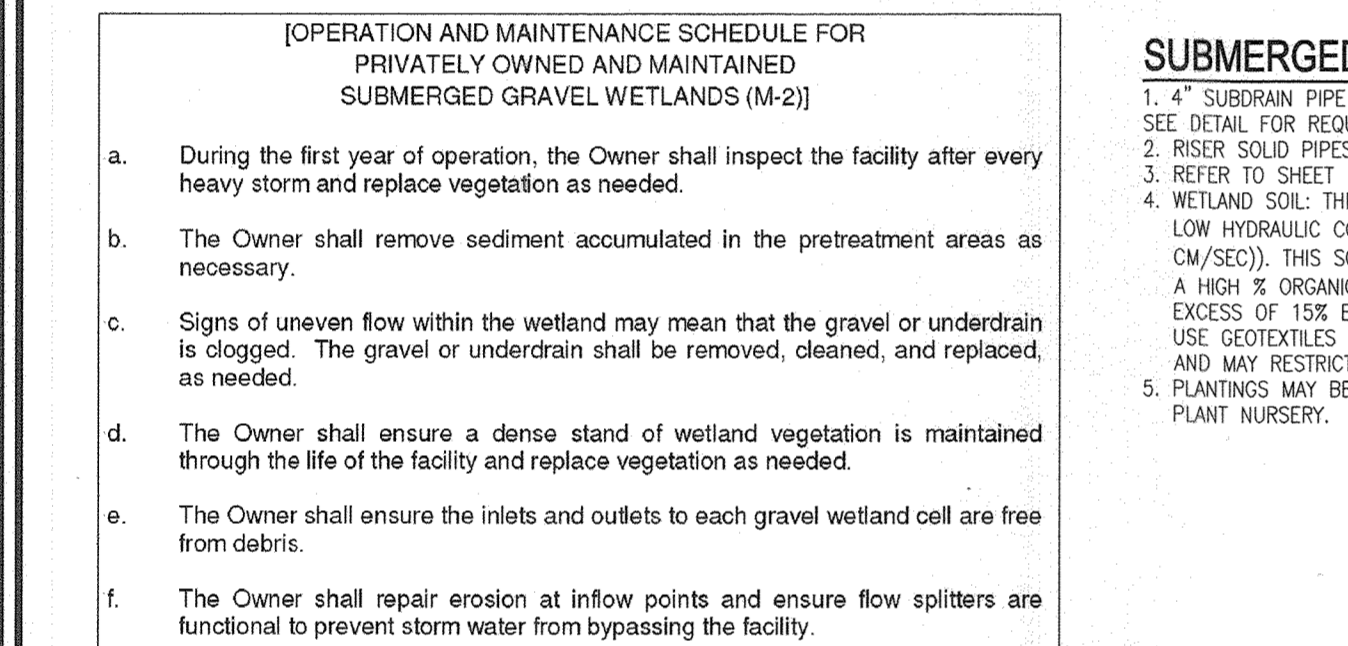
**SHRUBS/ORNAMENTAL GRASSES**

LEGEND	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
1	ILEX GLABRA 'COMPACTA' COMPACT INKBERRY	2.5'-3\"/>	

**AS-BUILT CERTIFICATION FOR PSWM**

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

DATE: 11-8-23



**GRAVEL WETLAND PLANTING REQUIREMENTS**

MBR #	AREA	STEMS REQUIRED (0.0229)	STEMS PROVIDED
GW	4189	96	96
TOTALS	4189	96	96

GRAVEL WETLAND AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT).

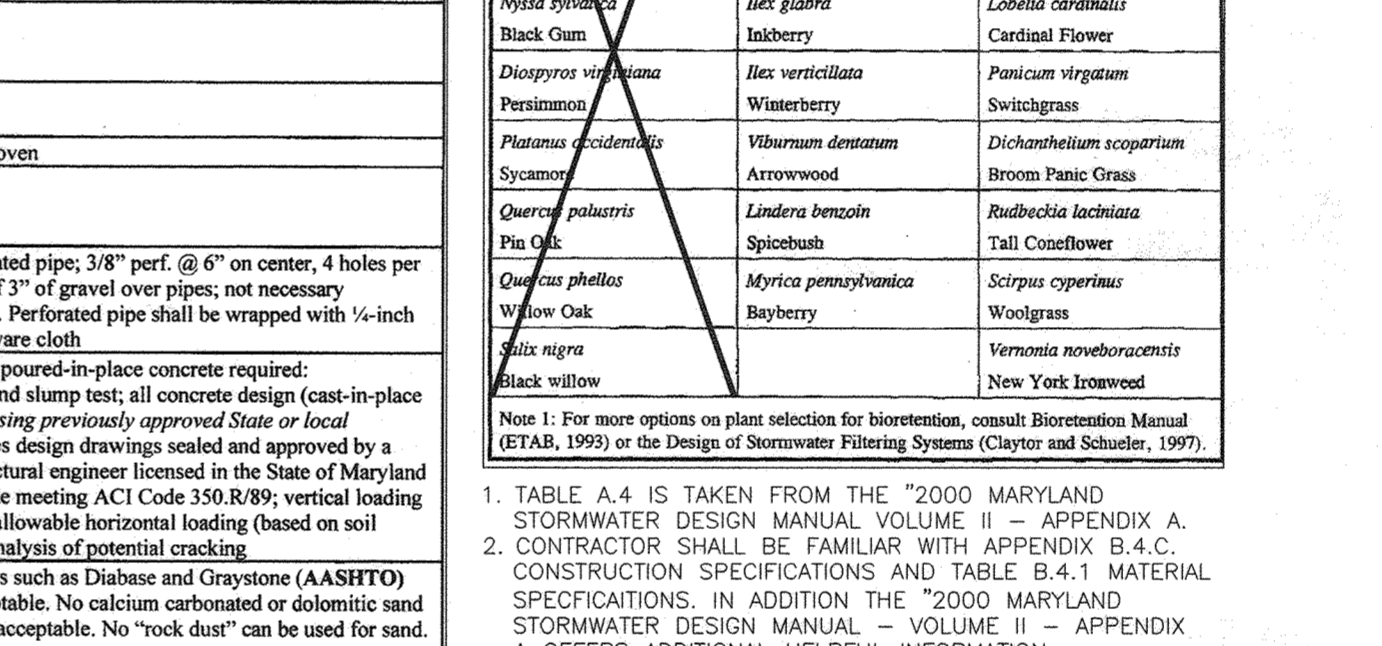
**MICRO-BIORETENTION (M-6) PLANTING SCHEDULE**

**PERENNIALS/GROUNDCOVER PLANTING SCHEDULE**

LEGEND	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
3	MERTENSIA VIRGINICA VIRGINIA BLUEBELLS	4\"/>	

**SHRUBS/ORNAMENTAL GRASSES**

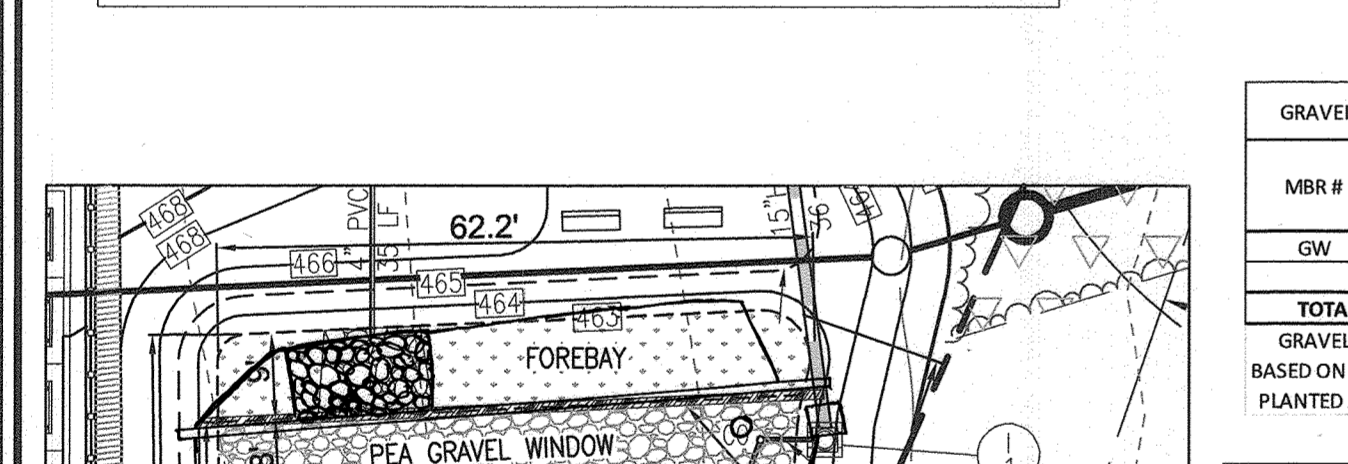
LEGEND	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
1	ILEX GLABRA 'COMPACTA' COMPACT INKBERRY	2.5'-3\"/>	



**AS-BUILT CERTIFICATION FOR PSWM**

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DATE: 11-8-23



**SUBMERGED GRAVEL WETLAND (M-2) PLANTING SCHEDULE**

**PLANTING SCHEDULE (SHRUB/ORNAMENTAL GRASSES)**

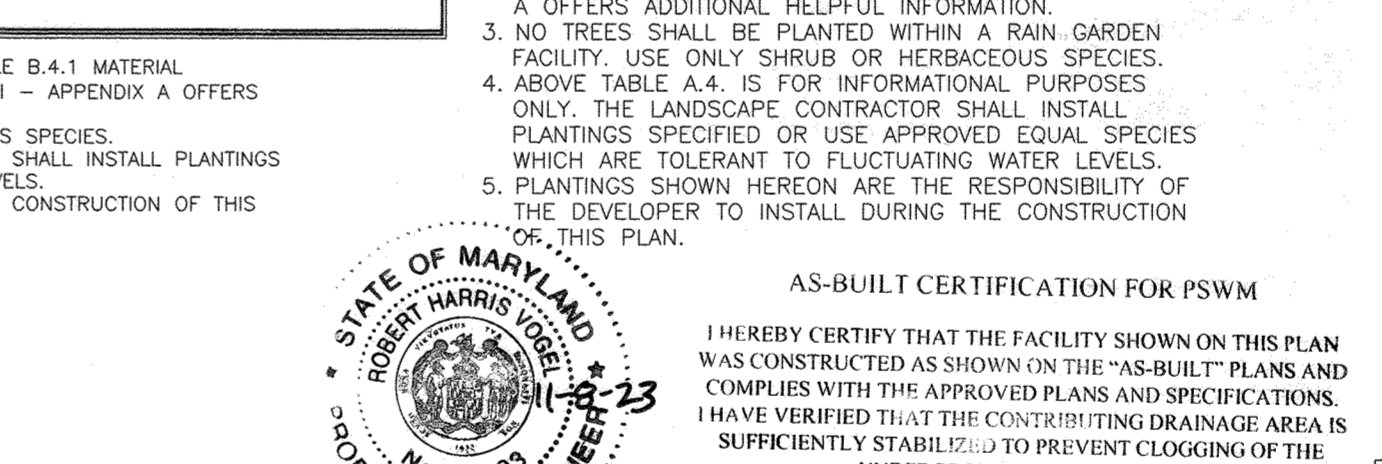
LEGEND	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
ST	24	SPIRAEA TOMENTOSA STEEPELUSH	3'-5\"/>	

**PERENNIALS/GROUNDCOVER PLANTING SCHEDULE**

LEGEND	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
146	146	MERTENSIA VIRGINICA VIRGINIA BLUEBELLS	4\"/>	

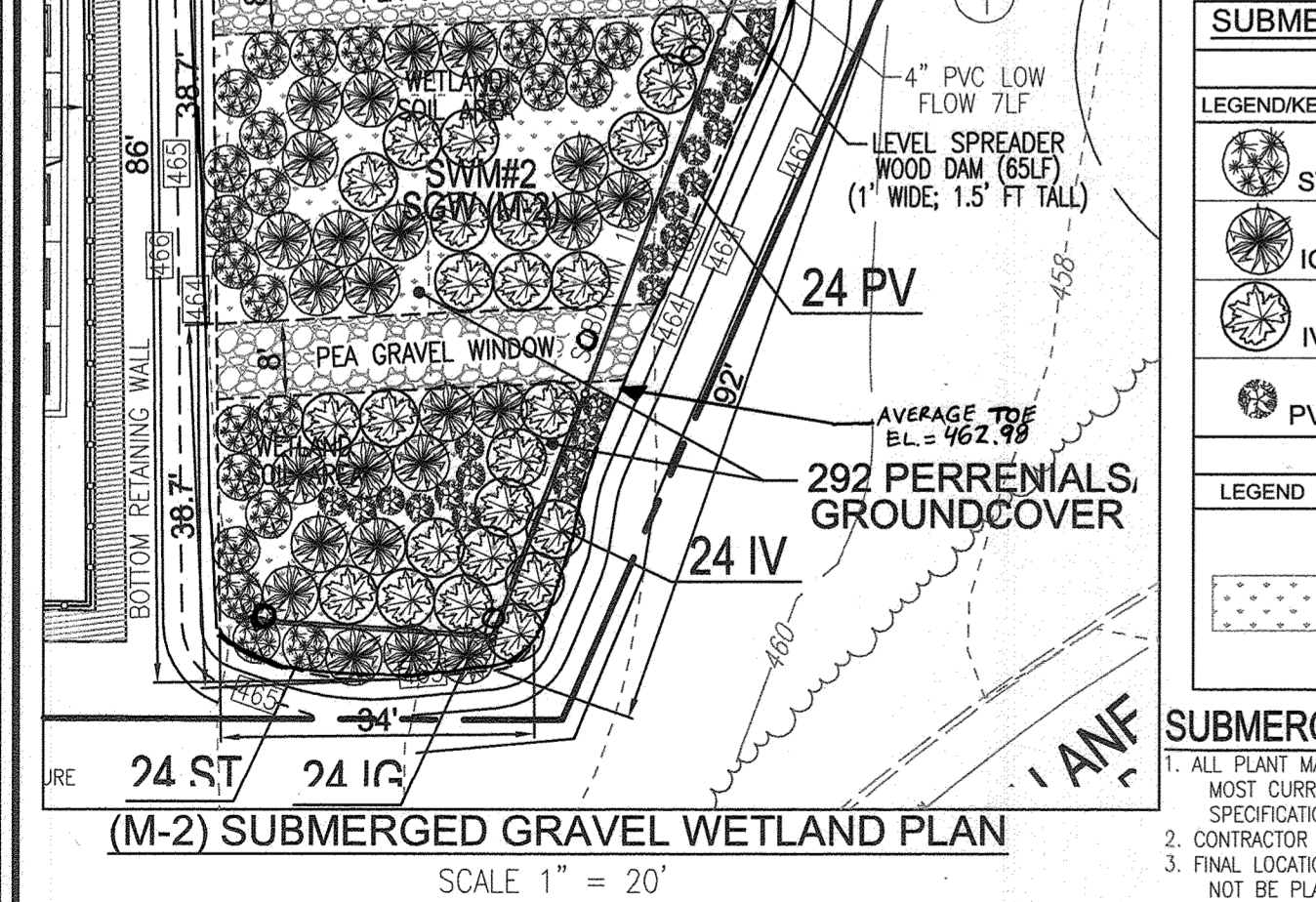
**MICRO-BIORETENTION PLANTING SCHEDULE NOTES**

1. ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HOWARD COUNTY PLANTING SPECIFICATIONS.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
3. FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
4. CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.
5. MICROBIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT). ABOVE PLANTING RATIOS ARE TO BE APPLIED TO THE AREAS PROVIDED IN THE ESDV SUMMARY.
6. FILTER AREA SHALL BE 50% COVERED BY PLANTINGS AT FULL GROWTH.



**HOWARD COUNTY HOUSING COMMISSION**

9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725



**ESD STORMWATER MANAGEMENT NOTES AND DETAILS**

**ELLICOTT GARDENS II**

HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
ZONED: POR  
PARCEL 428

**VOGEL ENGINEERING**

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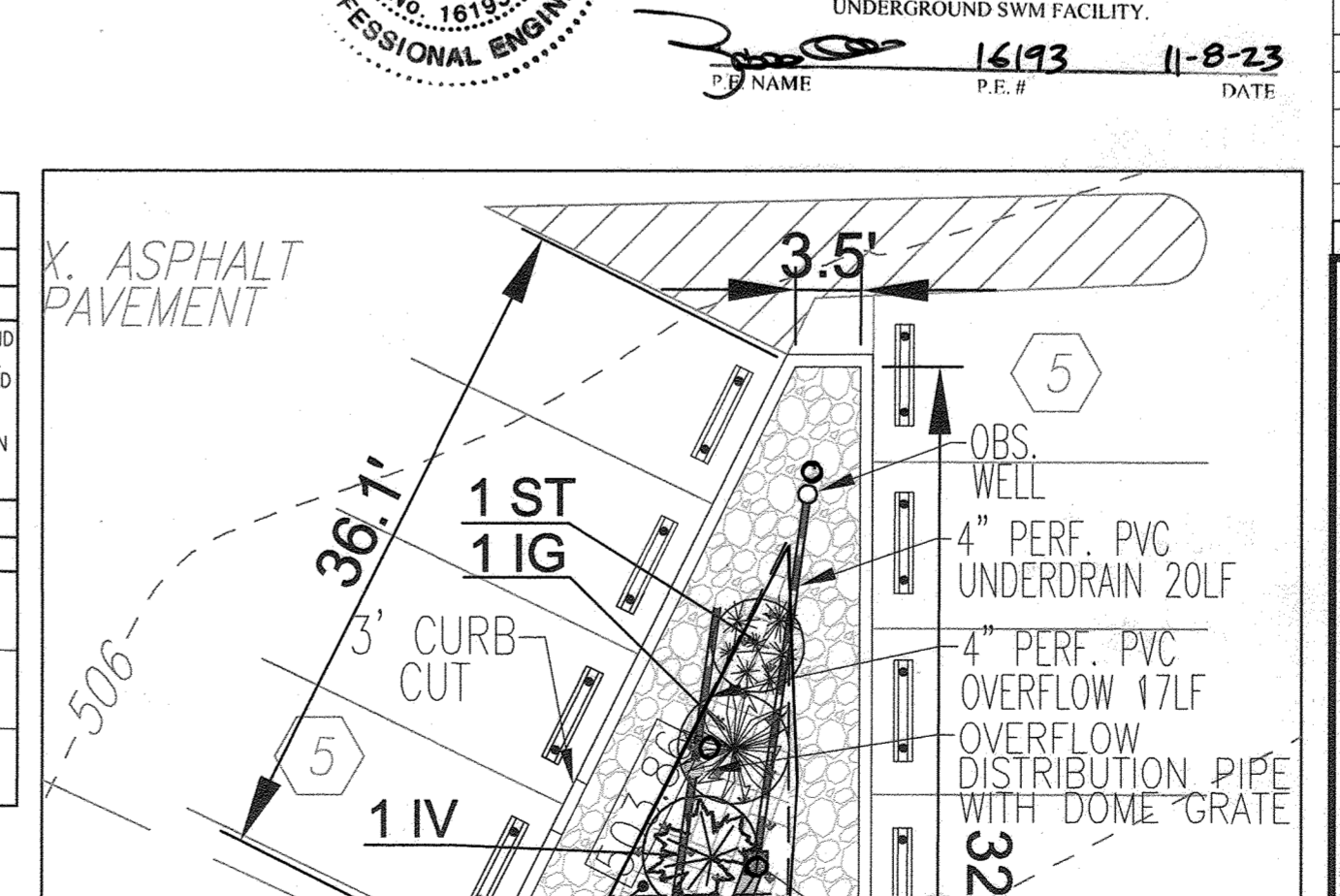
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**VOGEL ENGINEERING**

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**HOWARD COUNTY HOUSING COMMISSION**

9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DATE: 10-22-21

DATE: 11/9/21

DATE: 12-2-21

DESIGN BY: RHY

DRAWN BY: MP/K/DZE/AB

CHECKED BY: RHY

DATE: AUGUST 2021

SCALE: AS SHOWN

W.O. NO.: 06-017

10 SHEET OF 28

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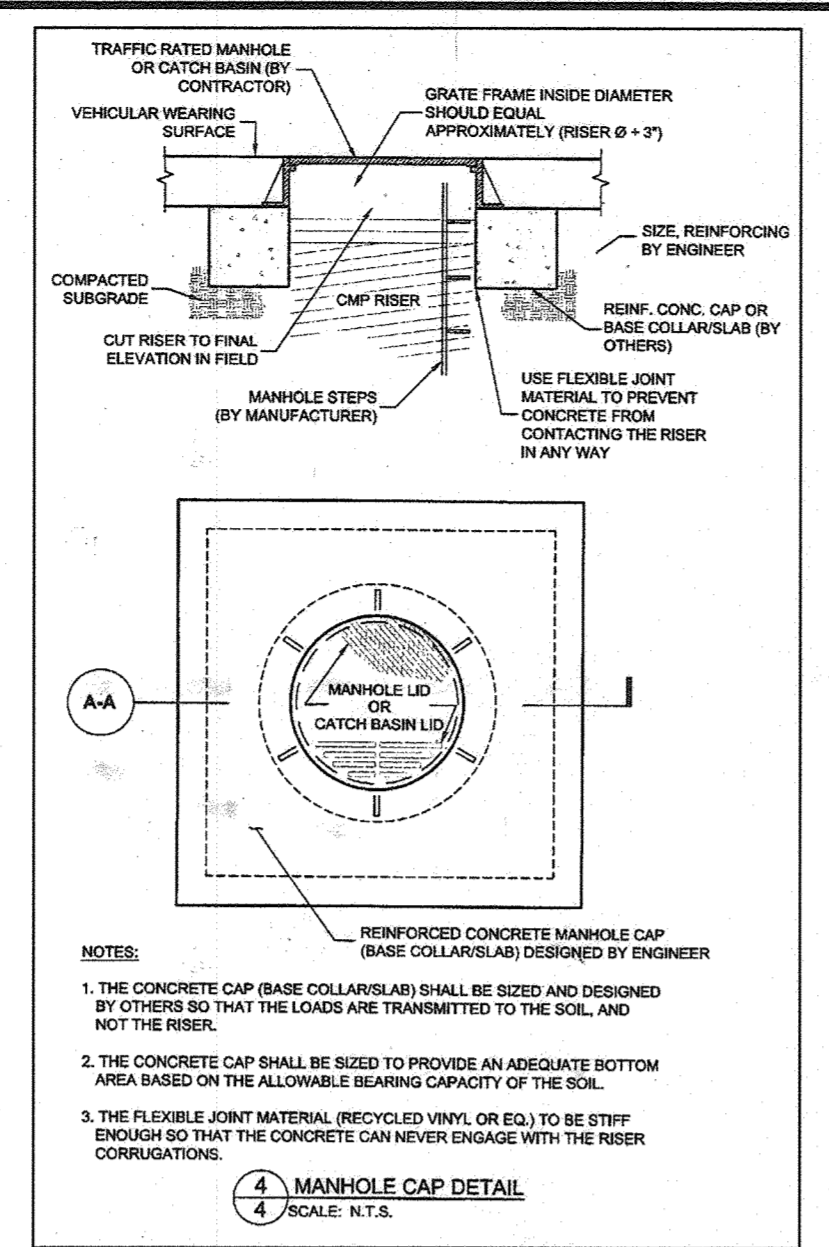
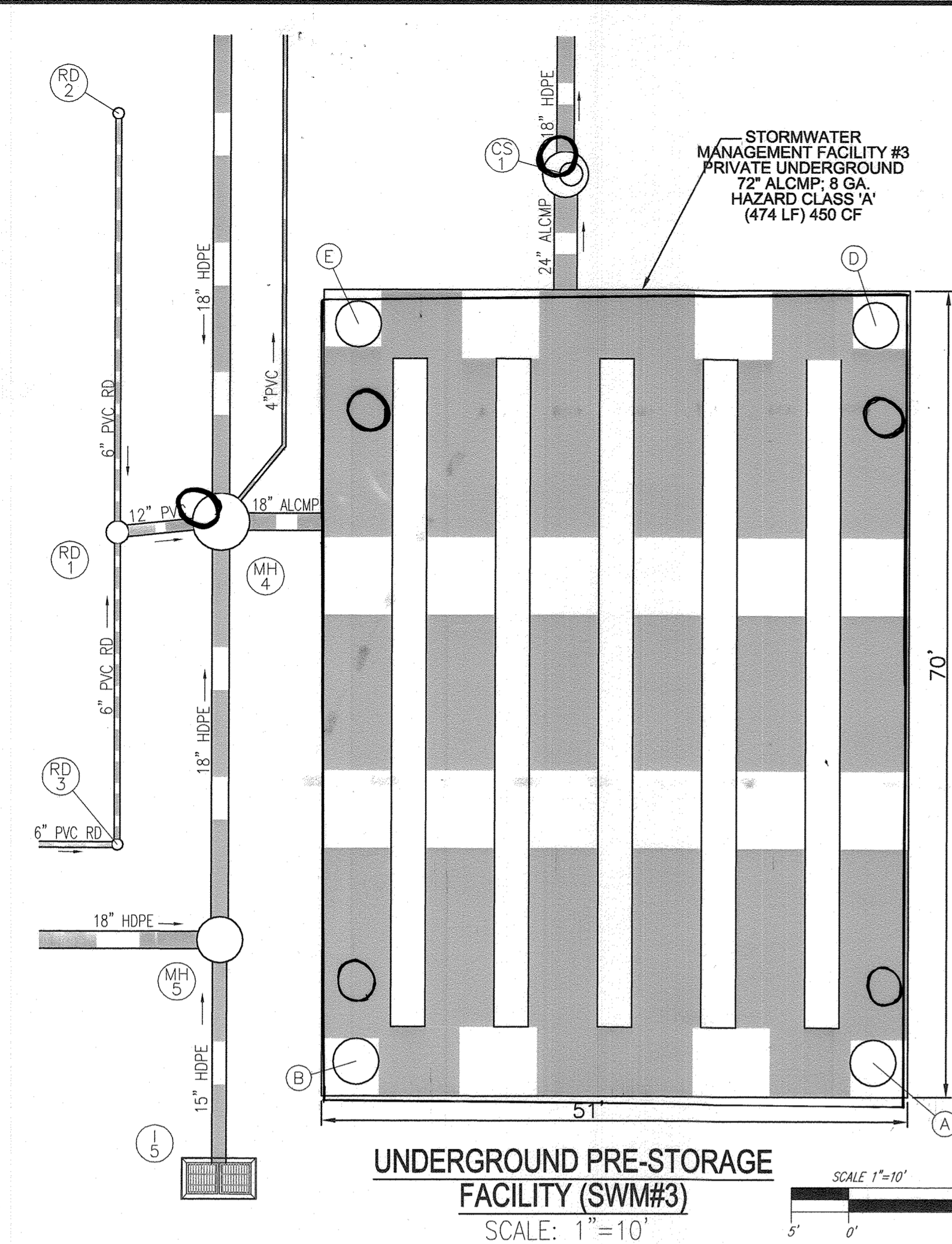
W.O. NO.: 06-017

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**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED UNDERGROUND FACILITIES**

A. THE UNDERGROUND STORMWATER MANAGEMENT FACILITY IS PRIVATELY OWNED AND IT SHALL BE THE RESPONSIBILITY OF THE OWNER TO PERIODICALLY INSPECT AND CLEAN THE FACILITY TO MAINTAIN ITS OPERATION AND FUNCTION.

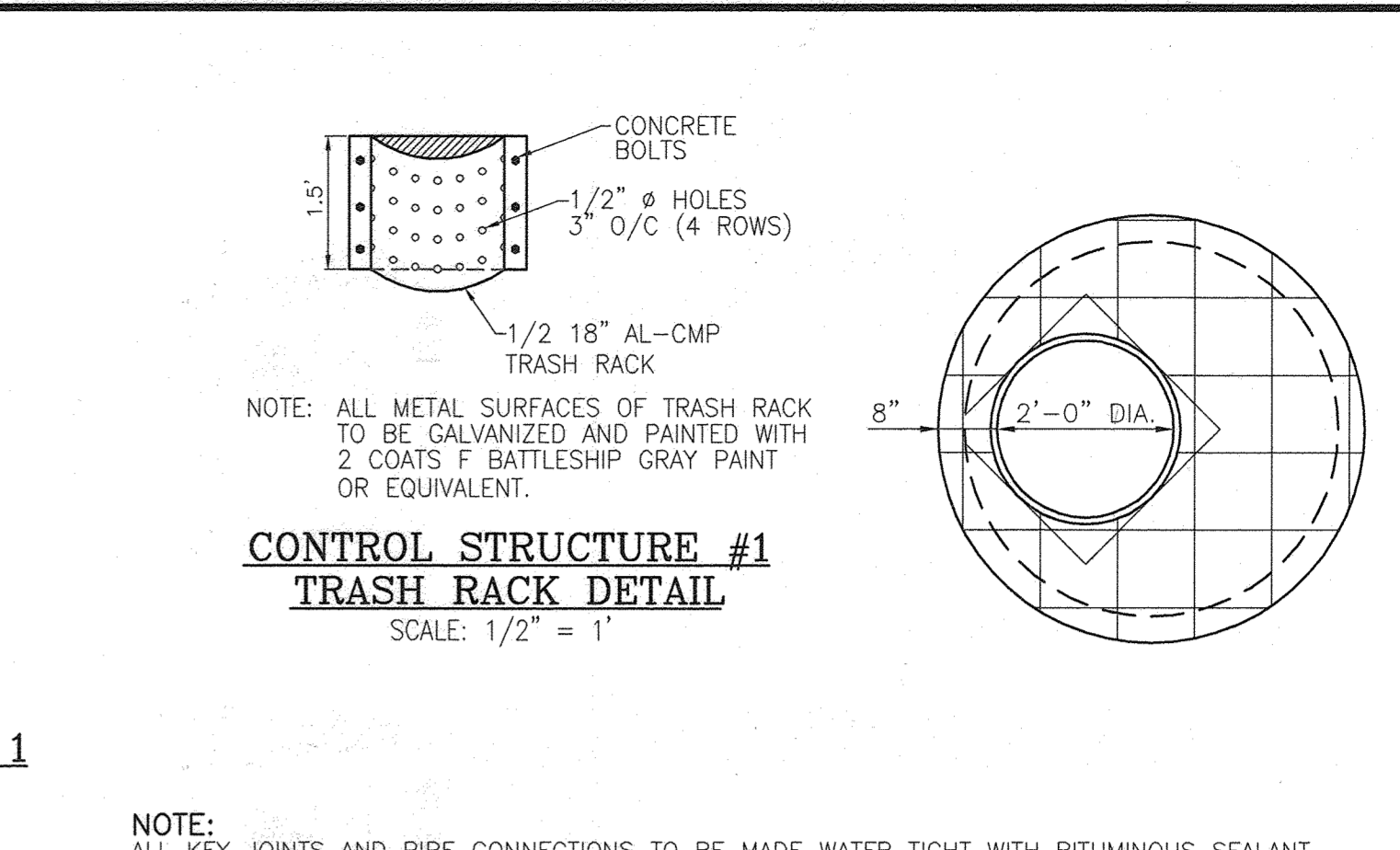
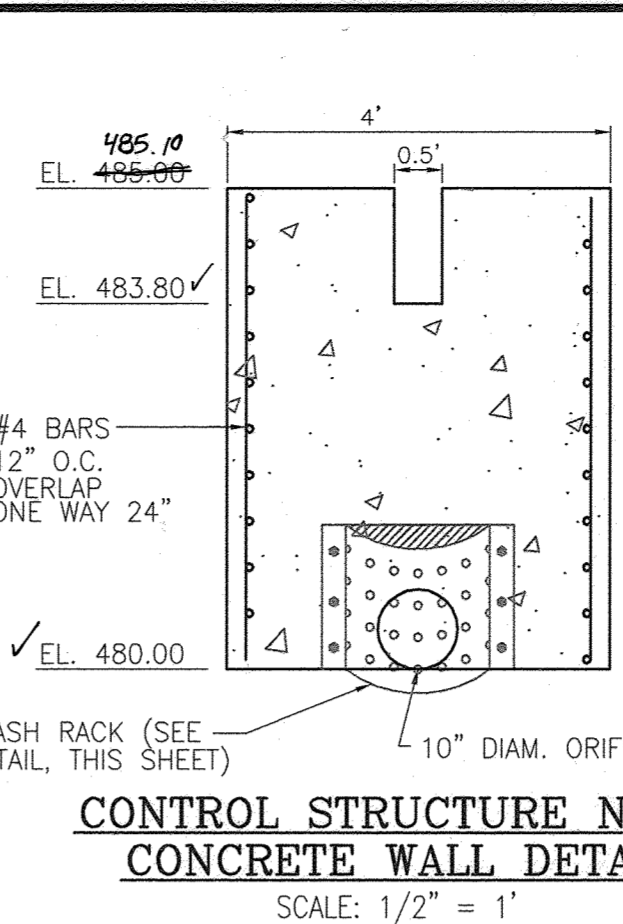
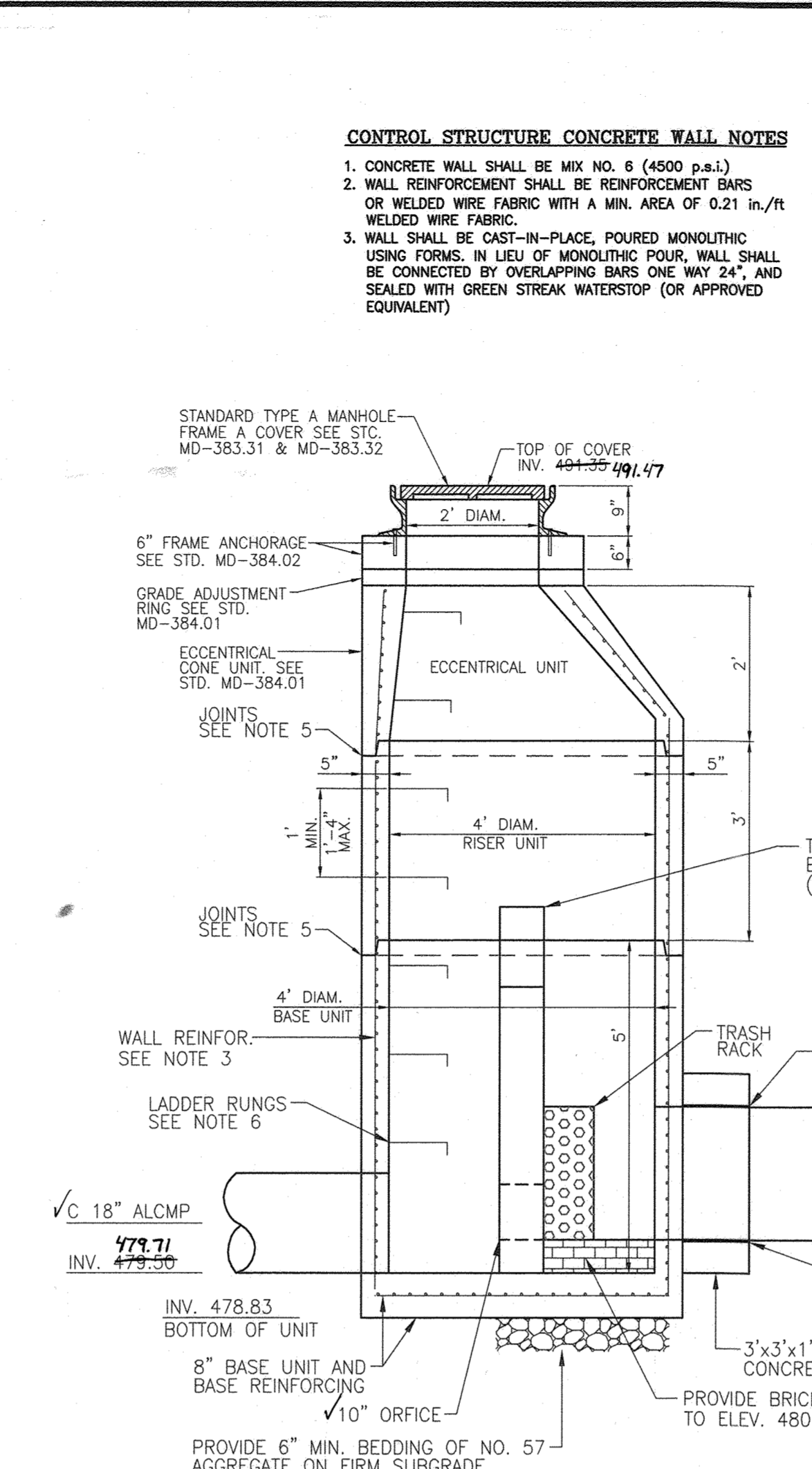
B. THE UNDERGROUND STORMWATER MANAGEMENT FACILITY SHALL BE INSPECTED YEARLY AT A MINIMUM AND AFTER ESPECIALLY SEVERE STORM EVENTS.

C. WHEN SEDIMENT ACCUMULATION OF MORE THAN 2" IS OBSERVED OR ANY DEBRIS THAT MIGHT OBSTRUCT THE OUTFALL IS OBSERVED, THE FACILITY SHALL BE CLEANED.

D. THE FACILITY SHALL BE CLEANED IMMEDIATELY AFTER PETROLEUM SPILLS. THE OWNER SHALL CONTACT THE APPROPRIATE REGULATORY AGENCIES NOTIFYING THEM OF THE SPILL AND CLEANUP OPERATION.

E. THE SEDIMENT AND DEBRIS SHALL BE REMOVED FROM THE UNDERGROUND STORMWATER MANAGEMENT FACILITY BY VACUUM TRUCK OR OTHER MANUAL MEANS. THE OWNER SHALL FOLLOW PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIAL AND LIQUID.

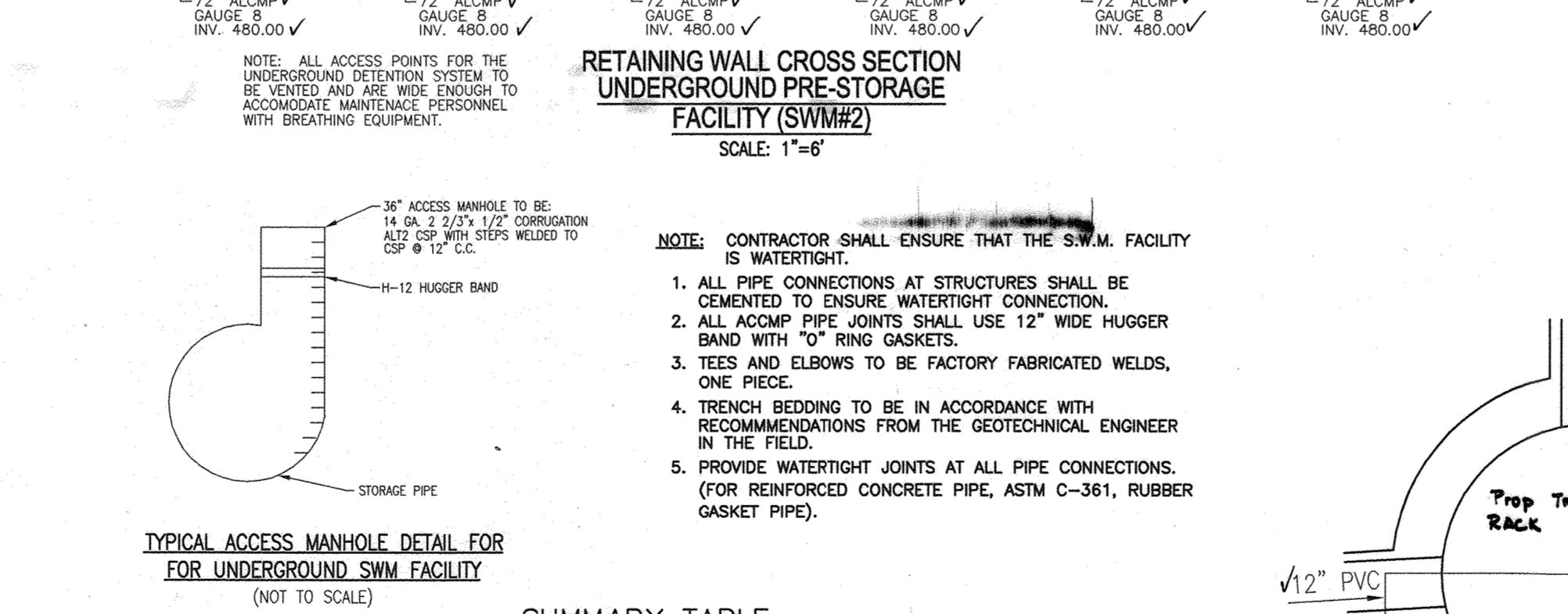
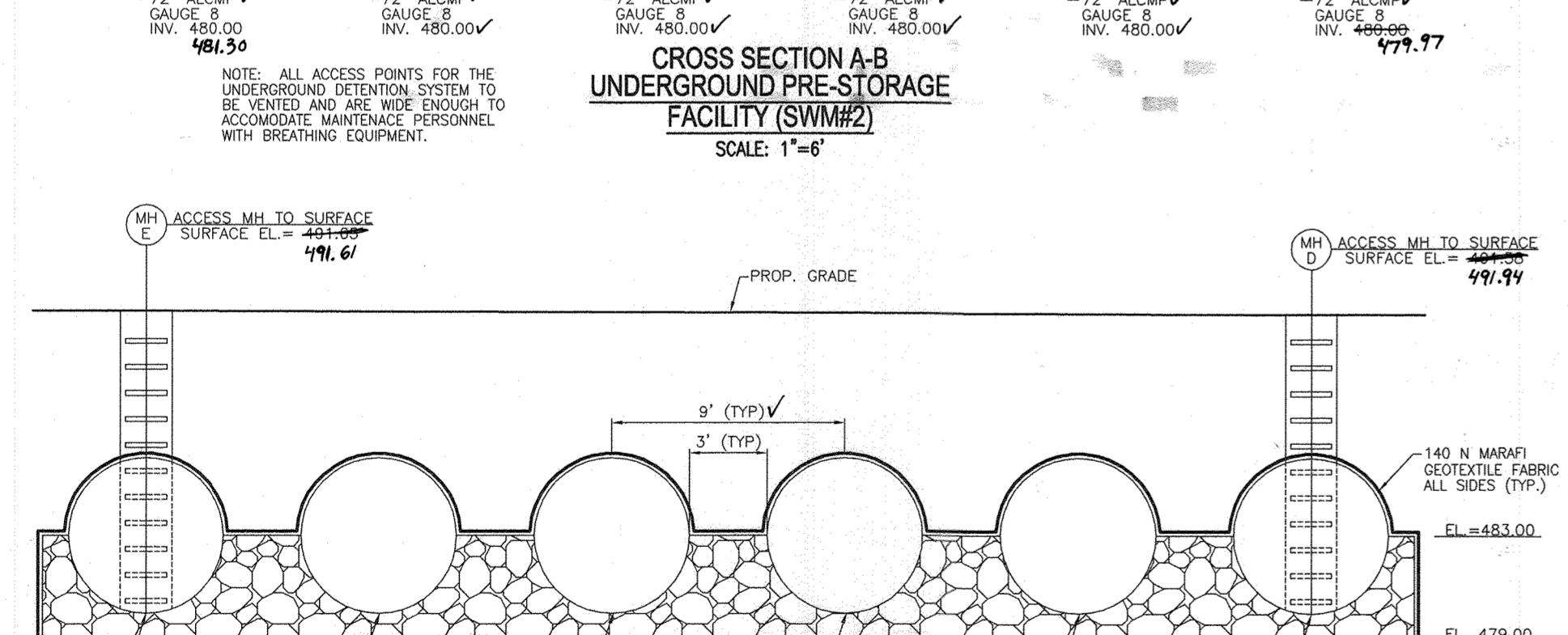
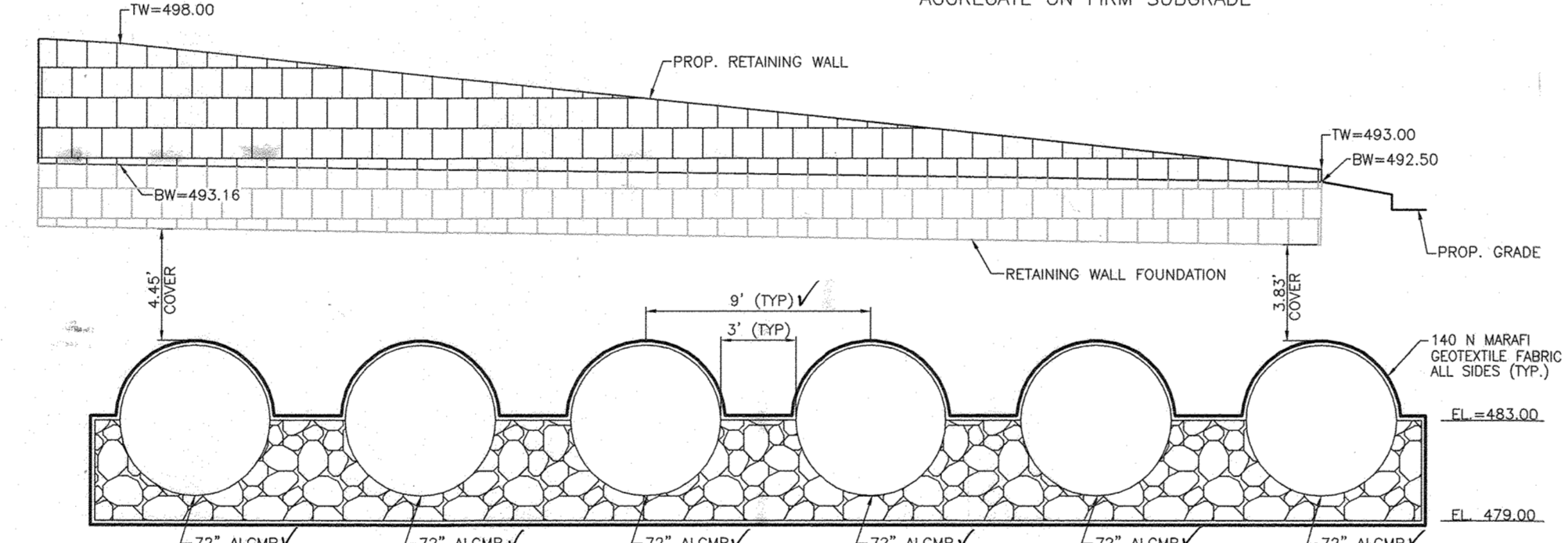
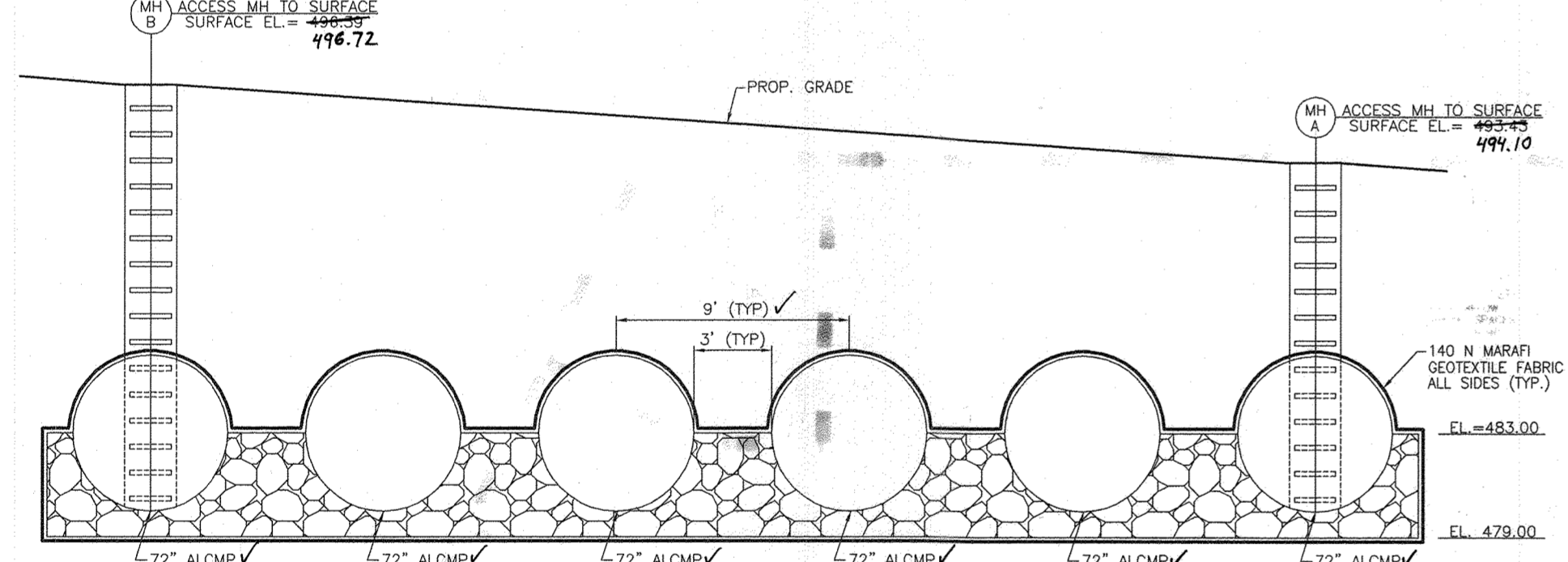
F. THE INLET AND OUTLET PIPES SHALL BE CHECKED FOR ANY OBSTRUCTIONS AT LEAST ONCE EVERY SIX (6) MONTHS. IF OBSTRUCTIONS ARE FOUND, THE OWNER SHALL HAVE THEM REMOVED AND PROPERLY DISPOSED OF.



**CONTROL STRUCTURE NO. 1 CONCRETE WALL DETAIL**  
SCALE: 1/2" = 1'

**CONTROL STRUCTURE NOTES:**

- MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.
- CONCRETE SHALL BE MIX NO. 6 (4500 P.S.I.)
- WALL REINFORCEMENT FOR BASE UNITS, RISER UNITS AND ECCENTRIC CONE UNITS SHALL BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MIN. AREA OF 0.12 IN<sup>2</sup>/FT AND MAX. SPACING OF 12" FOR THE 48" DIAM. MANHOLES. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 AND A 52. REINFORCEMENT SHALL MEET ASTM A 615, GRADE 60.
- BASE REINFORCEMENT TO BE REINFORCEMENT BARS OR WELDED WIRE FABRIC WITH A MIN. AREA OF 0.20 IN<sup>2</sup>/FT AND A MAX. SPACING OF 10" WITH 2" COVER FROM THE TOP OF BASE. THE BASE SHALL BE CAST MONOLITHIC WITH THE BASE UNIT OR JOINTED PER MANUFACTURERS DESIGN.
- THE MANUFACTURER SHALL FORM MALE AND FEMALE ENDS OF JOINTS USING THEIR OWN DESIGN. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING (WHERE APPLICABLE) MORTAR, RUBBER O-RING GASKETS MEETING ASTM C 361 AND C 443 OR FLEXIBLE PLASTIC GASKETS MEETING ASTM M 198 TYPE B.
- LADDER RUNGS SHALL BE INSTALLED IN VERTICAL ALIGNMENT AT 1'-4" MAXIMUM C/C. RUNG TYPES SHALL BE IN ACCORDANCE WITH STANDARDS MD-383.91 OR MD-383.92. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
- WHEN THE DISTANCE BETWEEN MULTIPLE PIPE OPENINGS IN THE BASE UNIT OR ANY RISER UNIT IS LESS THAN 6" ADDITIONAL NO. 3 BARS ARE REQUIRED AROUND OPENINGS.
- LIFT HOLES OR LIFT EYES SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
- MIX NO. 2 CONCRETE OR BRICK CHANNEL SHALL BE PROVIDED IN THE FIELD AND SHALL SLOPE 2" PER FOOT TOWARD OUTLET OR AS DIRECTED BY THE ENGINEER.
- THE DROP STONE LANDING SHALL BE USED ONLY WHEN THERE ARE PIPES CONNECTED TO THE RISER UNITS. SEE STD. MD-384.13 FOR DETAILS.
- MIN. DEPTH PAYMENT PER EACH SHALL BE 9'-0" MEASURED FROM THE BOTTOM OF THE BASE UNIT TO THE TOP OF THE MANHOLE COVER VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 9'-0". THE COST OF THE DROP STONE LANDING, NO. 57 AGGREGATE GROUT, SEALANT, AND ALL NECESSARY APPURTENANCES SHALL BE INCIDENTAL TO THE PRICE BID.
- MANHOLE HAS BEEN DESIGNED FOR HS-25 LOADING. ACCORDING TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.



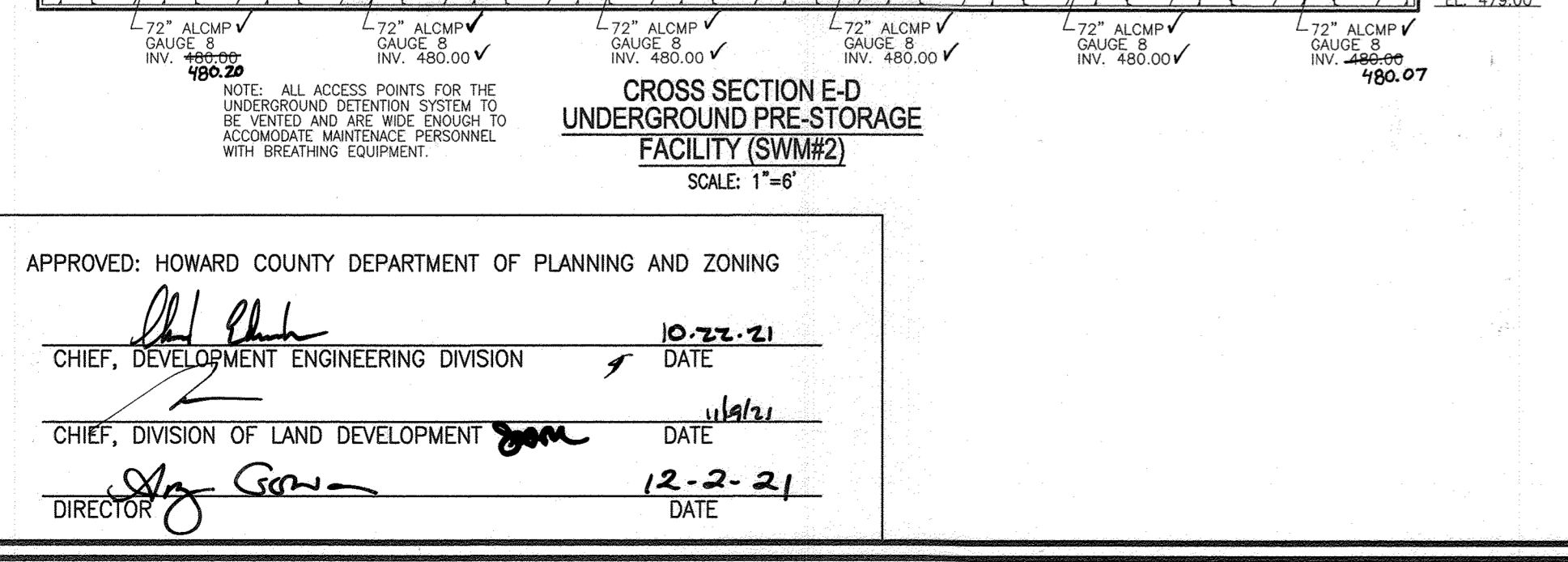
**CS-1 PRE-CAST SWM CONTROL STRUCTURE MD SHA STD. 384.01**  
SCALE: 1/2" = 1'



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

AS-BUILT CERTIFICATION FOR PSWM  
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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

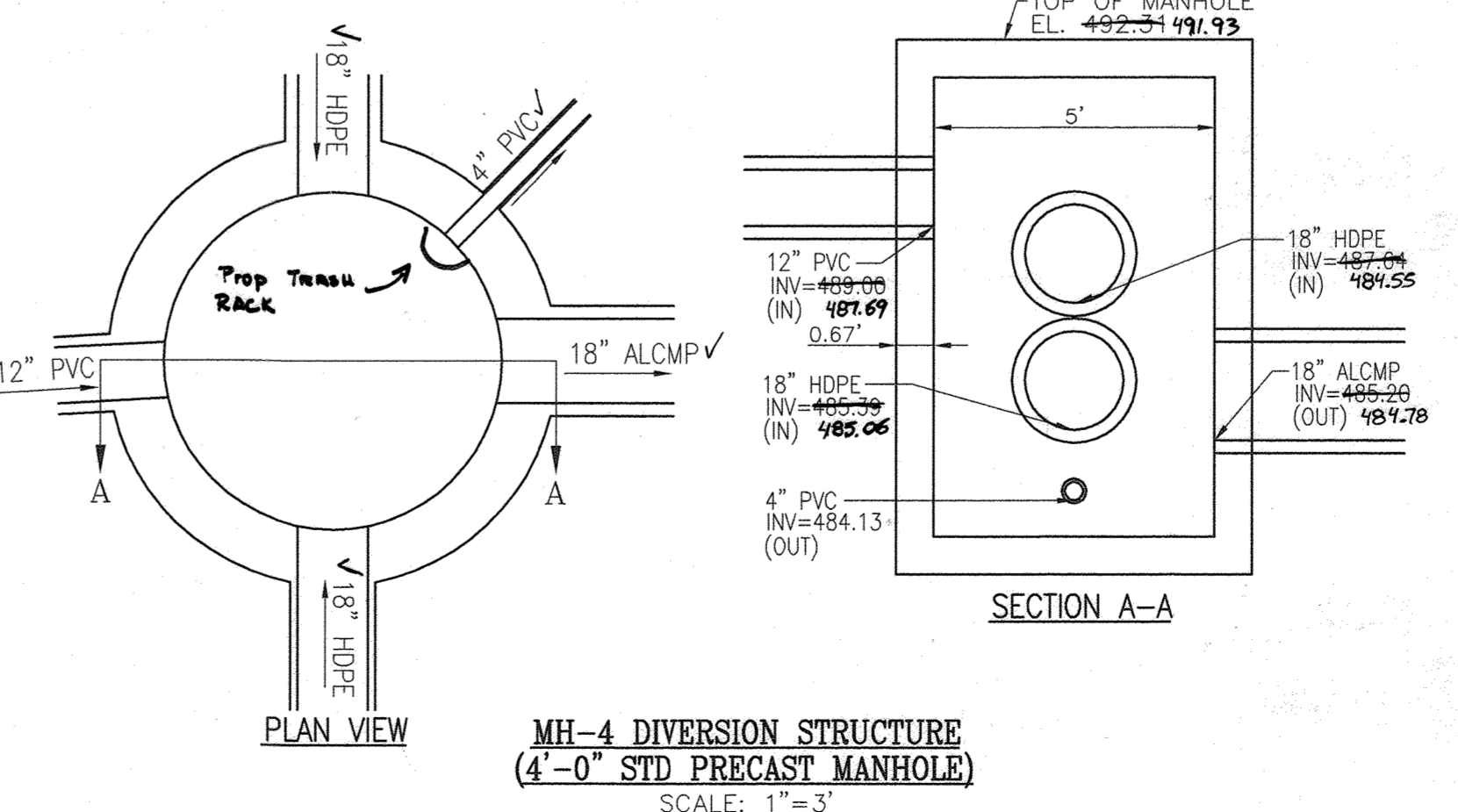
*Robert H. Vogel* 16193 11-8-23  
P.E. NAME P.E. # DATE



**SUMMARY TABLE**

SP#1	REQUIREMENT	VOLUME REQUIREMENT W/O CREDITS	CREDITS	VOLUME REQUIREMENT AFTER CREDITS	VOLUME PROVIDED	NOTES
1	WATER QUALITY VOLUME W/OV (1-INCH)	0.13 AC.FT.	N/A	N/A	0.13 AC.FT.	PROVIDED IN 1 MICRO-BIO AND 1 SUBMERGED GRAVEL WETLAND
2	RECHARGE VOLUME REV	0.10 AC.FT.	N/A	N/A	0.10 AC.FT.	PROVIDED IN 1 MICRO-BIO AND 1 SUBMERGED GRAVEL WETLAND
3	OVERHEAD FLOOD PROTECTION, Q10P	0.18 AC.FT., 7,841 CU.FT	N/A	N/A	0.18 AC.FT., 7,841 CU.FT	PROVIDED IN 474 LF OF 72", 12 GA AL-CMP UNDERGROUND STORAGE
4	EXTREME FLOOD VOLUME, Q100P	0.24 AC.FT., 10,455 CU.FT	N/A	N/A	0.24 AC.FT., 10,455 CU.FT	PROVIDED IN 474 LF OF 72", 12 GA AL-CMP UNDERGROUND STORAGE

SWM PROVIDED BY: WOV PROVIDED IN 1 MICRO-BIO AND 1 SUBMERGED GRAVEL WETLAND  
REV PROVIDED IN SUBMERGED GRAVEL WETLAND  
10-YR AND 100-YR VOLUME PROVIDED IN 72" AL-CMP UNDERGROUND STORAGE FACILITY.



**MH-4 DIVERSION STRUCTURE (4'-0" STD PRECAST MANHOLE)**  
SCALE: 1" = 3'

NOTE: DEBRIS IS TO BE KEPT OUT OF STORMWATER MANAGEMENT FACILITIES DURING AND AFTER CONSTRUCTION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*John J. ...* 10-22-21  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*John J. ...* 11/16/21  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*John J. ...* 12-2-21  
DIRECTOR DATE

**PROFESSIONAL ENGINEER**  
ROBERT H. VOGEL, PE No. 16193

**SITE DEVELOPMENT PLAN**  
10YR & 100YR STORMWATER MANAGEMENT NOTES AND DETAILS

**ELLICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V ZONED: POR  
1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND PARCEL 428

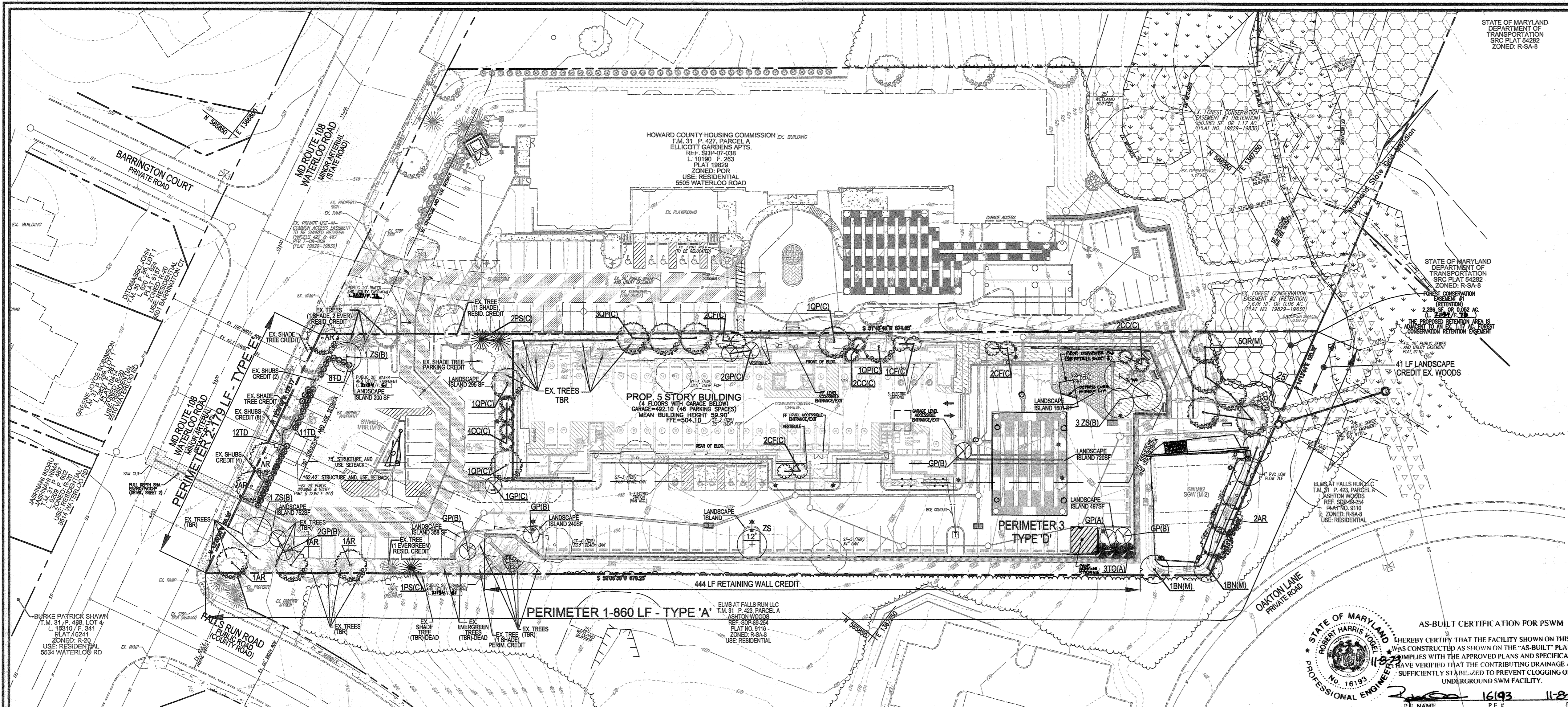
**VOGEL ENGINEERING**  
TIMMONS GROUP  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

DESIGN BY: RHV  
DRAWN BY: MP/KG/DZE/AB  
CHECKED BY: RHV  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

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. 16193 EXPIRATION DATE: 08-27-2022

12 SHEET OF 28





### LEGEND:

	EXISTING CONTOUR		GRASS PAVERS
	PROPOSED CONTOUR		EXISTING 20' PUBLIC SEWER AND UTILITY EASEMENT
	EX. CURB AND GUTTER		EXISTING PRIVATE USE-IN-COMMON EASEMENT
	EX. UTILITY POLE		EXISTING 20' PUBLIC WATER AND UTILITY EASEMENT
	EX. LIGHT POLE		EXISTING FOREST CONSERVATION EASEMENT
	EX. MAILBOX		20' PUBLIC WATER AND UTILITY EASEMENT
	EX. SANITARY MH		20' PUBLIC DRAINAGE AND UTILITY EASEMENT
	EX. SANITARY LINE		FOREST CONSERVATION EASEMENT
	EX. CLEANOUT		AMENITY RECREATION AREA
	EX. FIRE HYDRANT		
	EX. WATER LINE		
	EX. FENCE		
	EXISTING TREES		
	EXISTING TREELINE		
	EX. WETLAND BUFFER		
	EX. STREAM BUFFER		
	EXISTING STREAM		
	EX. STREAM BANK		
	EXISTING WETLANDS		
	SOILS BOUNDARY		
	PROPERTY LINE		
	RIGHT-OF-WAY LINE		
	SETBACKS		
	PROPOSED CURB AND GUTTER		
	PROPOSED SIDEWALK		
	PROPOSED SIDEWALK RAMP		
	PROPOSED TREELINE		
	PROPOSED STORM DRAIN		
	PROPOSED STORM DRAIN INLET		
	PROPOSED FIRE HYDRANT		
	PROPOSED WATER TEE & VALVE		
	PROPOSED WATER MAIN		
	PROPOSED SEWER MAIN		
	PROPOSED LIGHTS		
	PROPOSED STREET SIGN		
	ELECTRIC VEHICLE CHARGING STATION		

### GENERAL NOTES:

- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. THE REQUIRED PARKING AND PERIMETER LANDSCAPING WILL BE BONDED PER THIS SUBMISSION.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPERS AGREEMENT WITH THIS PLAN. IN THE AMOUNT OF \$26,280.00 FOR THE REQUIRED 59 SHADE TREES (\$300 PER TREE), 3 EVERGREEN TREES (\$150 PER TREE), AND 45 SHRUBS (\$30 PER SHRUB), 444 FT. OF RETAINING WALL (\$20 PER LF OF WALL).
- IN ACCORDANCE WITH SDP-10-021, THE PLANNING DIRECTOR HAS DETERMINED THAT THIS SITE AND ADJACENT TM PARCEL 427, ELLICOTT GARDENS (SDP-07-038), ARE PART OF THE SAME DEVELOPMENT FOR DEVELOPMENT AND ZONING SETBACK PURPOSES PER ZONING REGULATION SECTION 128A.10.

### LANDSCAPE SCHEDULE NOTE:

- AT THE TIME OF PLANT INSTALLATION, ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPE PLAN, SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENTS, BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELOCATIONS OF THE REQUIRED PLANTINGS MAY BE MADE WITHOUT PRIOR REVIEW AND APPROVAL FROM THE DEPARTMENT OF PLANNING AND ZONING. ANY DEVIATION FROM THE APPROVED LANDSCAPE PLAN MAY RESULT IN DENIAL OR DELAY IN THE RELEASE OF LANDSCAPE SURETY UNTIL SUCH TIME AS ALL REQUIRED MATERIALS ARE PLANTED AND/OR REVISIONS ARE MADE TO THE APPLICABLE PLANS.
- THE OWNER, TENANT AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION, AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS ENSURING CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
- FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
- CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLANT DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

STATE OF MARYLAND  
ROBERT HARRIS VOGEL  
PROFESSIONAL ENGINEER  
NO. 16193  
DATE: 11-2-23  
P.E.# 16193

### Summary Table

Tree No.	Common Name/Scientific Name	Size DBH	Condition	Notes
1	Tulip Poplar <i>Liriodendron tulipifera</i>	35" @ 2' above ground	Poor to Fair	Double lead. Small crown (<15% live crown factor). Measured at narrowest point below stem juncture—two feet above ground. Tree in decline. Both leads have large bark on one side over the majority of the length of the trunk, likely from lightning damage. Secondary stems in broken at about 50 feet height and has no scaffold branches remaining. The main stem has an old wound consistent with a lightning strike about 15' wide, with missing or loose bark the entire length of the trunk. Reaction wood at the edges indicates an unsuccessful effort to close the large wound. Wood rot and insect damage are active in the sapwood, compromising the trunk. Where bark is still attached on this wound, fungus is growing on a section of bark about 2' wide by 1' deep. The canopy is very small relative to the size of the trunk and the remaining canopy is 30% dead wood. The stem overhang to the southwest is rotting a branch. Small roots are exposed and dry and larger roots are damaged by the erosion.
2	Tulip Poplar <i>Liriodendron tulipifera</i>	35" @ 2' above ground	Poor to Fair	Tree is stressed likely from clearing of forest on the SW edge and grading to the SW within the CR. Tap roots are exposed and rotting. Small crown (<15% live crown factor). Trunk intact with good root fair. Fill on Critical Root Zone on SE side. 15% of crown is deadwood. Diameter of dead wood includes pieces ranging from 3-4" diameter to 3-4' length.
3	White Oak <i>Quercus alba</i>	34.5"	Good	Tree performing well considering that the forest adjacent was removed. There is 8" within the critical root zone to the northwest and the buried root fair. Live crown ratio 40%. One dead branch is less than 2% of the canopy. CM with red root can. Authors report that White Oak has moderate tolerance to fill and is a common survivor of construction activity.
4	Black Oak <i>Quercus velutina</i>	33.5"	Fair	Tree is stressed. 15% dead branches, including scaffold branches. Live crown ratio 40%. Good root fair. When black oak is stressed it often succumbs to secondary insects and disease as the observed decline is a concern. The tree is moderately tolerant of development impacts.
5	Chestnut Oak <i>Quercus montana</i>	34"	Good	This tree is a good forest specimen currently at the maximum height for the species. Live crown ratio 40%. Less than 10% dead wood, 3" dia. x 1' long. Stems from exposure due to the removal of adjacent trees may be less than the other four specimens because the exposure is east facing and the tree is more interior to the forest. The species is also tolerant of dry conditions. This species tolerance to development impacts is moderate to good.

Approved: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

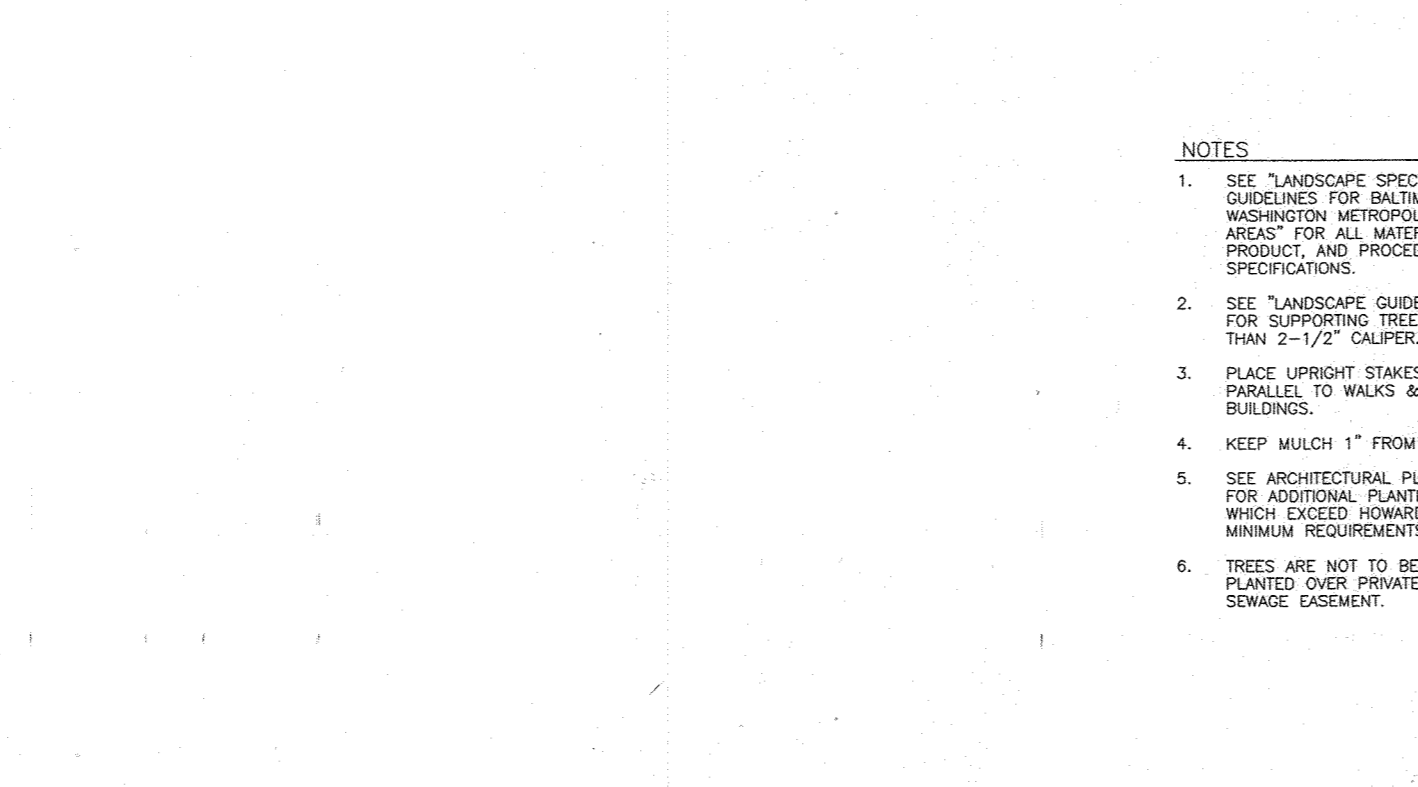
Chief, Development Engineering Division: *[Signature]* DATE: 10-23-21

Chief, Division of Land Development: *[Signature]* DATE: 11/16/21

Director: *[Signature]* DATE: 12-2-21

### PLAN VIEW

SCALE: 1"=40'



### TREE PLANTING AND STAKING

DECIDUOUS TREES UP TO 2-1/2" CALIPER NOT TO SCALE

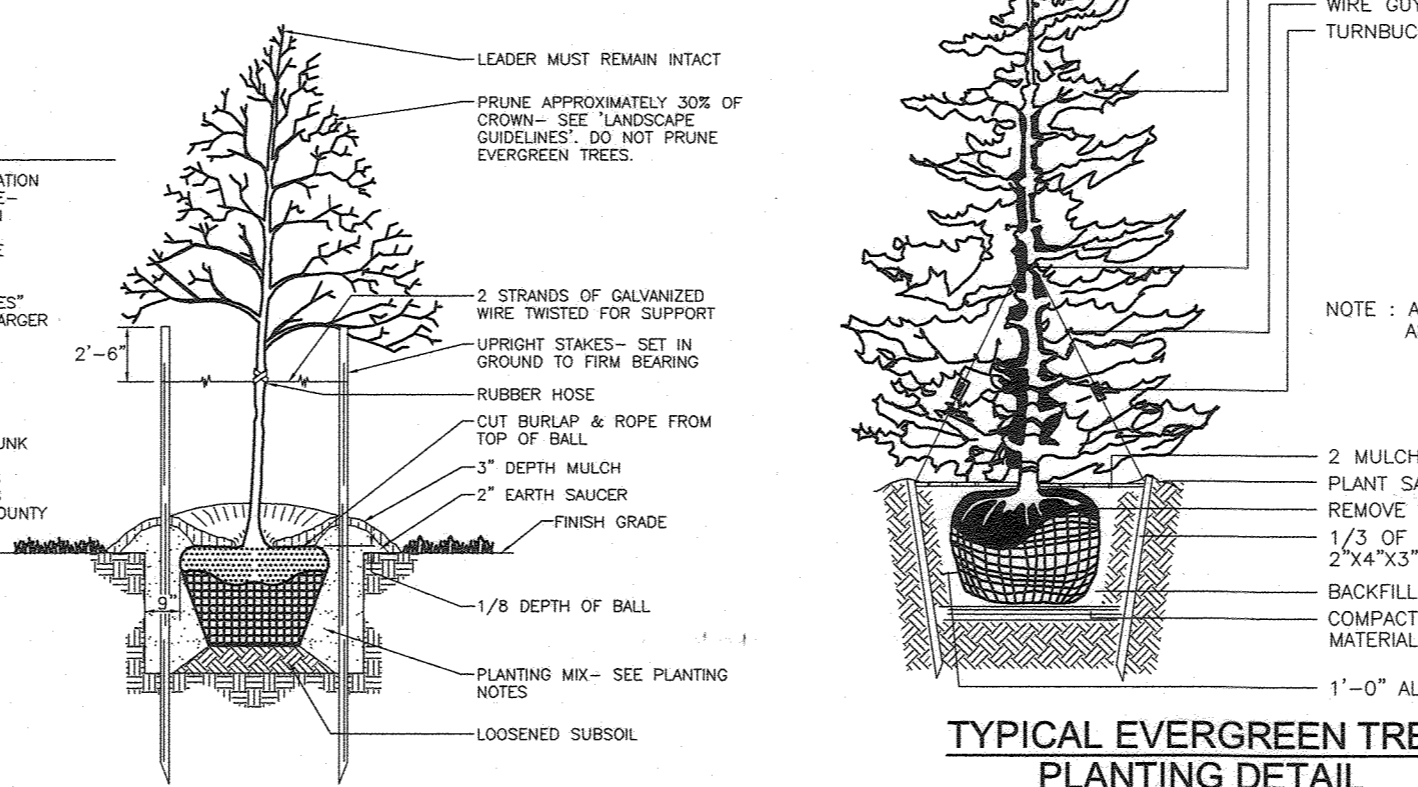
#### SCHEDULE A PERIMETER LANDSCAPING

CATEGORY	ADJACENT TO ROADWAYS AND PERIMETER PROPERTIES	ADJACENT TO DUMPSTER	TOTAL
PERIMETER/FRONTAGE DESIGNATION	1	2	3
LANDSCAPE TYPE	A	E	D
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	860'	179'	21'
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	YES 41'	YES (SEE BELOW)	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	444'	NO	NO
NUMBER OF PLANTS REQUIRED	375	140	13
SHADE TREES	160	7	3
EVERGREEN TREES	-	14	45
SHRUBS	6	3	10
NUMBER OF PLANTS PROVIDED	6	3	3
SHADE TREES	-	-	1
EVERGREEN TREES	1*	2**	31
OTHER TREES (2:1 SUBSTITUTION)	1*	2**	3
SHRUBS (10:1 SUBSTITUTION)	1*	14**	14
DESCRIBE PLANT SUBSTITUTION CREDITS (BELOW IF NEEDED)			

\* CREDIT FOR 1 EXISTING SHADE TREE  
\*\* CREDIT FOR 2 EXISTING SHADE TREES AND 14 EXISTING SHRUBS.

### SHRUB PLANTING DETAIL

NOT TO SCALE



### TYPICAL EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

#### SCHEDULE B PARKING LOT INTERNAL LANDSCAPING

NUMBER OF PARKING SPACES	128
NUMBER OF TREES REQUIRED	13
NUMBER OF TREES PROVIDED	12
OTHER TREES (2:1 SUBSTITUTION)	1
EX. SHADE TREES (CREDIT)	0

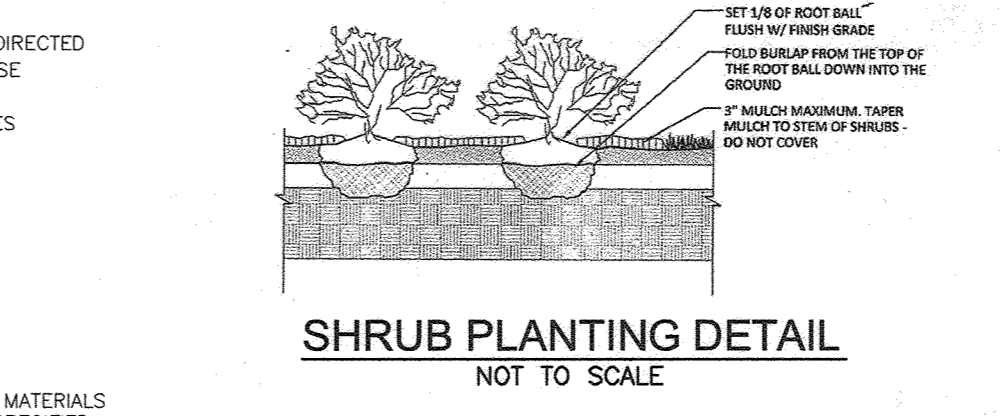
#### SCHEDULE C RESIDENTIAL DEVELOPMENT INTERNAL LANDSCAPING

NUMBER OF DWELLING UNITS	70
NUMBER OF TREES REQUIRED (1:3)	23
NUMBER OF TREES PROVIDED	10
SHADE TREES (CREDIT)	2
EVERGREEN TREES (2:1 SUBSTITUTION)	3
EX. EVERGREEN TREES (CREDIT/2:1 SUBSTITUTION)	3
OTHER TREES (2:1 SUBSTITUTION)	16
SHRUBS (10:1 SUBSTITUTION)	0

\* CREDIT FOR 2 EX. SHADE AND 3 EX EVERGREEN TREES.

#### SCHEDULE D - SPECIMEN TREE MITIGATION

NUMBER OF SPECIMEN TREES TO BE REMOVED	5
NUMBER OF SHADE TREES REQUIRED (2:1)	10
NUMBER OF SHADE TREES PROVIDED	10



### SHRUB PLANTING DETAIL

NOT TO SCALE

#### PLANT LIST - SCHEDULE A (PERIMETER)

KEY	QUAN	BOTANICAL NAME	SIZE	CAT
AR	9	ACRE RUBRUM 'ARMSTRONG'	2.5"-3" CAL	B & B
GP	1	QUERCUS PALUSTRIS 'GREEN PILLAR'	12' HGT. MIN.	B & B
TO	3	THILIA OCCIDENTALIS 'GREEN EMERALD'	6'-8" HT.	B & B
TD	31	TAXUS MEDIA 'DENSIFORMIS'	2.5"-3" HT.	B & B

#### PLANT LIST - SCHEDULE B (PARKING LOT)

KEY	QUAN	BOTANICAL NAME	SIZE	CAT
ZP	6	ZELKOVA SERBATA 'VILLAGE GREEN'	2.5"-3" CAL	B & B
GP	6	QUERCUS PALUSTRIS 'GREEN PILLAR'	12' HGT. MIN.	B & B

#### PLANT LIST - SCHEDULE C (RESIDENTIAL)

KEY	QUAN	BOTANICAL NAME	SIZE	CAT
QP	7	QUERCUS PALUSTRIS/PIN OAK	2.5"-3" CAL	B & B
GP	3	QUERCUS PALUSTRIS 'GREEN PILLAR'	12' HGT. MIN.	B & B
CC	8	CERES CANDIDENSIS EASTERN REDBUD	2.5"-3" CAL	B & B
CF	8	CORNUS FLORIDA WHITE FLOWERING DOGWOOD	8'-10' HGT.	B & B
PS	3	PINUS STROBUS EASTERN WHITE PINE	6'-8" HT.	B & B

#### PLANT LIST - SCHEDULE D (SPECIMEN TREE MITIGATION)

KEY	QUAN	BOTANICAL NAME	SIZE	CAT
QR	5	QUERCUS RUBRA NORTHERN RED OAK	2.5"-3" CAL	B & B
BN	5	BETULA NIGRA 'BNMTF' DURA-HEAT RIVER BIRCH	2.5"-3" CAL	B & B

OWNER/DEVELOPER  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

NO.	REVISION	DATE
2	REVISE PLAN TO RELOCATE DUMPSTER PAD	3-15-23

SITE DEVELOPMENT PLAN  
LANDSCAPE PLAN  
ELLICOTT GARDENS II  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 WATERLOO ROAD  
TAX MAP 31 BLOCK 19  
1ST ELECTION DISTRICT

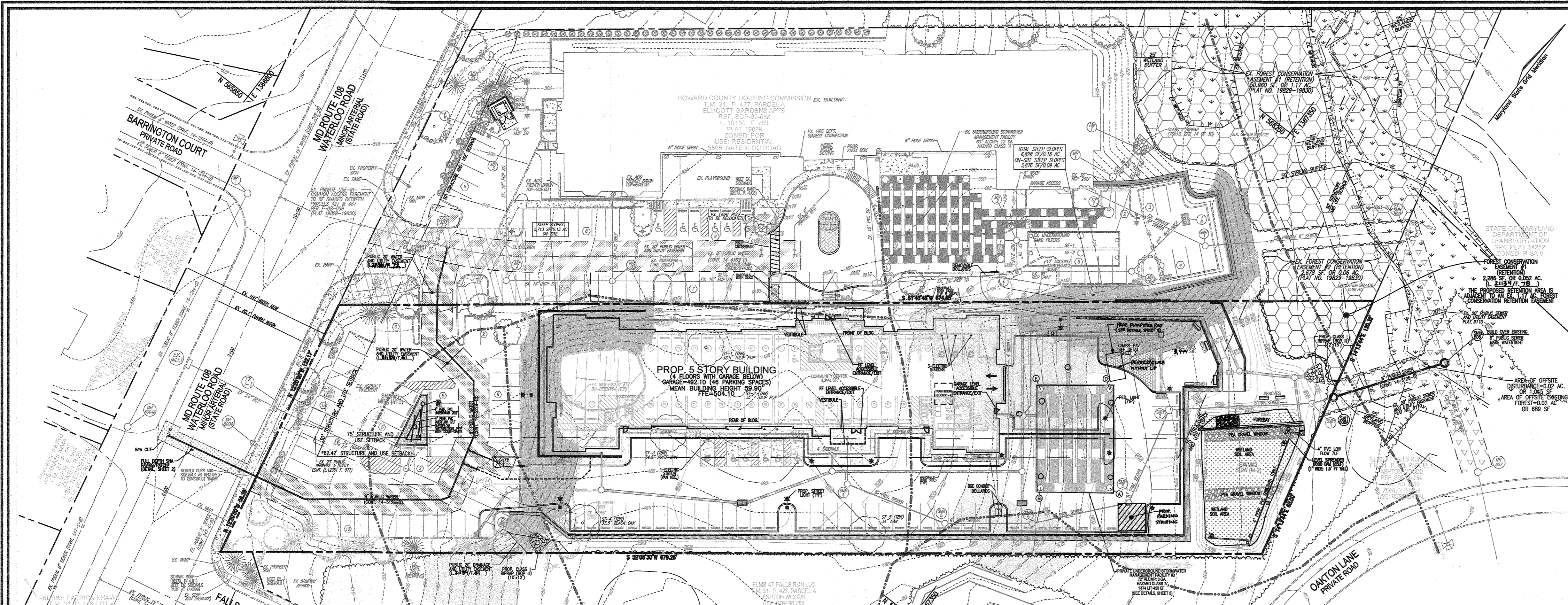
VOGEL ENGINEERING  
TIMMONS GROUP  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
P: 410.461.7666 F: 410.461.8961 www.timmons.com

DESIGN BY: RHV  
DRAWN BY: MP/KG/DZE/AB  
CHECKED BY: RHV  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/L

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. EXPIRATION DATE: 09-27-2022

ROBERT H. VOGEL, P.E. NO. 16193





### LEGEND:

EXISTING CONTOUR	PROPOSED LIGHTS
PROPOSED CONTOUR	PROPOSED STREET SIGN
EX. CURB AND GUTTER	ELECTRIC VEHICLE CHARGING STATION
EX. UTILITY POLE	MICRO-BRENTATION
EX. LIGHT POLE	SUBMERGED GRAVEL WETLAND
EX. SANITARY MH	GRASS PAVERS
EXISTING SIGN	EXISTING 20' PUBLIC SEWER AND UTILITY EASEMENT
EX. SANITARY LINE	EXISTING PRIVATE USE-IN-COMMON EASEMENT
EX. CLEANOUT	EXISTING 20' PUBLIC WATER AND UTILITY EASEMENT
EX. FIRE HYDRANT	EXISTING FOREST CONSERVATION EASEMENT
EX. WATER LINE	20' PUBLIC WATER AND UTILITY EASEMENT
EX. FENCE	20' PUBLIC DRAINAGE AND UTILITY EASEMENT
EXISTING TREES	FOREST CONSERVATION EASEMENT
EXISTING TREELINE	EX. STEEP SLOPES (25%+)
EX. WETLAND BUFFER	EX. MODERATE SLOPES (15% - 24.99%)
EX. STREAM BUFFER	
EXISTING STREAM	
EX. STREAM BANK	
EXISTING WETLANDS	
SOILS BOUNDARY	
PROPERTY LINE	
RIGHT-OF-WAY LINE	
SETBACKS	
PROPOSED CURB AND GUTTER	
PROPOSED SIDEWALK	
PROPOSED SIDEWALK RAMP	
PROPOSED TREELINE	
PROPOSED STORM DRAIN	
PROPOSED STORM DRAIN INLET	
PROPOSED FIRE HYDRANT	
PROPOSED WATER TEE & VALVE	
PROPOSED WATER MAIN	
PROPOSED SEWER MAIN	

### SOILS LEGEND

SYMBOL	NAME / DESCRIPTION	GROUP	K FACTOR	ERODIBLE	HYDRIC
**FcaA	FALLSINGTON SANDY LOAMS, 0 TO 2% SLOPES, POORLY DRAINED	D	0.24	NO	YES
**Ucd	URBAN LAND CHILLUM-BELTSVILLE COMPLEX, 5 TO 15% SLOPES, WELL DRAINED	D	0.43	YES	NO
**Rub	RUSSETT AND BELTSVILLE 2 TO 5% SLOPES, MODERATELY WELL DRAINED	C	0.37	YES	NO
**Sd	SASSAFRAS AND CROOM, 10 TO 15% SLOPES, WELL DRAINED	B	0.37	YES	NO
**Uab	URBAN LAND SASSAFRAS-BELTSVILLE COMPLEX, 0 TO 5% SLOPES, WELL DRAINED	D	0.37	YES	NO
**Ucb	URBAN LAND CHILLUM-BELTSVILLE COMPLEX, 0 TO 5% SLOPES, WELL DRAINED	D	0.37	YES	NO

- TAKEN FROM: SCS-WEB SOIL SURVEY, HOWARD COUNTY.  
 - K VALUES PER <http://www.howardisd.org/documents> - "K FACTORS (USE KW)".  
 - HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT.

## FOREST CONSERVATION PLAN

SCALE: 1"=40'

### FOREST CONSERVATION WORKSHEET FOR ELICOTT GARDENS II

Net Tract Area	A = 2.53
A. Total (Gross) Tract Area	B = 0.00
B. Area within 100-year Floodplain	C = 0.00
C. Other Deductions (Identify)	D = 2.53
D. Net Tract Area	E = 0.40
E. Afforestation Threshold (Net Tract Area x 15%)	F = 0.40
F. Reforestation Threshold (Net Tract Area x 15%)	G = 0.40
Existing Forest Cover	H = 2.20
I. Area of Forest above Reforestation Threshold	J = 1.80
J. Area of Forest above Reforestation Threshold	K = 1.80
Break Even Point	L = 1.00
L. Break Even Point	M = 1.20
K. Forest Clearing Permitted without Mitigation	N = 0.90
Proposed Forest Clearing	O = 0.00
O. Total Area of Forest to be Cleared	P = 0.00
P. Total Area of Forest to be Retained	Q = 1.50
Planting Requirements Inside Watershed	R = 0.00
R. Reforestation for Clearing above the Reforestation Threshold	S = 0.00
S. Credit for Retention above the Reforestation Threshold	T = 1.50
T. Total Reforestation and Afforestation Requirement	U = 1.20
U. 75% of Total Obligation (Retention + Planting)	V = 1.10
V. Planting Required Onsite to meet 75% Obligation	W = 0.00
Planting Requirements Outside Watershed	X = 0.00
X. Total Afforestation Required	Y = 0.00
Y. Remaining Planting within Watershed for Reforestation Credit	Z = 1.50
Z. Reforestation for Clearing above the Reforestation Threshold	AA = 0.90
AA. Reforestation for Clearing below the Reforestation Threshold	BB = 0.00
BB. Credit for Retention above the Reforestation Threshold	CC = 2.70
CC. Total Reforestation Required	DD = 0.00
DD. Total Afforestation and Reforestation Requirement	

### FOREST STAND DATA

KEY	COMMUNITY TYPE	ACREAGE (NTA)	DOMINANT VEGETATION	GENERAL CONDITION	PRIORITY ACREAGE
F1	Oak-POPULAR	1.8	URBAN FOREST, THICK, POOR CONDITION, 15% DEAD WOOD, SMALL LIVE-CROWN RATIO	GOOD	0

SEE ACCOMPANYING REPORT FOR COMPLETE STAND DESCRIPTIONS

### BENCHMARKS

HOWARD COUNTY BENCHMARK 301B	ELEV. 526.868
N 566937.926 E 1366270.75	
HOWARD COUNTY BENCHMARK 310B	ELEV. 512.080
N 567567.473 E 1367353.38	

### FSD NOTES:

- NO RARE, THREATENED OR ENDANGERED SPECIES OR THEIR HABITATS WERE ON THE PROPERTY.
- SURROUNDING LAND USE IS HIGH DENSITY RESIDENTIAL DEVELOPMENT AND COMMERCIAL. THE SUBJECT PROPERTY IS ZONED POR.
- APPROXIMATELY 0.2 ACRES OF FOREST IS PRESENT WITHIN 100 FEET OF THE SUBJECT PROPERTY.
- THERE ARE NO WETLANDS ON THE PROPERTY. THE PROPERTY IS WITHIN THE USE I WATERSHED OF DEEP RUN (02-19-00).
- NO 100 YEAR FLOODPLAIN IS PRESENT ON THE SUBJECT PROPERTY.
- THERE ARE STEEP SLOPES (25% OR GREATER) ON THE PROPERTY.
- THERE ARE STEEP SLOPES (15%-24.9% OR GREATER) ON THE PROPERTY.
- THERE ARE NO KNOWN HISTORIC STRUCTURES OR CHIMNEYS ON THE PROPERTY.
- THERE ARE SPECIMEN TREES, STATE CHAMPION TREES AND/OR TREES AND/OR TREE 75% OF THE SIZE OF A STATE CHAMPION TREE ON THE PROPERTY.

### GENERAL NOTES

- GROSS SITE AREA: 2.53 AC.
- NET SITE AREA: 2.53 AC.
- AREA OF 100-YEAR FLOODPLAIN: 0.00 AC.
- AREA OF WETLANDS AND BUFFERS(ONSITE): 0.021 AC.
- AREA OF STREAM AND BUFFERS(ONSITE): 0.18 AC.
- AREA OF > 25% STEEP SLOPES: 2.20 AC.
- EXISTING FOREST (FSD): POR
- EXISTING USE: RESIDENTIAL
- PROPOSED USE: RESIDENTIAL

### SPECIMEN TREE CHART

KEY #	SPECIES	SIZE	CRZ	COMMENTS
1	TULIP POPULAR	32.5	48.75	POOR CONDITION, IN DECIDUE SUBSTANTIAL CROWN # IN TRUNK, SEE SCHEDULE
2	TULIP POPULAR	35	52.50	FAIR CONDITION, 15% DEAD WOOD, SMALL LIVE-CROWN RATIO
3	WHITE OAK	34.5	51.75	GOOD CONDITION
4	BLACK OAK	33.5	50.25	FAIR CONDITION, 15% DEAD WOOD
5	CHESTNUT OAK	34	50.00	GOOD CONDITION

WP-20-049 REFERENCE NOTE:  
 THIS PROJECT IS SUBJECT TO WP-20-049, APPROVED 10/01/20, TO SECTION 16.1205(a)(3) AND SECTION 16.1209(a)(2) OF THE FOREST CONSERVATION REGULATIONS TO REMOVE 5 SPECIMEN TREES AND TO MEET LESS THAN 75% OF THE REQUIRED FOREST CONSERVATION OBLIGATION ON SITE. APPROVAL SUBJECT TO THE FOLLOWING CONDITIONS:  
 A. ALTERNATIVE COMPLIANCE APPROVAL IS LIMITED TO THE REMOVAL OF SPECIMEN TREES #1 THROUGH #5 AS DEPICTED ON THE MODIFIED ALTERNATIVE COMPLIANCE EXHIBIT. ANY PROPOSAL TO REMOVE ADDITIONAL SPECIMEN TREES WILL REQUIRE A NEW ALTERNATIVE COMPLIANCE REQUEST OR AN AMENDMENT TO THIS ALTERNATIVE COMPLIANCE REQUEST.  
 B. A MINIMUM OF 10 ADDITIONAL, NATIVE, 3" DBH TREES SHALL BE PROVIDED ON SITE AS PART OF THE MITIGATION FOR THE SPECIMEN TREE REMOVAL (2:1 REPLACEMENT). THIS MITIGATION WILL BE ADDRESSED WITH THE PROJECT KNOWN AS "ELICOTT GARDENS II" AND WILL BE IN ADDITION TO ANY REQUIRED LANDSCAPE OR FOREST CONSERVATION PLANTINGS.  
 C. IT SHALL BE REQUIRED TO RETAIN AS MUCH FOREST POSSIBLE WHILE KEEPING THE DESIGN THAT RECEIVED THAT COMPETITIVE STATE GRANT VIABLE.  
 D. THE LOCATION OF THE OFF-SITE OBLIGATION SHALL BE IDENTIFIED PRIOR TO RECEIVING A TECHNICALLY COMPLETE ON THE SOP FOR THE SITE.



VICINITY MAP  
 SCALE: 1"=1,000'  
 ADC MAP 27, GRID FB

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

2	REVISE PLAN TO RELOCATE DUMSTERS PAD	3-15-23
NO.	REVISION	DATE

### SITE DEVELOPMENT PLAN

## FOREST CONSERVATION PLAN

ELICOTT GARDENS II  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 WATERLOO ROAD  
 ZONED: POR PARCEL 428  
 TAX MAP 31 BLOCK 19 BA-06-009, SDP-07-038, F-08-064, BA-08-042V ZONED: POR PARCEL 428  
 1ST ELECTION DISTRICT SDP-07-038, WF-08-111, WF-08-085 HOWARD COUNTY, MARYLAND

**Eco-Science Professionals, Inc.**  
 CONSULTING ECOLOGISTS  
 P.O. BOX 598 GLEN ARB, MARYLAND 21067 Telephone (410) 863-7640 www.ecosciencemaryland.com

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 10/22/21  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 11/9/21  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*[Signature]* 12-2-21  
 DIRECTOR DATE

MYRA BROSIUS  
 ISA CERTIFIED ARBORIST™  
 CERT ID: MAS411A  
 MD DNR PCA  
 QUALIFIED PROFESSIONAL

DESIGN BY: RHY  
 DRAWN BY: NP/KG/DZE/AB  
 CHECKED BY: JPC/MB  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

14 SHEET OF 28







**GENERAL NOTES**

- CONSTRUCTION OF THE RETAINING WALLS SHOWN ON THIS PLAN SHALL BE PERFORMED UNDER THE OBSERVATION OF THE OWNERS INDEPENDENT TESTING AGENCY (ITA).
- IF THE ELEVATION, LOCATION, SURCHARGE LOADING, OR GRADING SURROUNDING THE RETAINING WALL CHANGES FROM THAT DEPICTED ON THESE PLANS, EGS SHALL BE NOTIFIED SO THAT MODIFICATIONS TO THE GEOTECHNICAL DESIGN CAN BE MADE, IF NECESSARY. NO MATERIAL SUBSTITUTIONS ARE PERMITTED.
- UTILITIES WITHIN THE REINFORCED ZONE AND UTILITIES DEEPER THAN 3 FEET WITHIN THE INFLUENCE OF THE REINFORCED ZONE SHALL BE INSTALLED SIMULTANEOUSLY WITH THE MSE WALL BACKFILL.
- UTILITIES ALONG THE TOE OF THE RETAINING WALL SHALL BE INSTALLED PRIOR TO RETAINING WALL CONSTRUCTION.

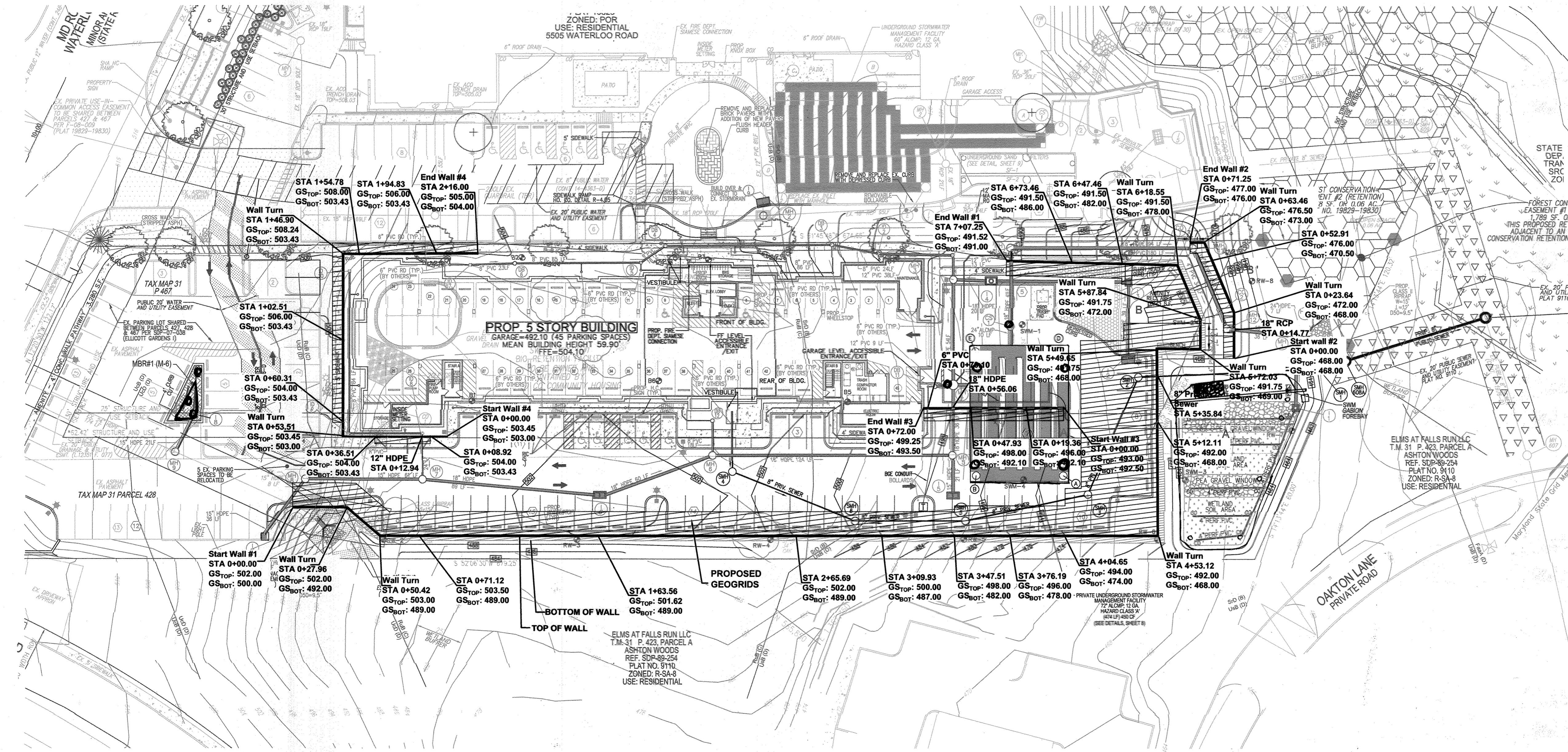
**RETAINING WALL DESIGN PARAMETERS**

<b>WALL GEOMETRY</b>	
BACK BATTER OF FACE:	8°
MINIMUM BLOCK EMBEDMENT:	SEE WALL PROFILE
<b>WALL SURCHARGE LOADS</b>	
VEHICULAR LIVE LOADS (psf):	250
<b>MINIMUM FACTORS OF SAFETY</b>	
F.S. AGAINST SLIDING:	1.5
F.S. AGAINST OVERTURNING:	2.0
F.S. AGAINST BEARING CAPACITY FAILURE:	2.0
F.S. AGAINST GLOBAL INSTABILITY:	1.3
F.S. AGAINST UNCERTAINTIES:	1.5
F.S. AGAINST GEOGRID PULLOUT:	1.5
<b>SOIL WITHIN REINFORCED FILL ZONE</b>	
DENSITY (PCF):	130
PHI (DEG):	34°
COHESION (PSF):	0
<b>SOIL WITHIN RETAINED ZONE</b>	
DENSITY (PCF):	130
PHI (DEG):	32°
COHESION (PSF):	0
<b>FOUNDATION SOIL</b>	
DENSITY (PCF):	130
PHI (DEG):	32°
COHESION (PSF):	50
ALLOWABLE BEARING PRESSURE (PSF):	SEE WALL PROFILE
LEVELING PAD:	GRADED AGGREGATE (TAMPED NO. 57 STONE)

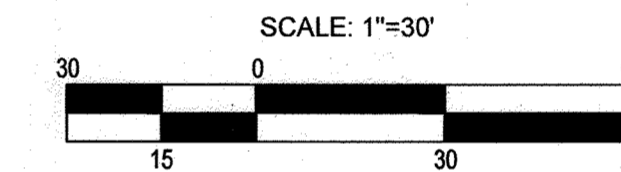
<b>GEOGRID DATA</b>	
GEOGRID TYPE:	MIRAFI 5XT, 7XT AND 10XT
COVERAGE OF GEOGRIDS (%):	100
CREEP REDUCTION FACTOR:	1.44
DURABILITY REDUCTION FACTOR:	1.10
INSTALLATION DAMAGE REDUCTION FACTOR:	1.05
SAND / SILT / CLAY:	MIRAFI 140N OR APPROVED EQUIVALENT
GEOTEXTILE TYPE:	
<b>MODULAR BLOCK DATA</b>	
MODULAR BLOCK SYSTEM:	KEYSTONE RETAINING WALL SYSTEM
BLOCK TYPE:	KEYSTONE COMPAC III UNITS AND CORRESPONDING CAP UNITS
UNIT FILL:	GRADED AGGREGATE (NO. 57 STONE)

**NOTES**

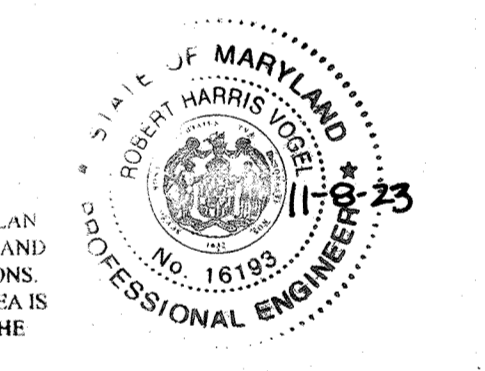
- THE DESIGN IS BASED ON SOILS HAVING A UNIFIED SOIL CLASSIFICATION SYSTEM DESIGNATION OF SM OR COARSER AND A FRICTION ANGLE OF 34° OR HIGHER FOR THE REINFORCED BACKFILL SOILS. REINFORCED FILL SHALL HAVE FINES CONTENT OF LESS THAN 45 PERCENT PASSING THE NO. 200 SIEVE, A LIQUID LIMIT OF LESS THAN 30 AND A PLASTICITY INDEX OF LESS THAN 10. THE OWNER'S ITA SHALL CONFIRM THE SOIL PROPERTIES AND SHEAR STRENGTH PARAMETERS SHOWN ON THESE PLANS PRIOR TO THE START OF WALL CONSTRUCTION. WHEN SHEAR STRENGTH TESTING IS DEEMED NECESSARY BY THE ITA, DIRECT SHEAR TESTING SHALL BE PERFORMED.
- BLOCK AND/OR GEOGRID SUBSTITUTIONS SHALL NOT BE PERMITTED.
- REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.



STA = STATION  
 GS<sub>TOP</sub> = GROUND SURFACE ELEVATION AT TOP OF WALL  
 GS<sub>BOT</sub> = GROUND SURFACE ELEVATION AT BOTTOM OF WALL  
 A - A' = CROSS-SECTION (SEE PAGES 23 AND 24)



AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE DRAINING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 E. NAME:                      P.E. # 16193 DATE: 11-0-23



**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

NO.	REVISION	DATE

**PLANS AND PARAMETERS**  
**ELLCOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 TAX MAP 31 BLOCK 19 PARCEL 428 ZONED: PGR  
 1ST ELECTION DISTRICT BA-06-005V, SDP-07-03B, F-08-064, BA-08-042V HOWARD COUNTY, MARYLAND  
 REF: SDP-06-264 PLAT NO. 3410 ZONED: R-SA-3 USE: RESIDENTIAL

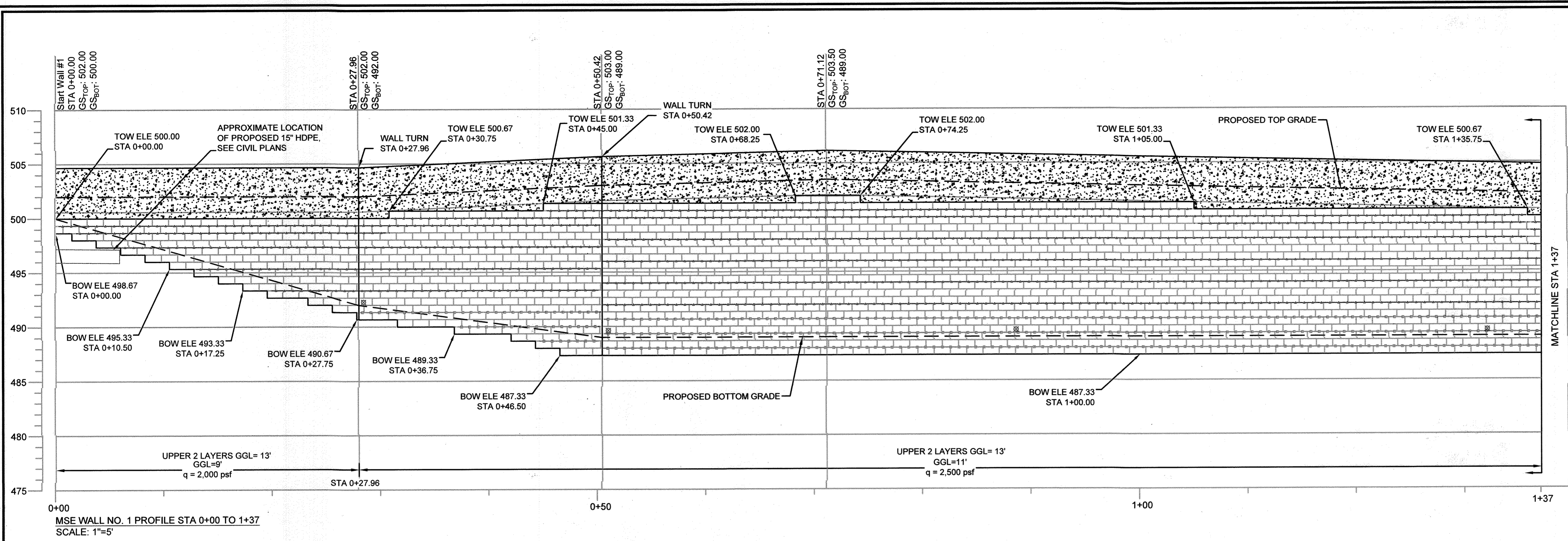
**ECS MID-ATLANTIC, LLC**  
 3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 WWW.ECSLIMITED.COM

PROFESSIONAL CERTIFICATE  
 DESIGN BY: KFB  
 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36622, EXPIRATION DATE: 01-31-2022  
 ANDREW MACLEOD, PE No. 36622

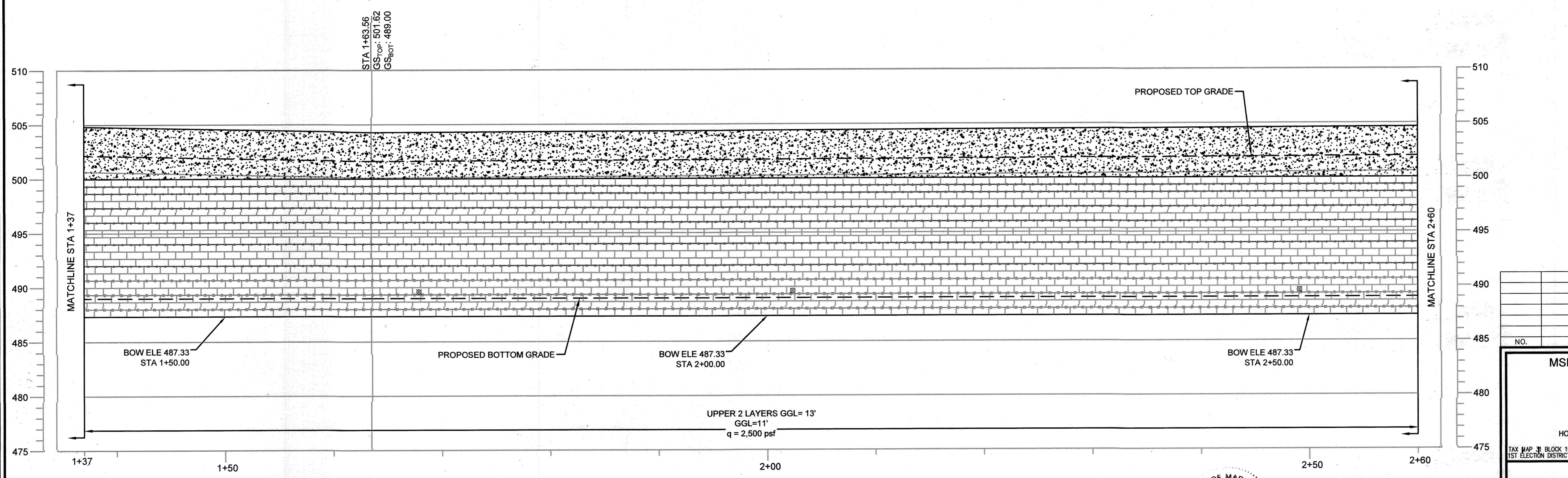
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Chief, Development Engineering Division: [Signature] DATE: 10-22-21  
 Chief, Division of Land Development: [Signature] DATE: 11/16/21  
 Director: [Signature] DATE: 12-2-21

NOTE: BASE DRAWING PROVIDED BY VOGEL ENGINEERING + TIMMONS GROUP, INC.





MSE WALL NO. 1 PROFILE STA 0+00 TO 1+37  
SCALE: 1"=5'



MSE WALL NO. 1 PROFILE STA 1+37 TO 2+60  
SCALE: 1"=5'

**LEGEND:**  
 TOW = TOP OF WALL  
 BOW = BOTTOM OF WALL  
 GS<sub>TOP</sub> = TOP GROUND SURFACE  
 GS<sub>BOT</sub> = BOTTOM GROUND SURFACE  
 —○— = MIRAFI 5XT  
 —○— = MIRAFI 7XT  
 —○— = MIRAFI 10XT  
 GGL = GEOGRID LENGTH  
 q = ALLOWABLE BEARING PRESSURE  
 ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING

- NOTES:**
- REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.
  - GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
  - REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.



NO AS-BUILT INFORMATION ON THIS SHEET

AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 P.E. NAME: [Signature] P.E. # 16193 DATE 11-8-23

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION: [Signature] DATE 10-22-21  
 CHIEF, DIVISION OF LAND DEVELOPMENT: [Signature] DATE 11/9/21  
 DIRECTOR: [Signature] DATE 12-2-21

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

NO.	REVISION	DATE

**MSE WALL NO. 1 PROFILE STA 0+00 TO 2+60**

**ELLICOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD  
 TAX MAP 31 BLOCK 19 BA-06-005V SDP-07-038 F-08-064 BA-08-042V ZONED: P08  
 1ST ELECTION DISTRICT SDP-07-538 WP-08-111 WP-09-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**  
 3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

PROFESSIONAL CERTIFICATE  
 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. 38822 EXPIRATION DATE: 01-31-2022

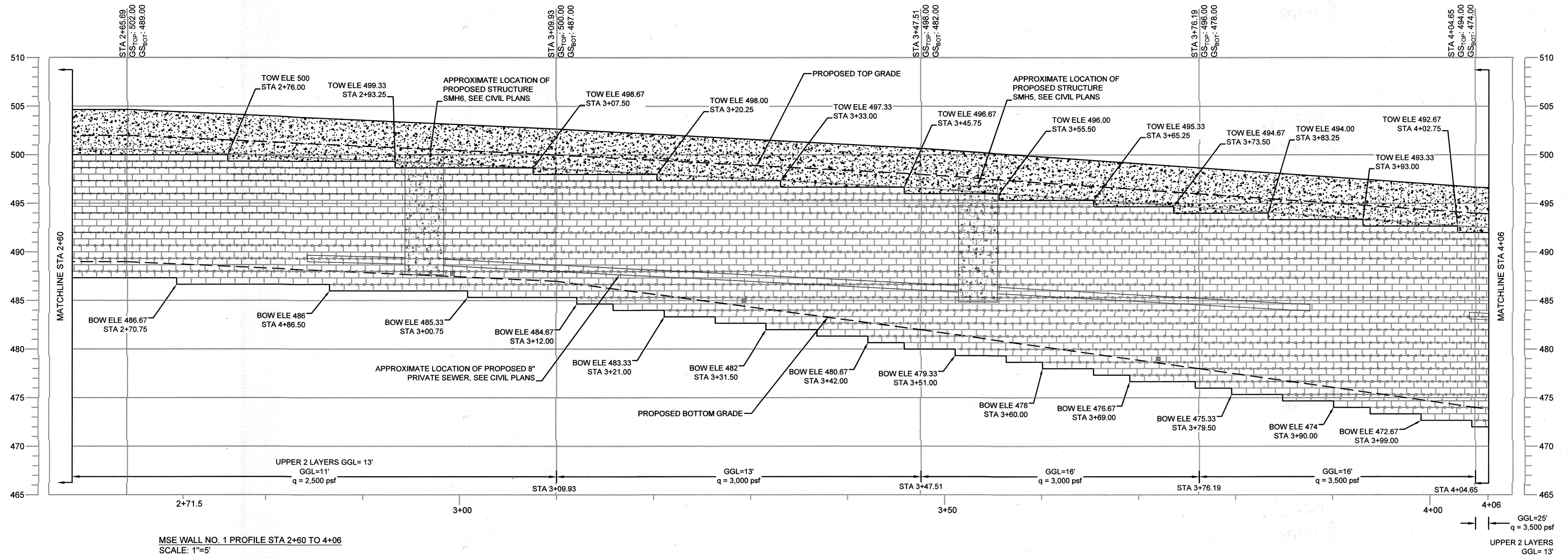
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 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

ANDREW MACLEOD, PE No. 36622

17 SHEET OF 28

AS-BUILT SEPTEMBER 2023 SDP-20-027





MSE WALL NO. 1 PROFILE STA 2+60 TO 4+06  
SCALE: 1"=5'

**LEGEND:**  
 TOW = TOP OF WALL  
 BOW = BOTTOM OF WALL  
 GS<sub>TOP</sub> = TOP GROUND SURFACE  
 GS<sub>BOT</sub> = BOTTOM GROUND SURFACE  
 --- = MIRAFI 5XT  
 --- = MIRAFI 7XT  
 --- = MIRAFI 10XT  
 GGL = GEOGRID LENGTH  
 q = ALLOWABLE BEARING PRESSURE  
 ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING

**NOTES:**  
 1. REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.  
 2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.  
 3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Chief, Development Engineering Division: *[Signature]* DATE: 10-22-21  
 Chief, Division of Land Development: *[Signature]* DATE: 11/1/21  
 Director: *[Signature]* DATE: 12-2-21



AS-BUILT CERTIFICATION FOR PSWM  
 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.  
 I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 NAME: Andrew MacLeod, P.E. # 16193, DATE: 11-8-23

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

NO.	REVISION	DATE

**MSE WALL NO. 1 PROFILE STA 2+60 TO 4+06**

**ELLICOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD  
 TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-09-042V ZONED: POF  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

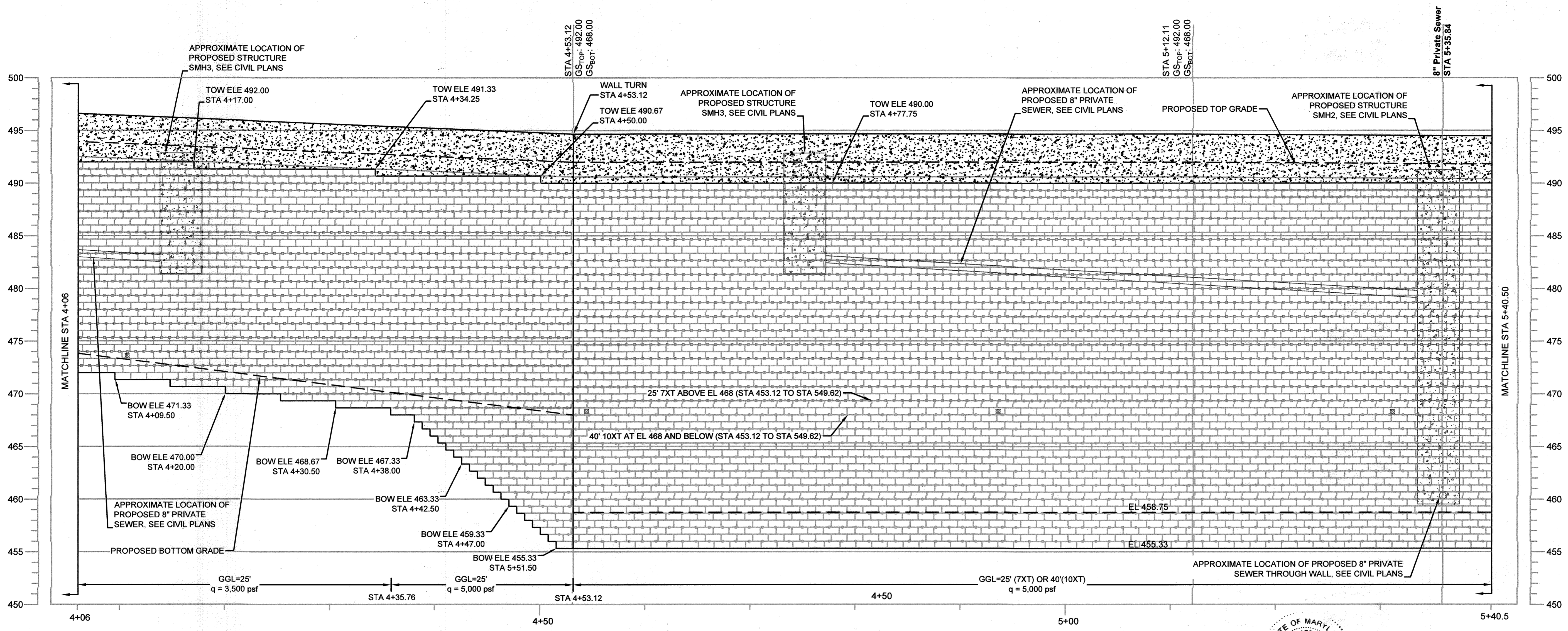
**ECS MID-ATLANTIC, LLC**  
 3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

**PROFESSIONAL CERTIFICATE**  
 DESIGN BY: KFB  
 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/  
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18 SHEET OF 28

NO AS-BUILT INFORMATION ON THIS SHEET

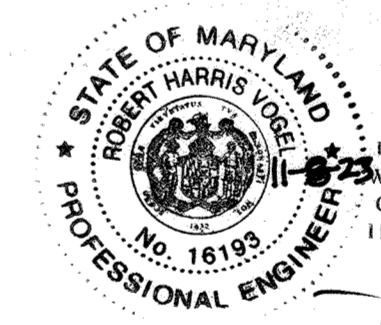




MSE WALL NO. 1 PROFILE STA 4+06 TO 5+40.50  
SCALE: 1"=5'

- LEGEND:**
- TOW = TOP OF WALL
  - BOW = BOTTOM OF WALL
  - GS<sub>TOP</sub> = TOP GROUND SURFACE
  - GS<sub>BOT</sub> = BOTTOM GROUND SURFACE
  - = MIRAFI 5XT
  - = MIRAFI 7XT
  - ◇— = MIRAFI 10XT
  - GGL = GEOGRID LENGTH
  - q = ALLOWABLE BEARING PRESSURE
  - ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING

- NOTES:**
1. REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.
  2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
  3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.



AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

DATE: 11-9-23  
 P.E. # 16193

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATIENCE WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

10-22-21  
 DATE

11/12/21  
 DATE

12-2-21  
 DATE

NO AS-BUILT INFORMATION ON THIS SHEET

NO.	REVISION	DATE

**MSE WALL NO. 1 PROFILE STA 4+06 TO 5+40.5**

**ELLCOTT GARDENS II**  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD ZONED: PDR  
 TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V PARCEL 428 & 467  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**  
 3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

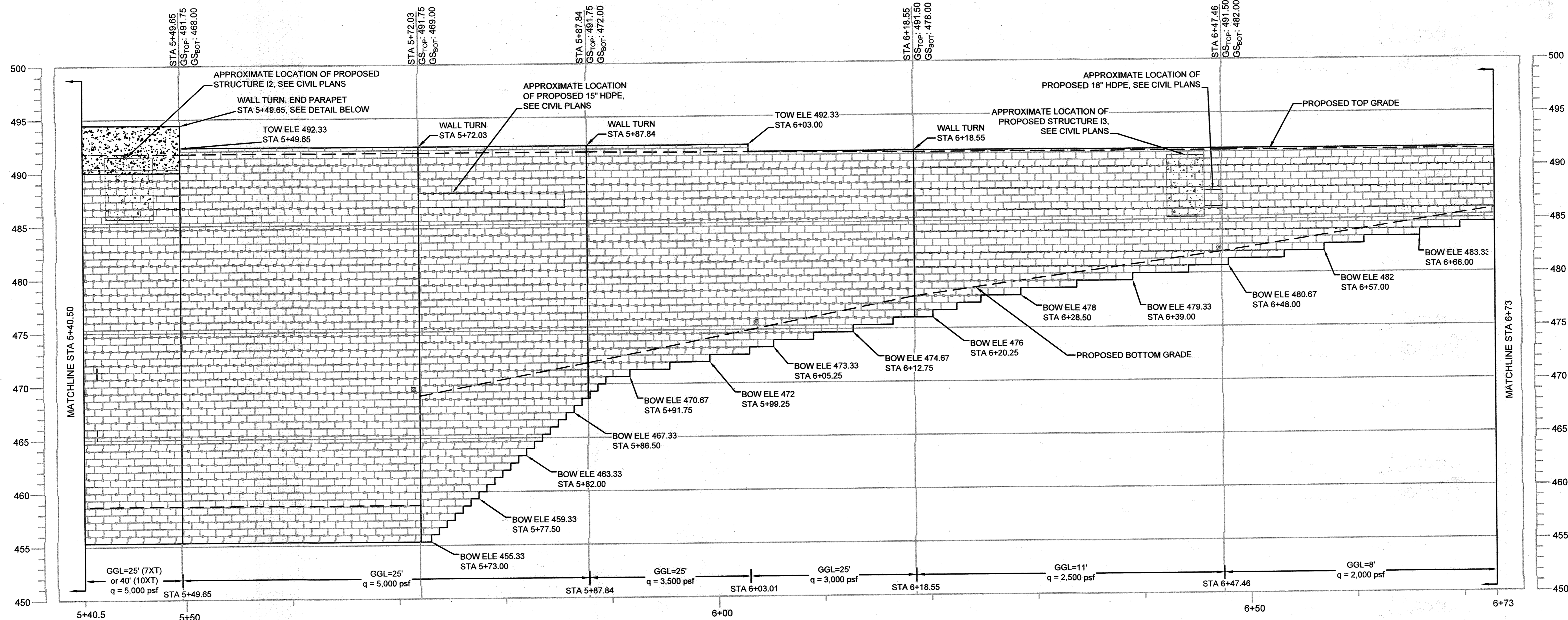
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 W.O. NO.: 06-01/

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36622 EXPIRATION DATE: 01-31-2022

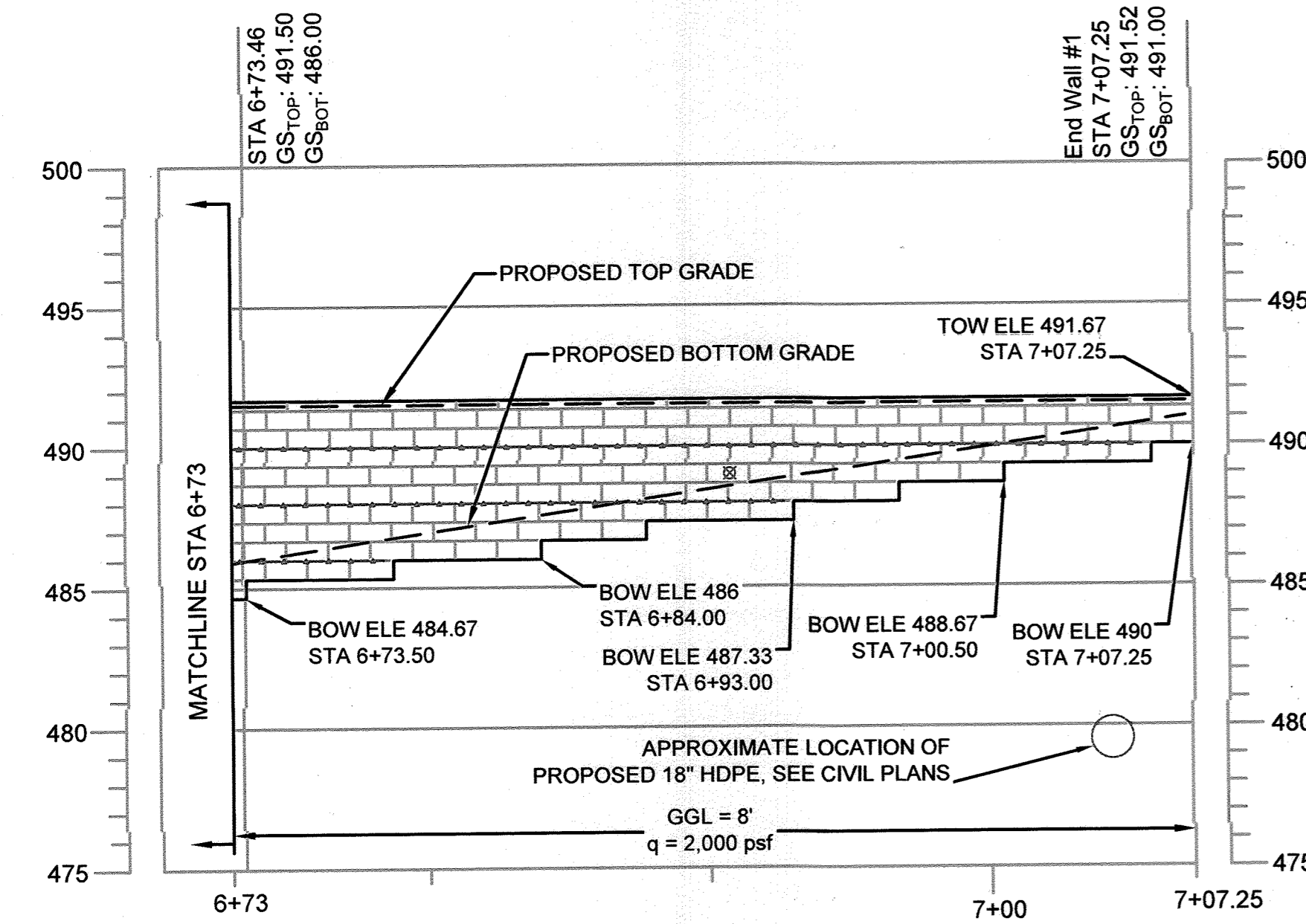
ANDREW MACLEOD, PE No. 36622

19 SHEET OF 28

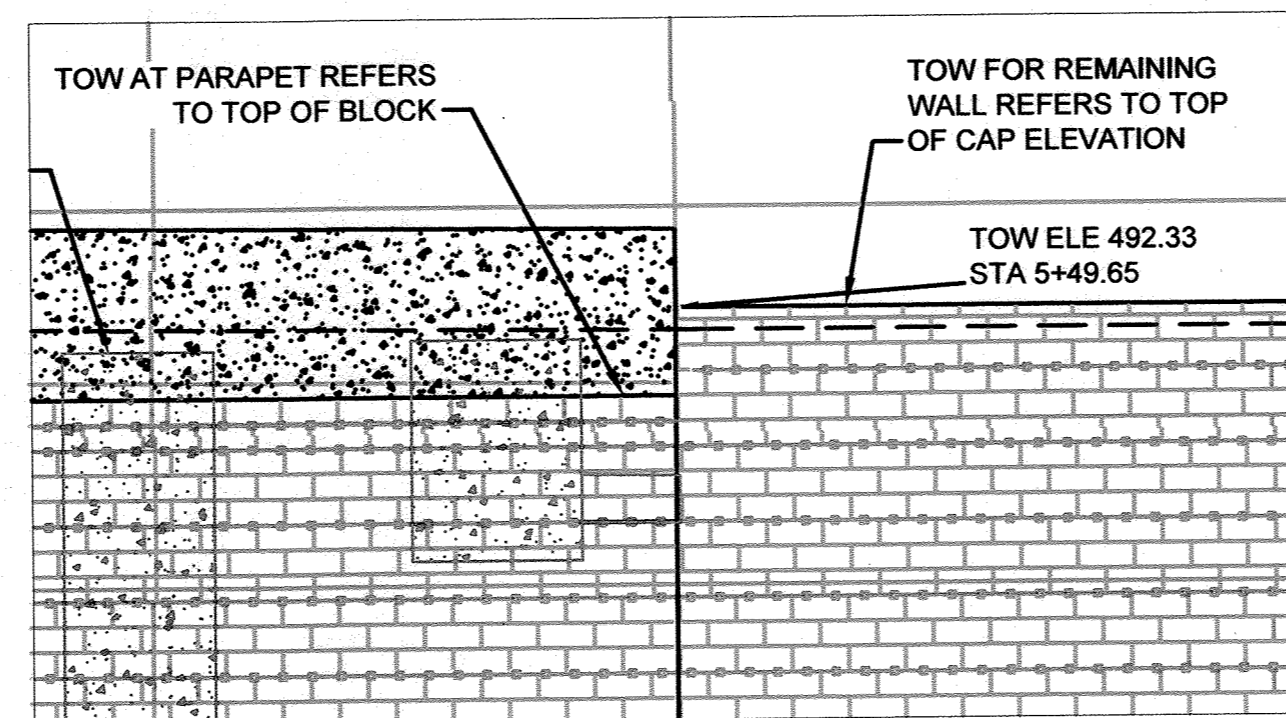




MSE WALL NO. 1 PROFILE STA 5+40.50 TO 6+73  
SCALE: 1"=5'



MSE WALL NO. 1 PROFILE STA 6+73 TO 7+07.25  
SCALE: 1"=5'



STA 5+49.65 DETAIL  
SCALE: 1"=5'

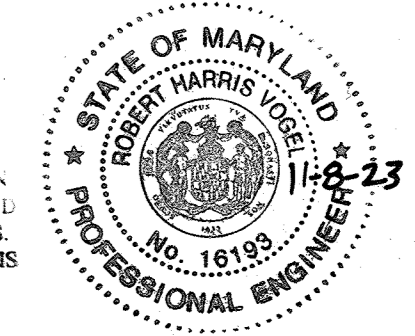
- LEGEND:**
- TOW = TOP OF WALL
  - BOW = BOTTOM OF WALL
  - GS<sub>TOP</sub> = TOP GROUND SURFACE
  - GS<sub>BOT</sub> = BOTTOM GROUND SURFACE
  - = MIRAFI 5XT
  - = MIRAFI 7XT
  - = MIRAFI 10XT
  - GGL = GEOGRID LENGTH
  - q = ALLOWABLE BEARING PRESSURE
  - ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING

- NOTES:**
1. REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.
  2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
  3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.

NO AS-BUILT INFORMATION ON THIS SHEET

AS-BUILT CERTIFICATION FOR PSWM  
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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

P.E. NAME: Robert Harris Vogel P.E.#: 1693 DATE: 11-8-23



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

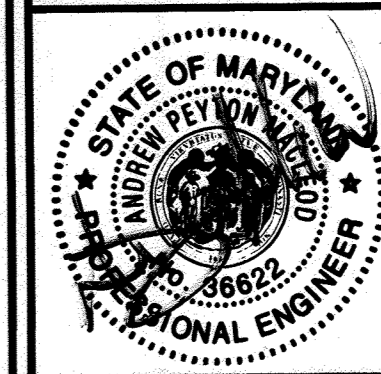
NO.	REVISION	DATE

MSE WALL NO. 1 PROFILE STA 5+40.5 TO 7+07.25

**ELLICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 & 5513 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-030, F-08-064, BA-08-042V PARCEL 122 & 467  
1ST ELECTION DISTRICT SDP-07-03X, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**

3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com



**PROFESSIONAL CERTIFICATE**

DESIGN BY: KFB  
DRAWN BY: KFB  
CHECKED BY: AM  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

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. 36622 EXPIRATION DATE: 06-01-2023

20 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 10-22-21  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

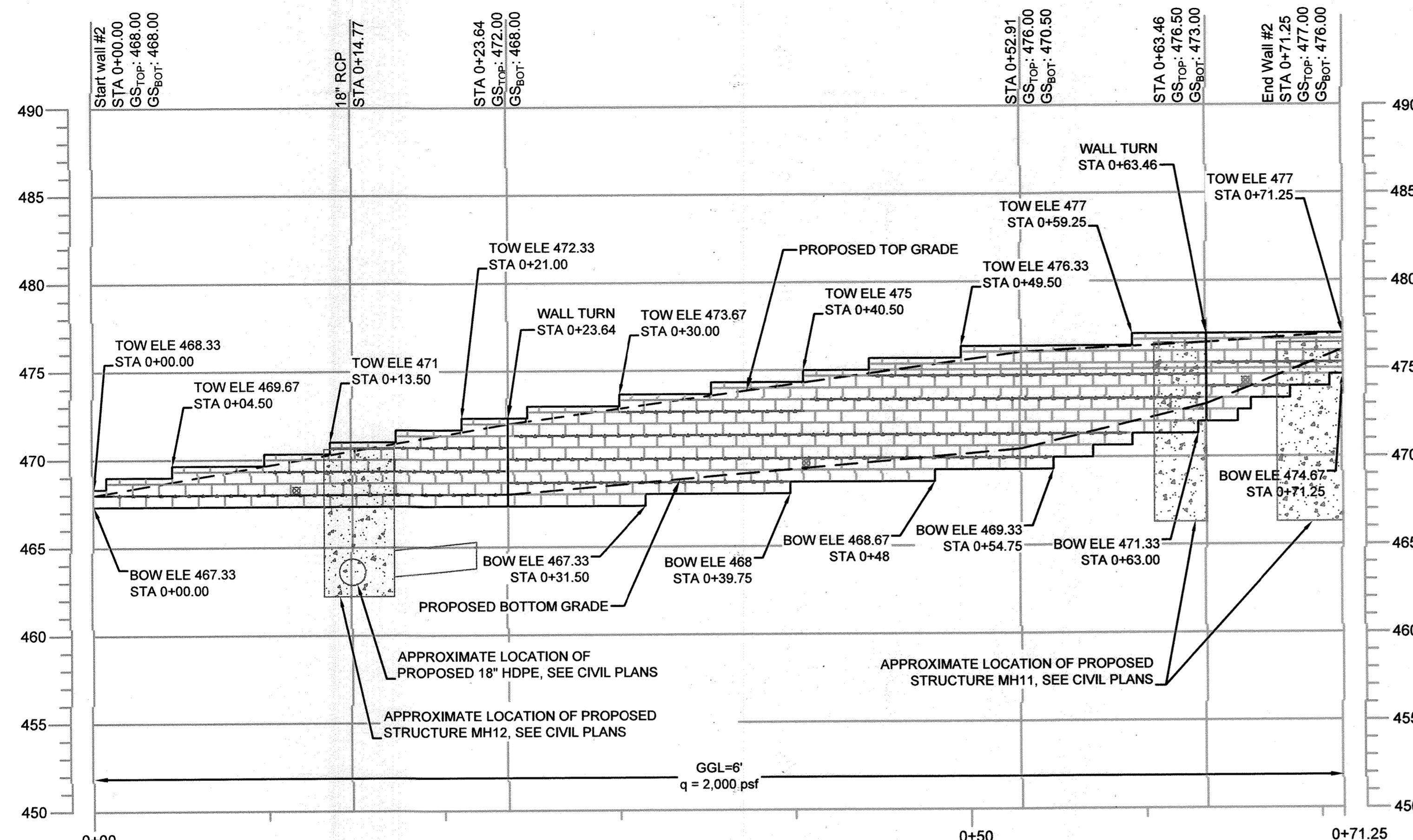
[Signature] 11/6/21  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 12-2-21  
DIRECTOR DATE

AS-BUILT SEPTEMBER 2023

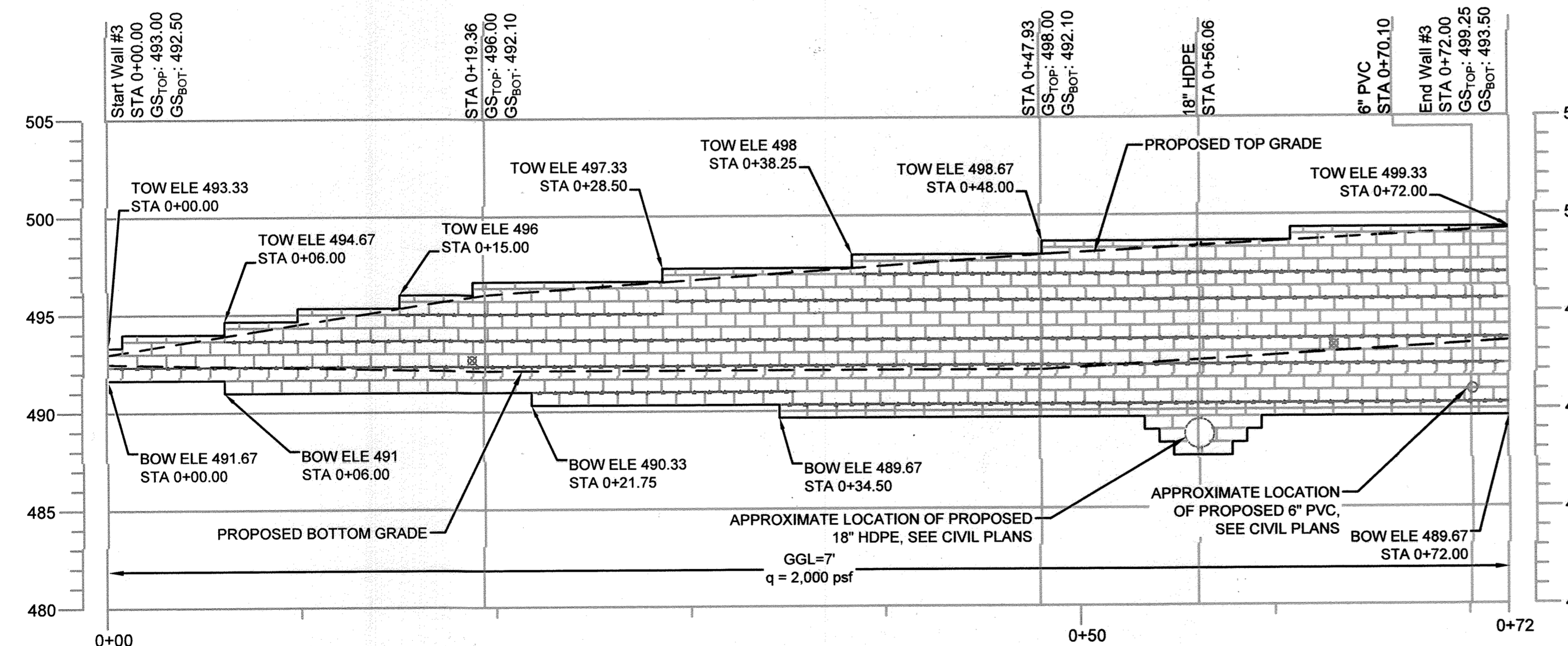
SDP-20-027





MSE WALL NO. 2 PROFILE STA 0+00 TO 0+71.25  
SCALE: 1"=5'

- LEGEND:**
- TOW = TOP OF WALL
  - BOW = BOTTOM OF WALL
  - GS<sub>TOP</sub> = TOP GROUND SURFACE
  - GS<sub>BOT</sub> = BOTTOM GROUND SURFACE
  - = MIRAFI 5XT
  - = MIRAFI 7XT
  - ◇— = MIRAFI 10XT
  - GGL = GEOGRID LENGTH
  - q = ALLOWABLE BEARING PRESSURE
  - ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING
- NOTES:**
- REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.
  - GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
  - REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.



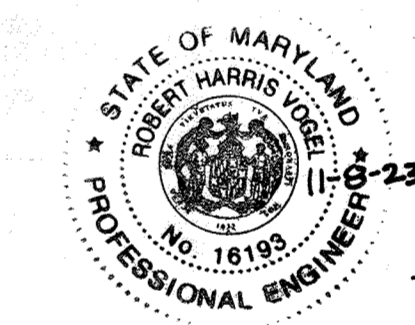
MSE WALL NO. 3 PROFILE STA 0+00 TO 0+72.00  
SCALE: 1"=5'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 10-22-21  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 12-2-21  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

*[Signature]*  
DIRECTOR DATE



AS-BUILT CERTIFICATION FOR PSWM

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

E. NAME: *[Signature]* P.E. # 16193 DATE: 11-8-23

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

NO.	REVISION	DATE

**MSE WALL NO. 2 AND 3 PROFILE**

**ELLCOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 & 5513 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V ZONED: POR  
1ST ELECTION DISTRICT SDP-07-038, WF-08-111, WF-08-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**

3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

**PROFESSIONAL CERTIFICATE**

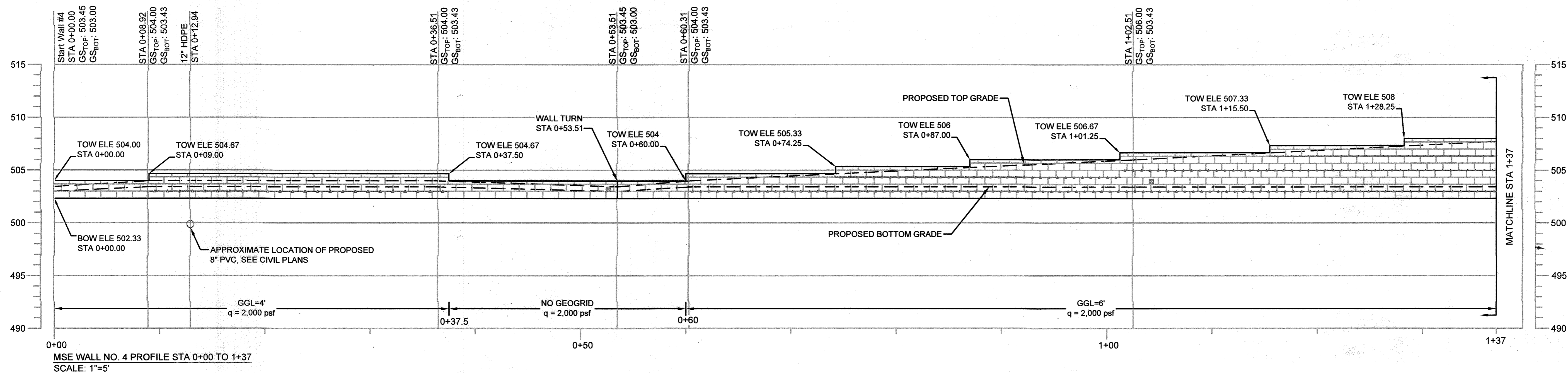
DESIGN BY: KFB  
DRAWN BY: KFB  
CHECKED BY: AM  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

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. 38622 EXPIRATION DATE: 01-31-2022

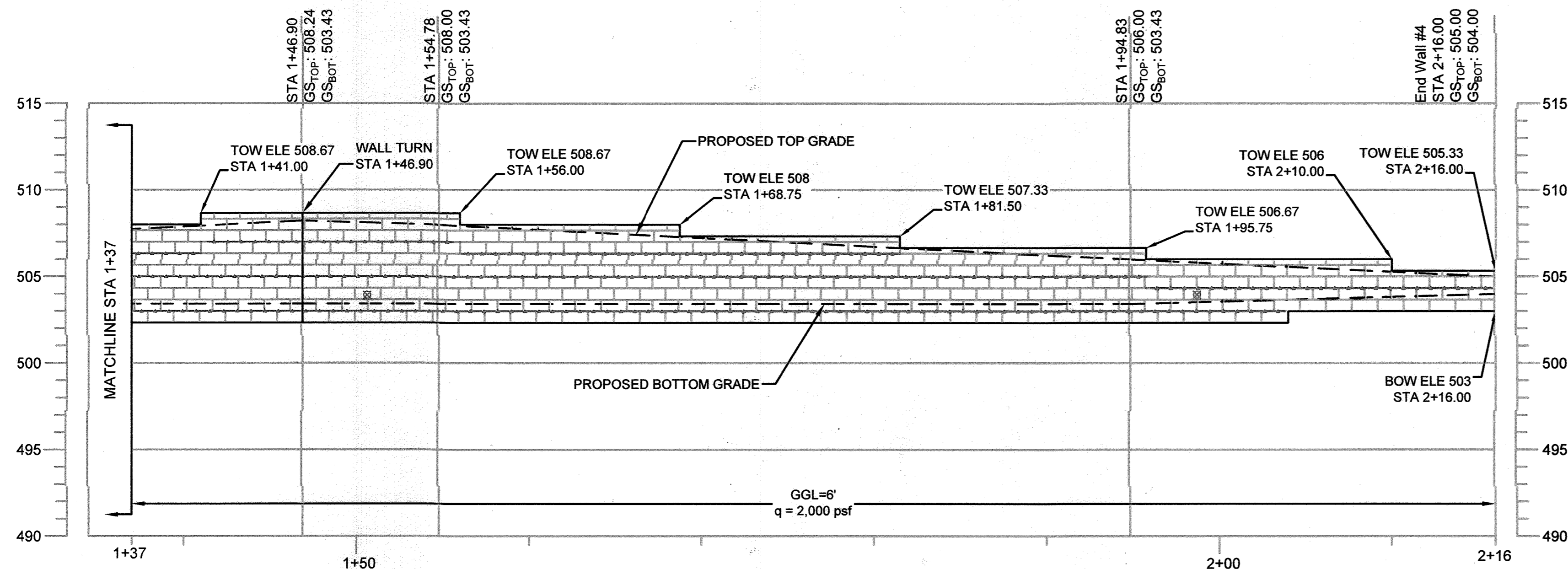
21 SHEET OF 28

NO AS-BUILT INFORMATION ON THIS SHEET





MSE WALL NO. 4 PROFILE STA 0+00 TO 1+37  
SCALE: 1"=5'



MSE WALL NO. 4 PROFILE STA 1+37 TO 2+16  
SCALE: 1"=5'

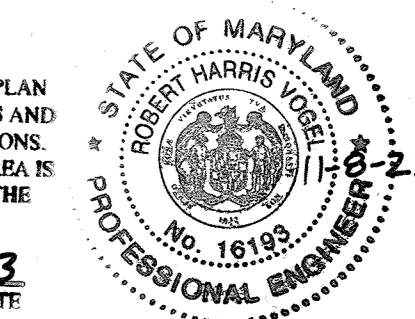
- LEGEND:**
- TOW = TOP OF WALL
  - BOW = BOTTOM OF WALL
  - GS<sub>TOP</sub> = TOP GROUND SURFACE
  - GS<sub>BOT</sub> = BOTTOM GROUND SURFACE
  - = MIRAFI 5XT
  - = MIRAFI 7XT
  - = MIRAFI 10XT
  - GGL = GEOGRID LENGTH
  - q = ALLOWABLE BEARING PRESSURE
  - ⊗ = 4" DIA. DRAIN, 40 FT MAX SPACING

**NOTES:**

1. REFER TO SHEET 25 AND 26 FOR MSE WALL DETAILS.
2. GEOGRID REINFORCEMENT LENGTH MEASURED FROM FACE OF BLOCK.
3. REINFORCED ZONE FILL SHALL EXTEND NOT LESS THAN 5' BEYOND THE ENDS OF GEOGRID.

AS-BUILT CERTIFICATION FOR PSWM  
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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

NAME: 16199 P.E.#  
DATE: 11-8-23



**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

NO.	REVISION	DATE

**MSE WALL NO. 4 PROFILE**

**ELLCOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 & 5513 WATERLOO ROAD ZONED: POP  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V PARCEL 428 & 467  
1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**

3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

DESIGN BY: KFB  
DRAWN BY: KFB  
CHECKED BY: AM  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

PROFESSIONAL CERTIFICATE  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 38822  
EXPIRATION DATE: 01-31-2022

22 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

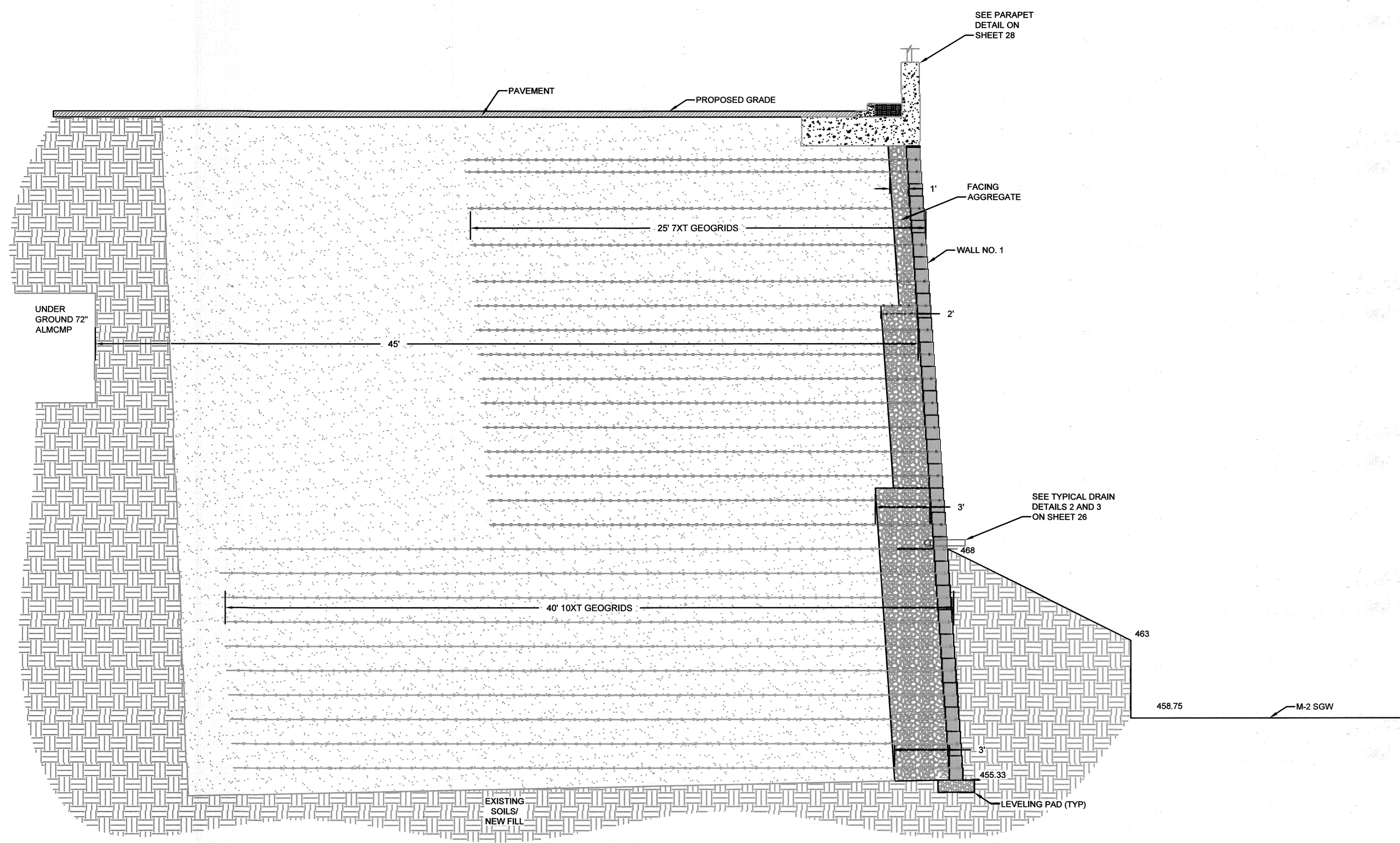
[Signature] 10-22-21  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 11/1/21  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

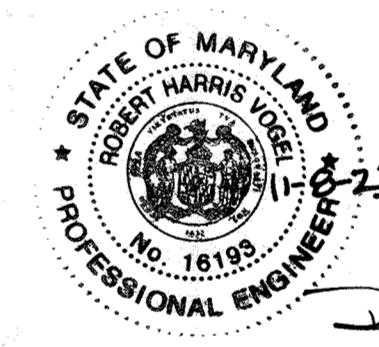
[Signature] 12-2-21  
DIRECTOR DATE

NO AS-BUILT INFORMATION ON THIS SHEET





CROSS SECTION A-A' (WALL 1 STA 5+12)



AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 P.E. NAME: Robert Harris P.E.#: 16193 DATE: 11-2-23

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATUXENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

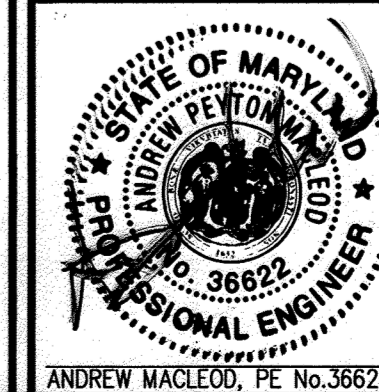
NO.	REVISION	DATE

MSE WALL NO. 1  
 CROSS-SECTION A-A'

ELLICOTT GARDENS II  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5514 & 5513 WATERLOO ROAD ZONED: PDR  
 TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-09-042V PARCEL 428 & 467  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**

3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com



DESIGN BY: KFB  
 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

PROFESSIONAL CERTIFICATE  
 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. 36622. EXPIRATION DATE: 01-31-2022

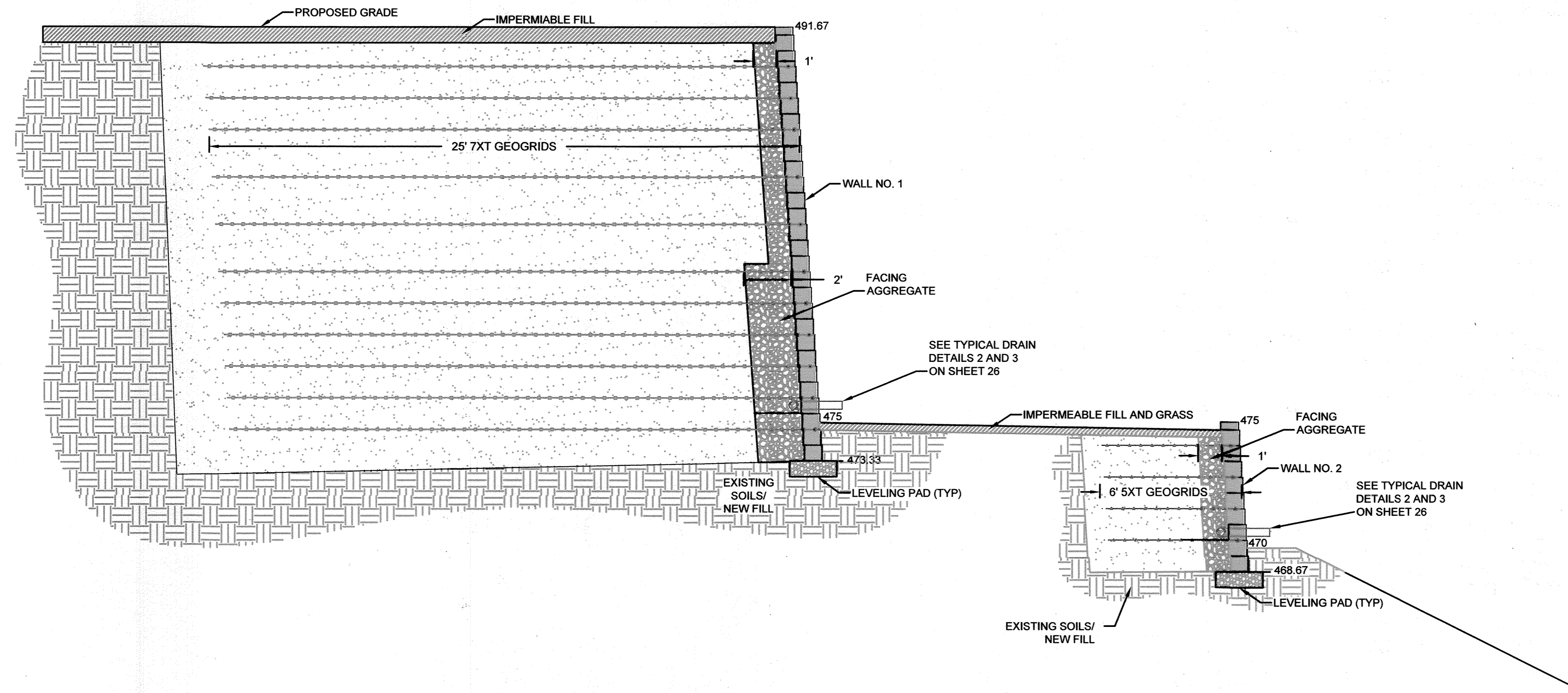
23 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION [Signature] DATE: 10-22-21  
 CHIEF, DIVISION OF LAND DEVELOPMENT [Signature] DATE: 11/9/21  
 DIRECTOR [Signature] DATE: 12-2-21

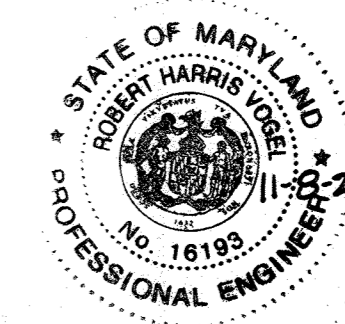
NO AS-BUILT INFORMATION ON THIS SHEET

AS-BUILT SEPTEMBER 2023





CROSS SECTION B-B' (WALL 1 STA 6+03, WALL 2 STA 0+43)



AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 R.H. 18193 11-8-23  
 P.E. # DATE

OWNER/DEVELOPER  
 HOWARD COUNTY HOUSING COMMISSION  
 9770 PATRIMENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

NO.	REVISION	DATE

MSE WALL NO. 1 AND 2  
 CROSS-SECTION B-B'  
 ELLICOTT GARDENS II  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD ZONED: POP  
 TAX MAP 31 BLOCK 19 BA-08-005V, SDP-07-038, F-08-064, BA-08-042V PARCEL 428 & 467  
 1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND

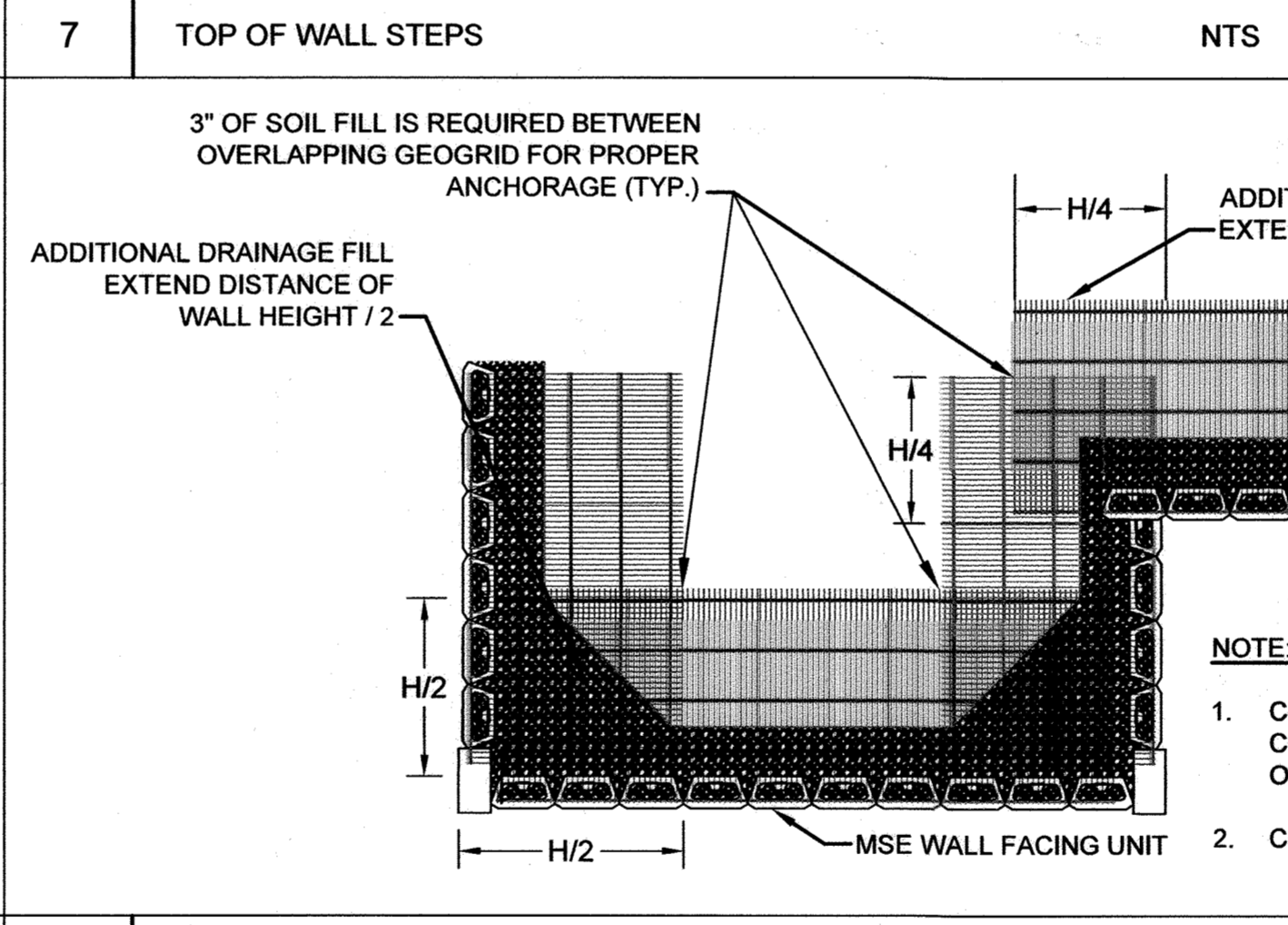
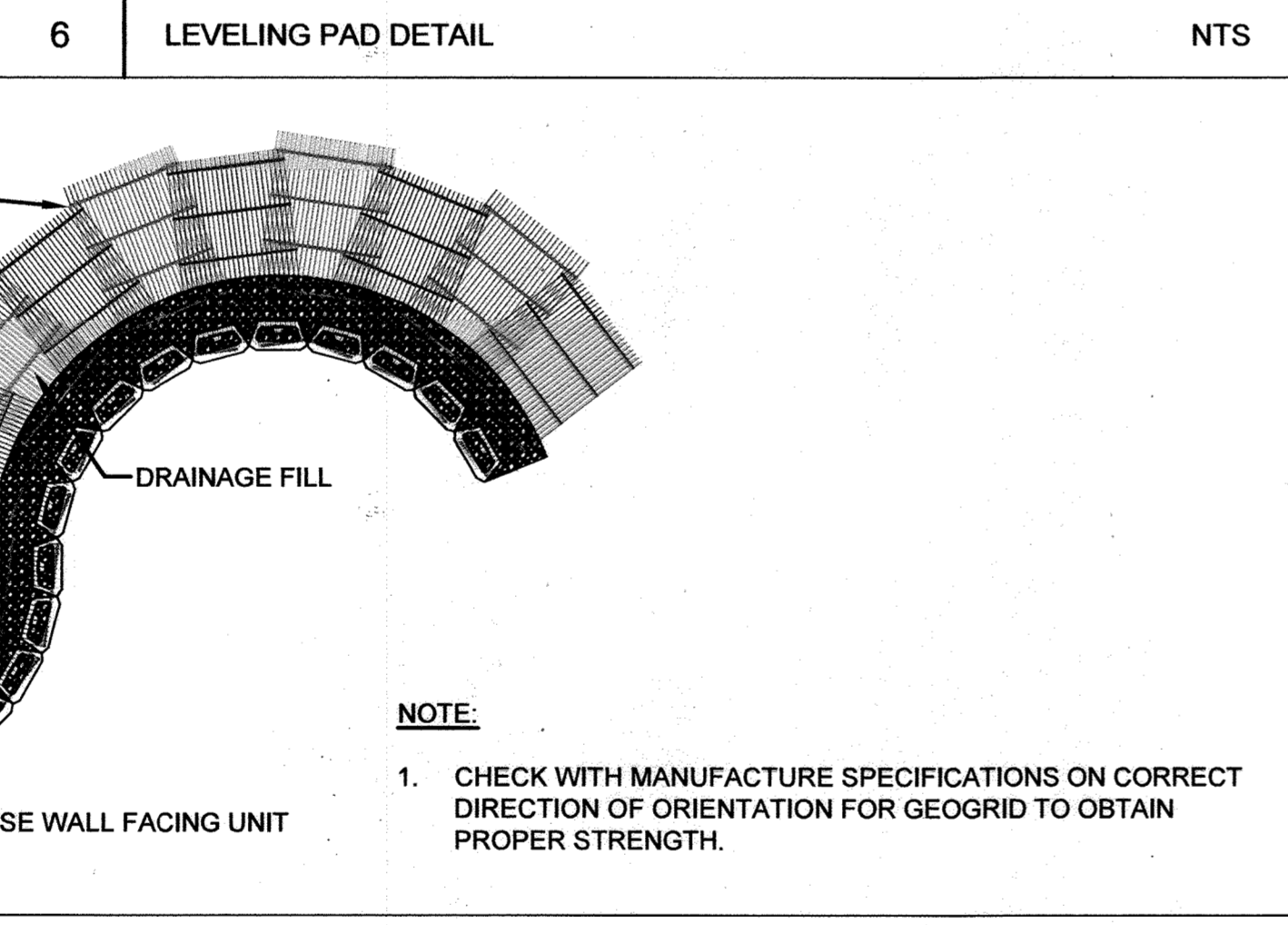
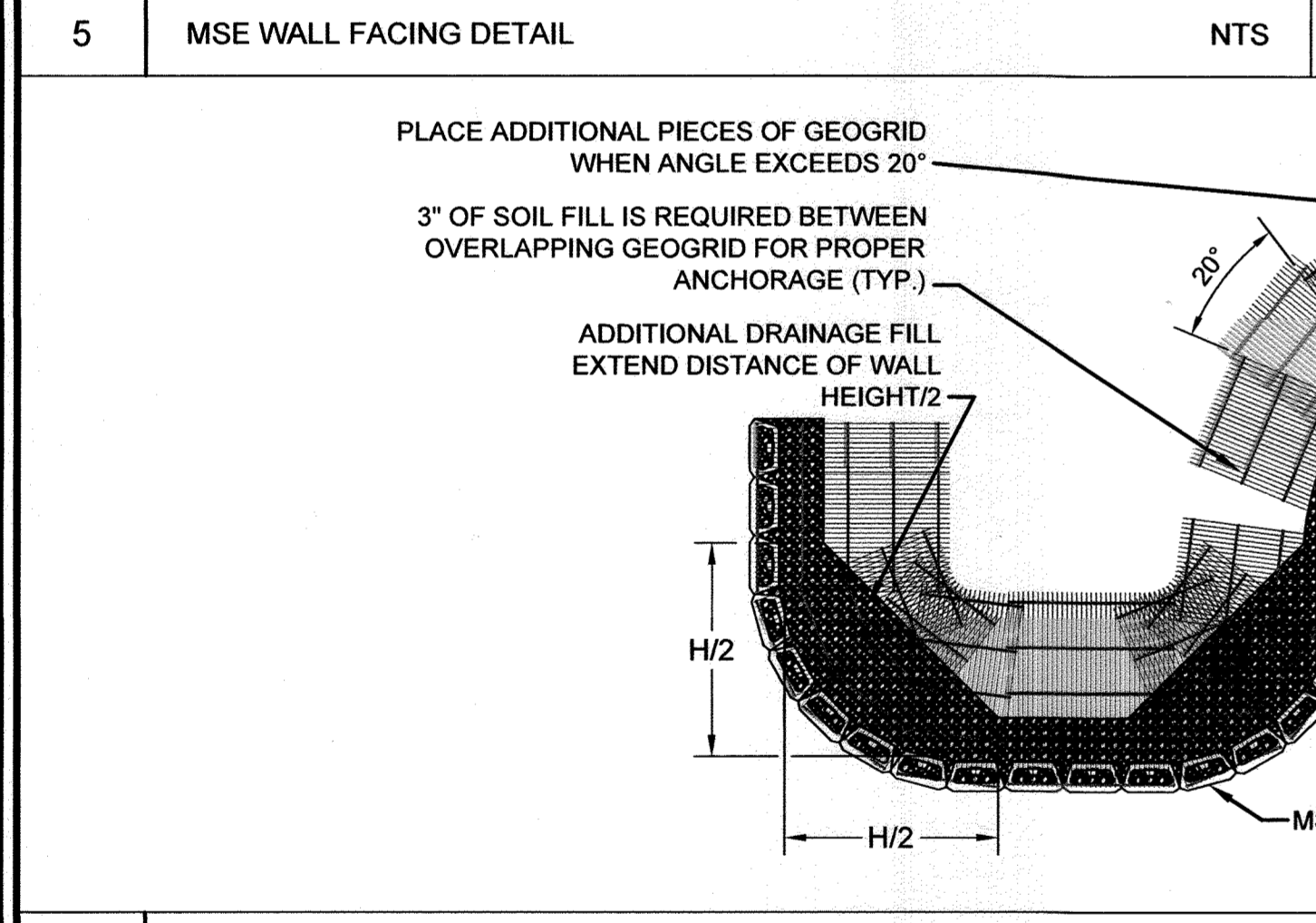
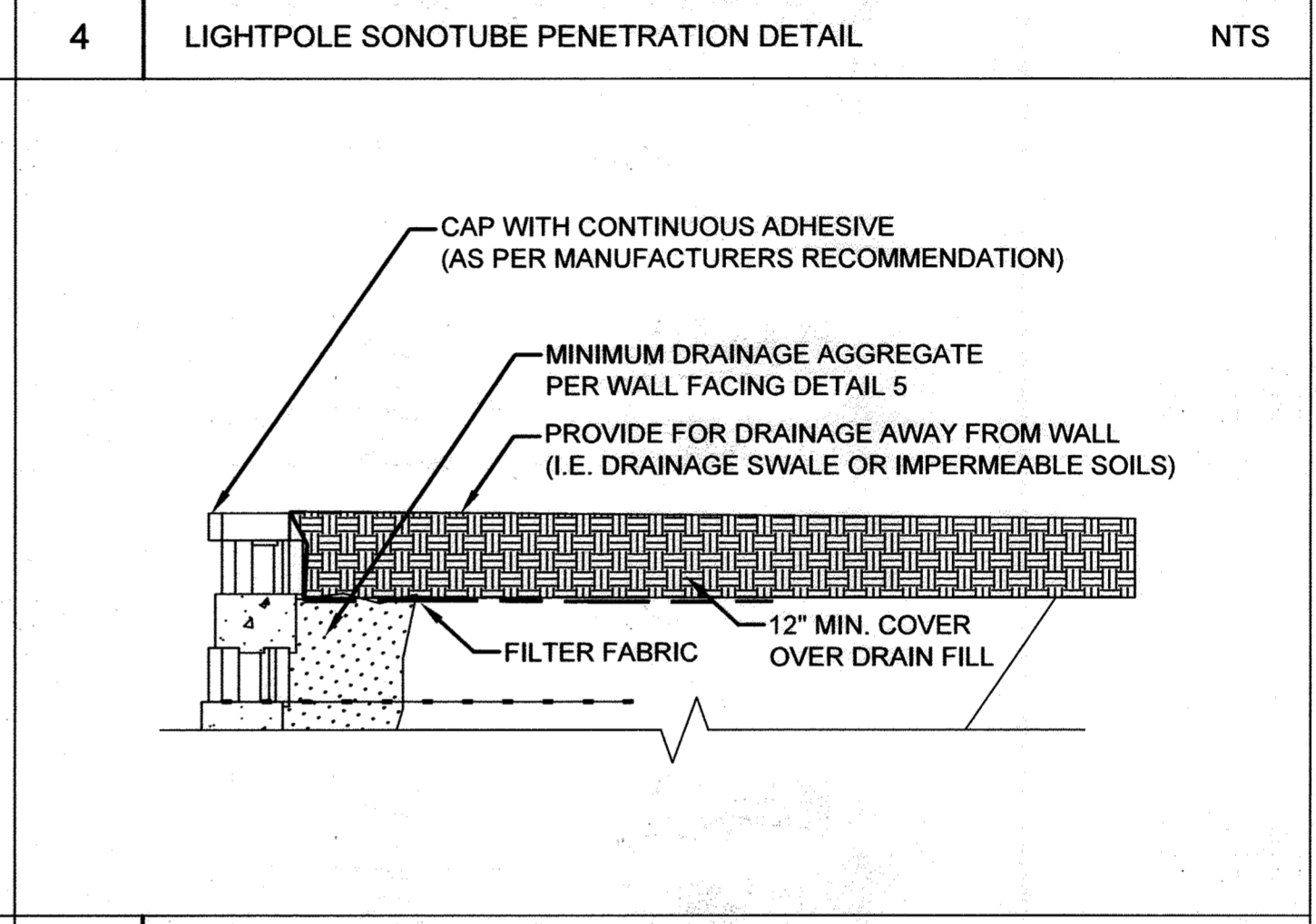
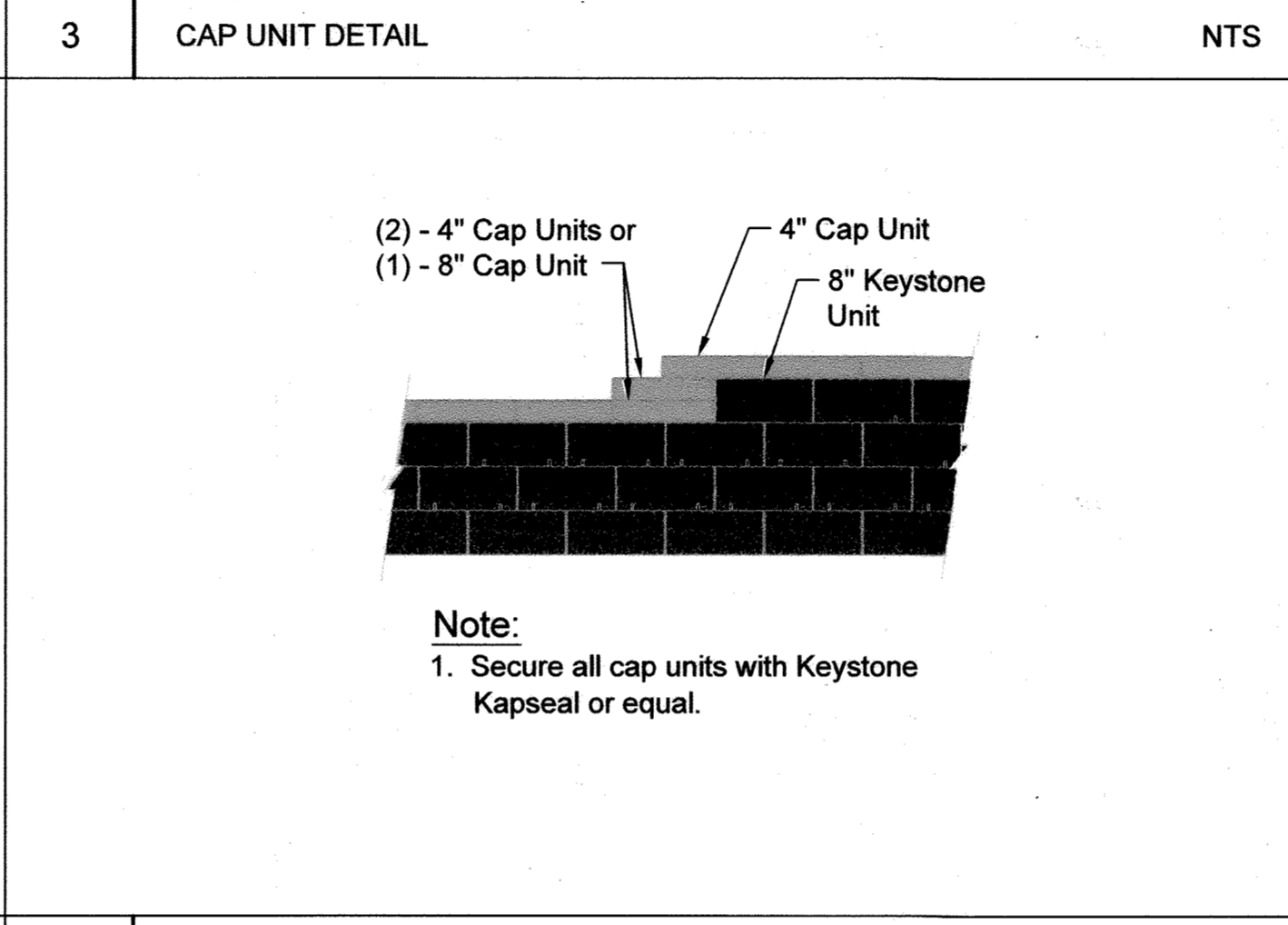
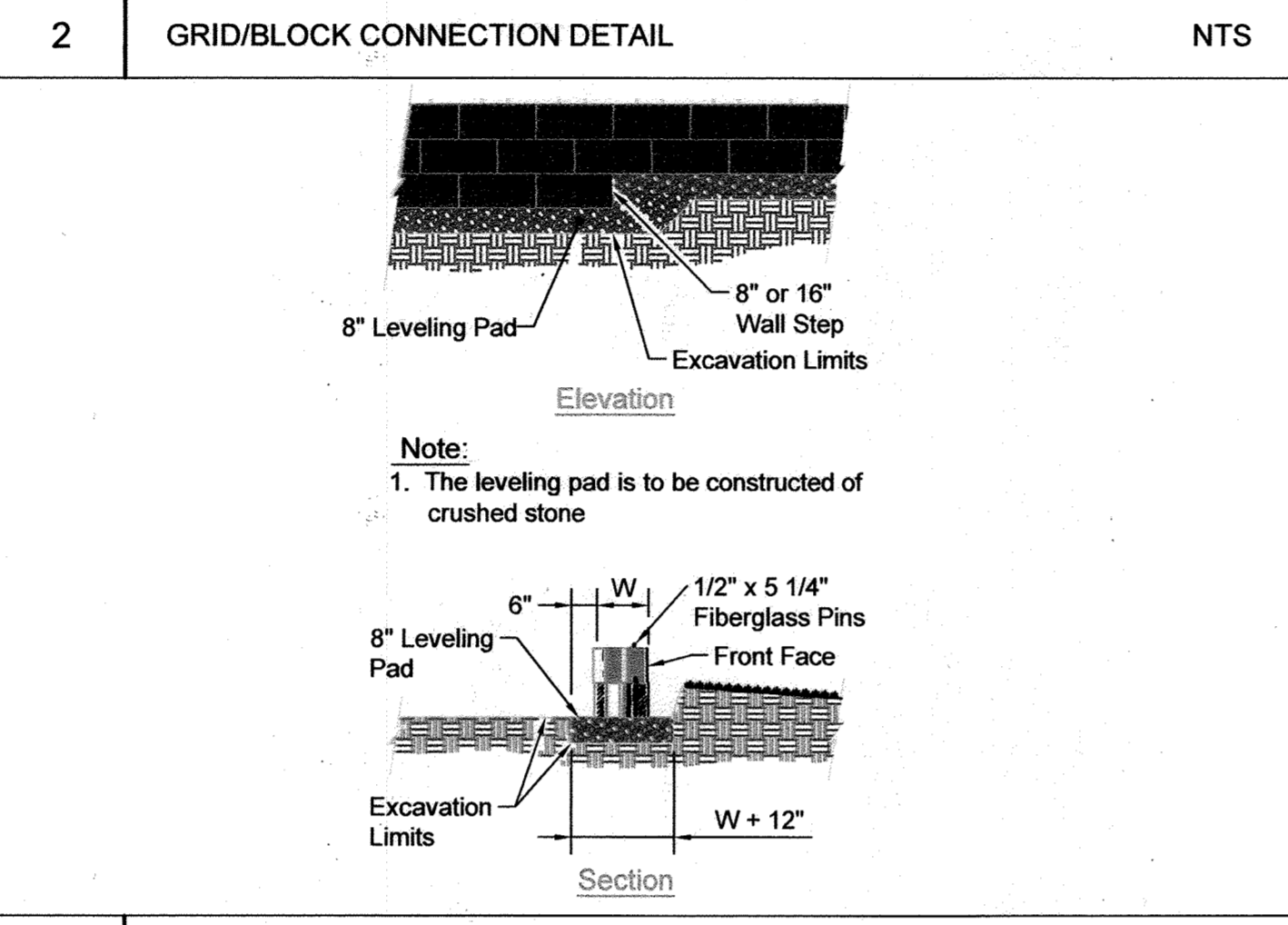
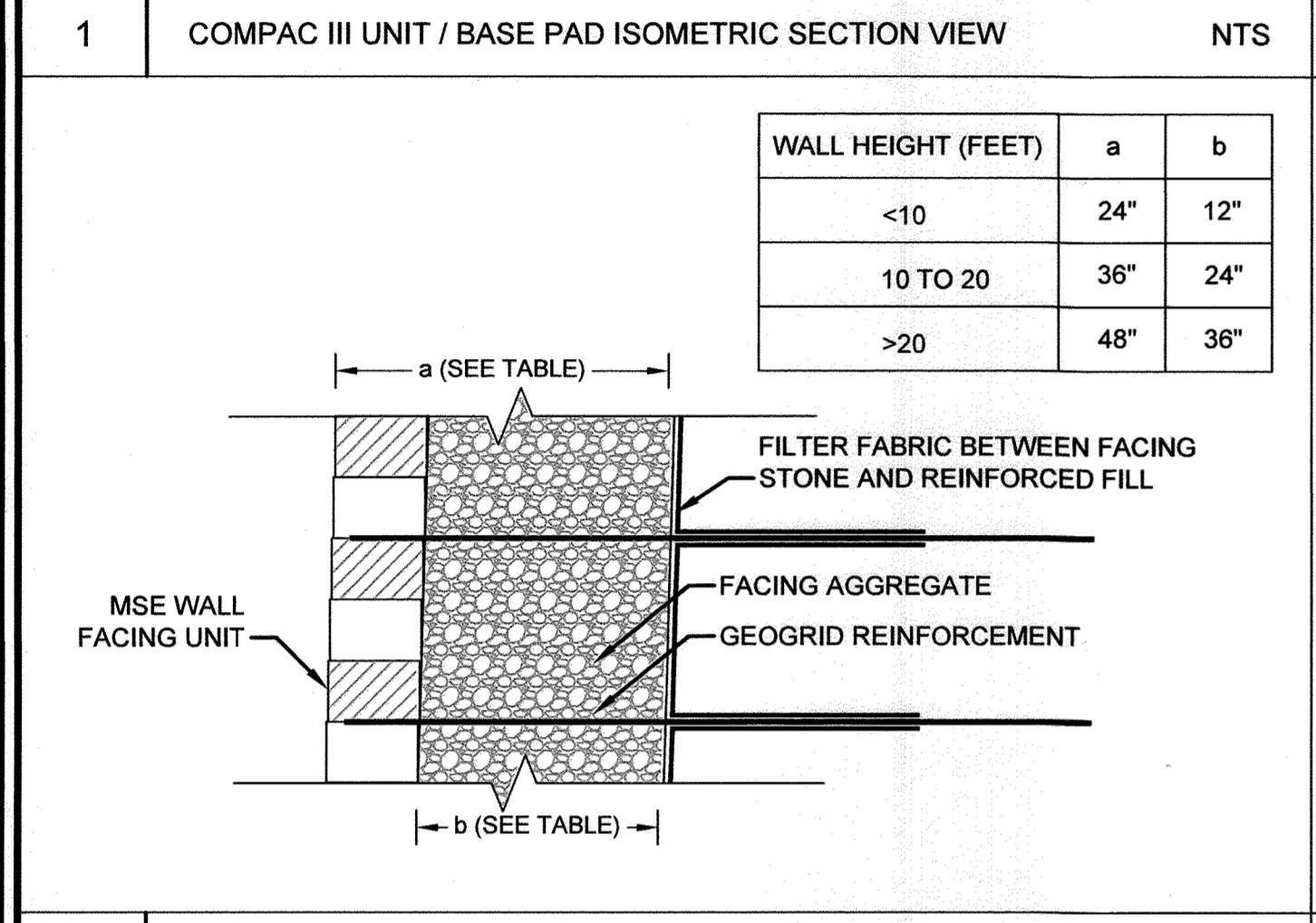
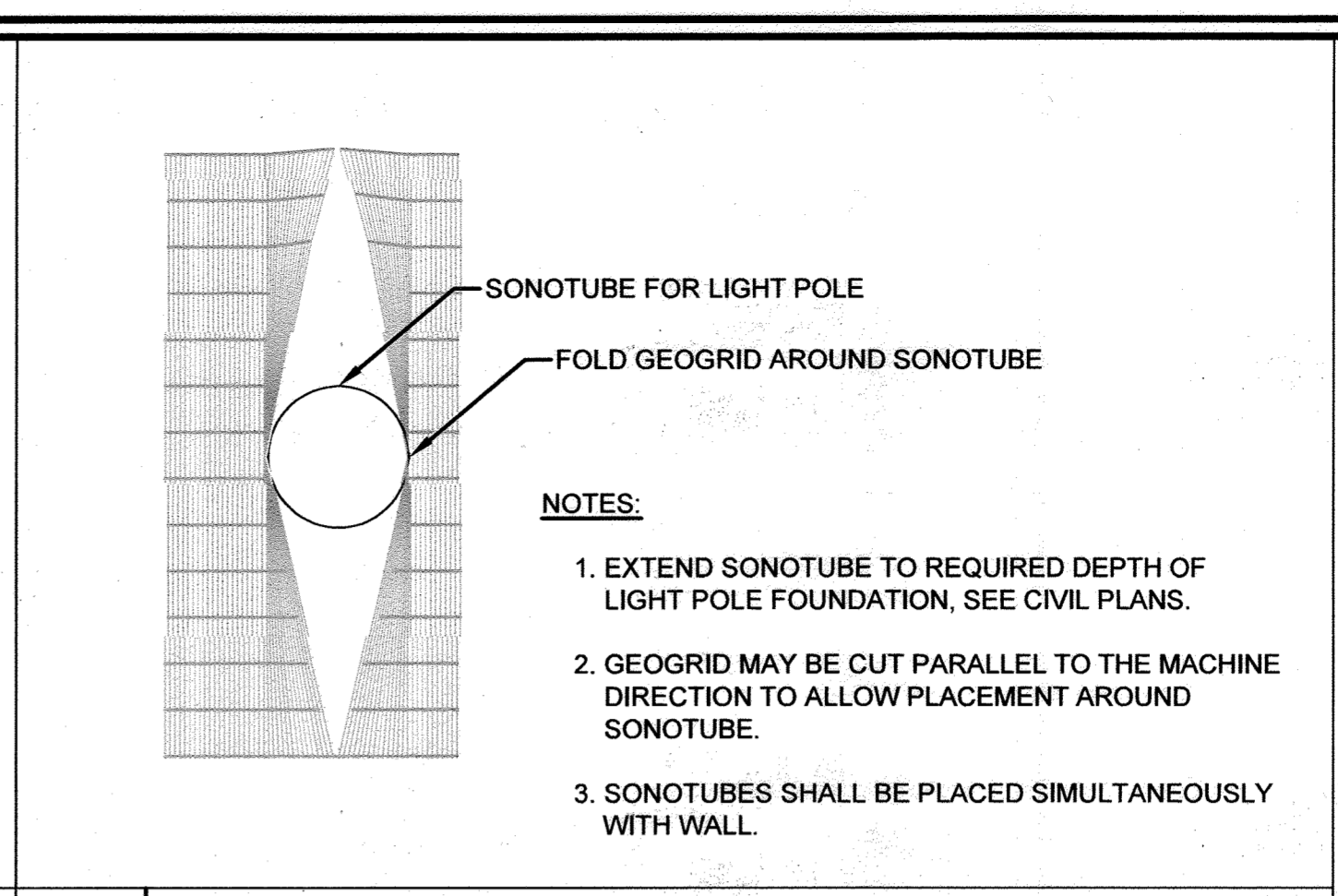
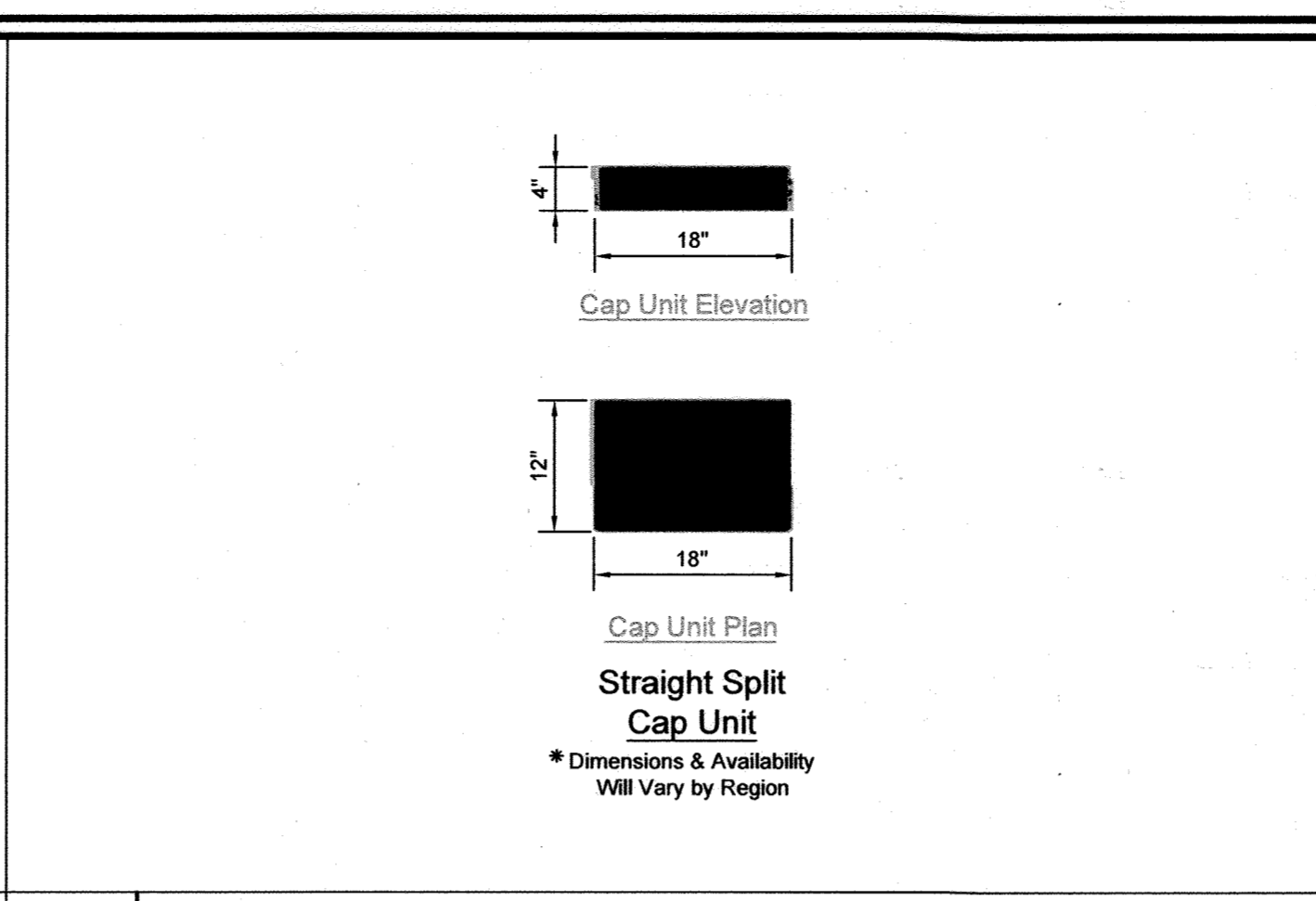
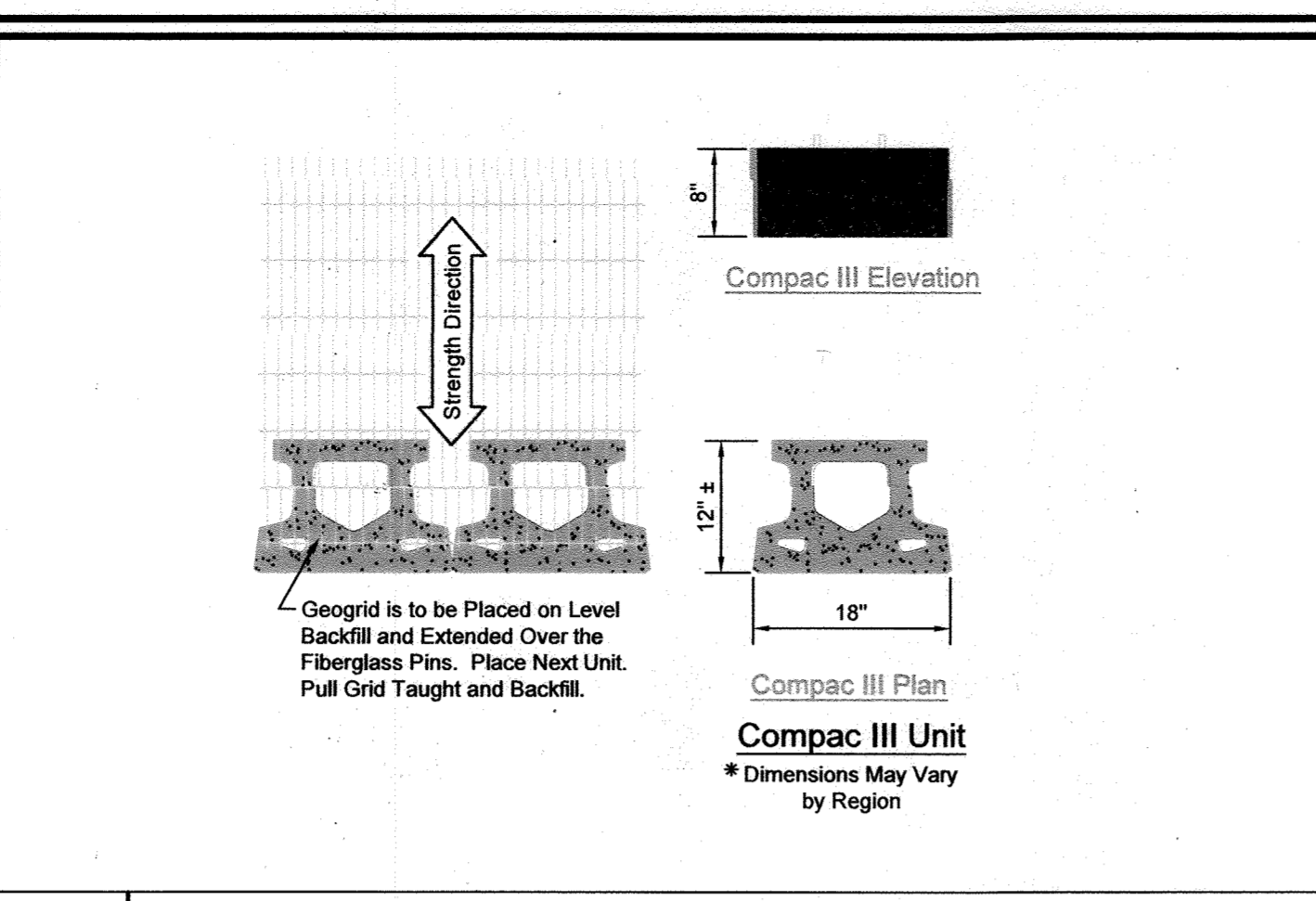
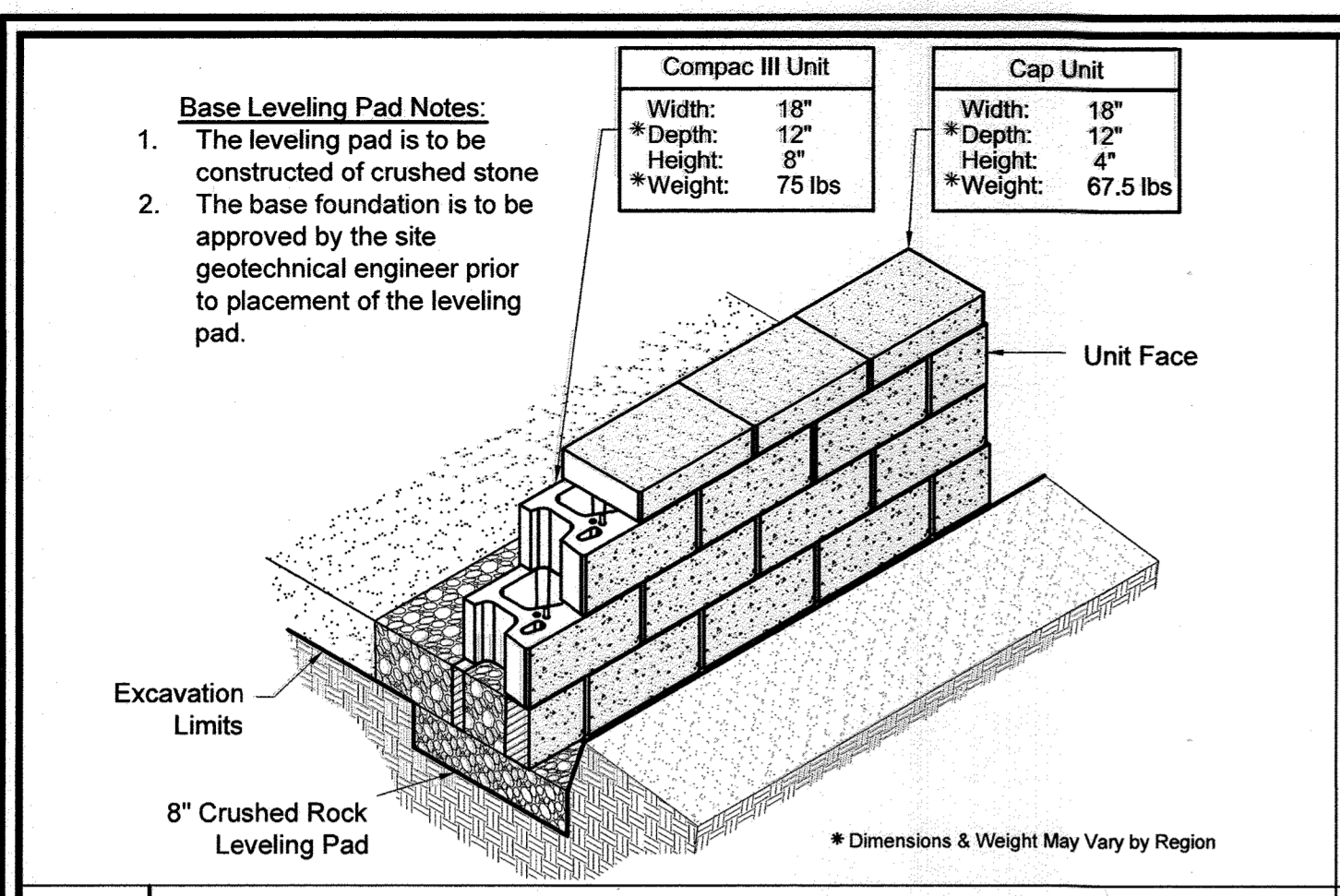
**ECS MID-ATLANTIC, LLC**  
 3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
 P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

	DESIGN BY: KFB	PROFESSIONAL CERTIFICATE 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. 36622 EXPIRATION DATE: 01-31-2022
	DRAWN BY: KFB	
	CHECKED BY: AM	
	DATE: AUGUST 2021	
SCALE: AS SHOWN	NO. OF SHEETS: 24 OF 28	
W.O. NO.: 06-01/		

NO AS-BUILT INFORMATION ON THIS SHEET

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 10-22-21  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
 [Signature] 11/9/21  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE  
 [Signature] 12-2-21  
 DIRECTOR DATE





AS-BUILT CERTIFICATION FOR PSWM

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

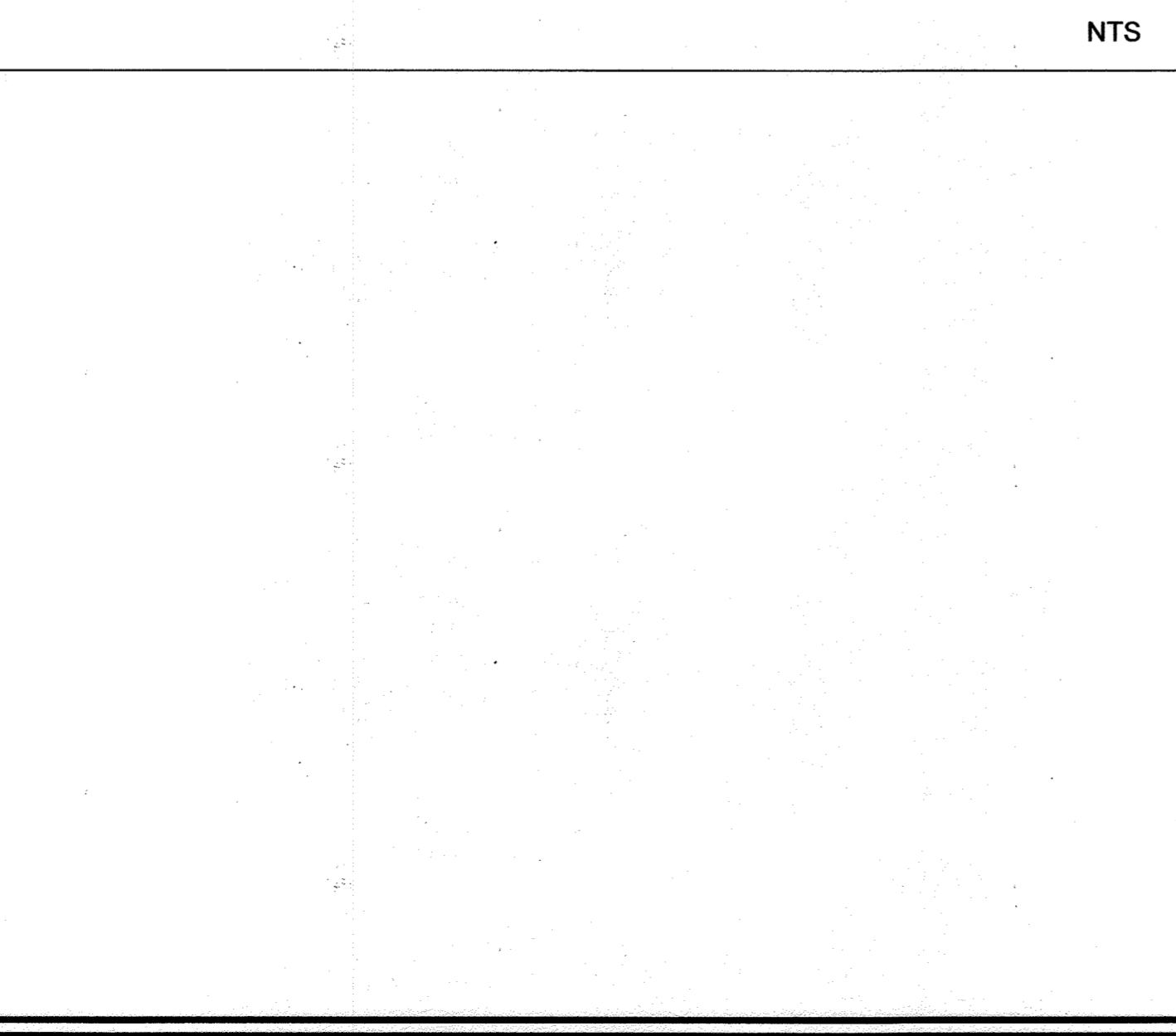
STATE OF MARYLAND  
 ROBERT HARRIS YORK  
 PROFESSIONAL ENGINEER  
 No. 16193  
 NAME: [Signature] P.E.#: 16193 DATE: 11-8-23

**OWNER/DEVELOPER**  
 HOWARD COUNTY HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD  
 9770 PATUMENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division  
 Chief, Division of Land Development  
 Director

10-22-21  
 11/14/21  
 12-2-21



NO AS-BUILT INFORMATION ON THIS SHEET

MSE WALL DETAILS

ELLICOTT GARDENS II  
 HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
 5511 & 5513 WATERLOO ROAD  
 9770 PATUMENT WOODS DRIVE  
 COLUMBIA, MD 21046  
 410-730-3725

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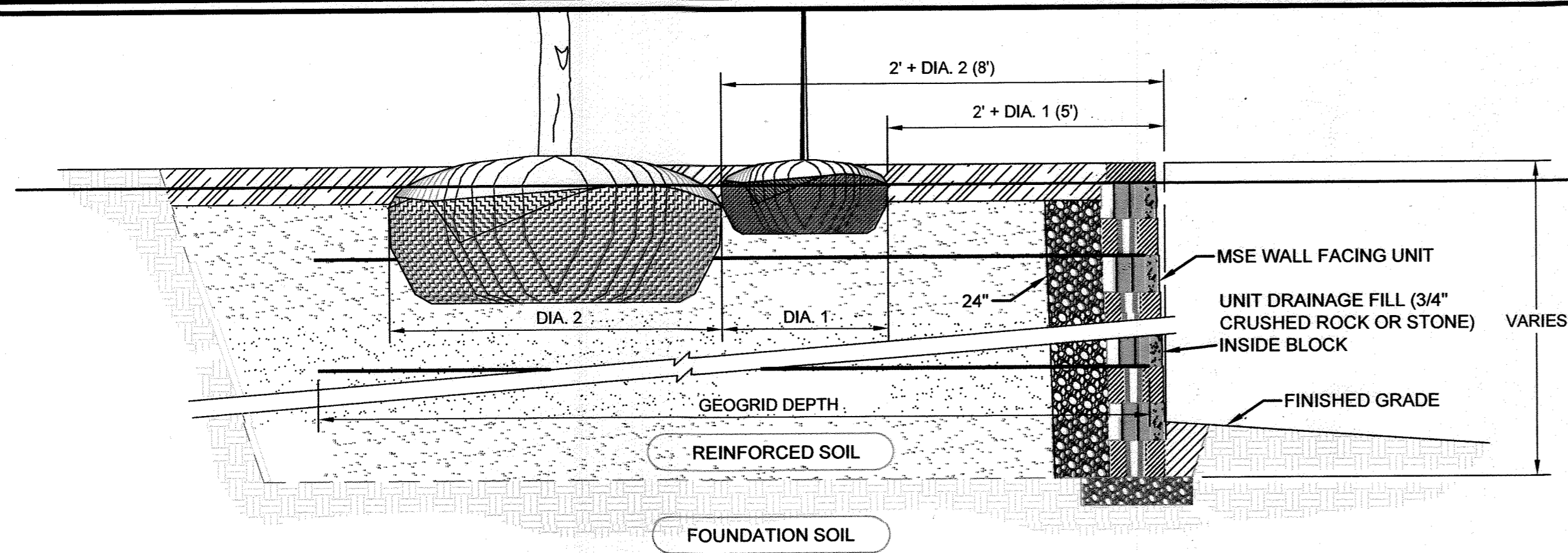
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 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
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 W.O. NO.: 06-01/

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 EXPIRATION DATE: 01-31-2022

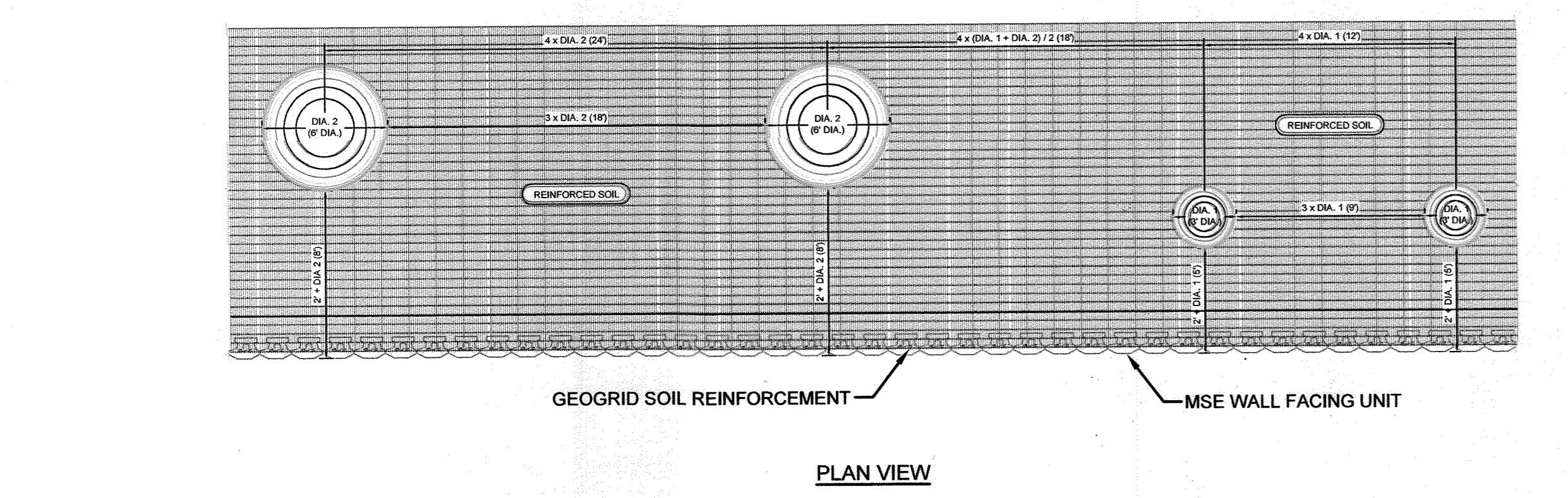
ANDREW MACLEOD, PE No. 38622

25 SHEET OF 28



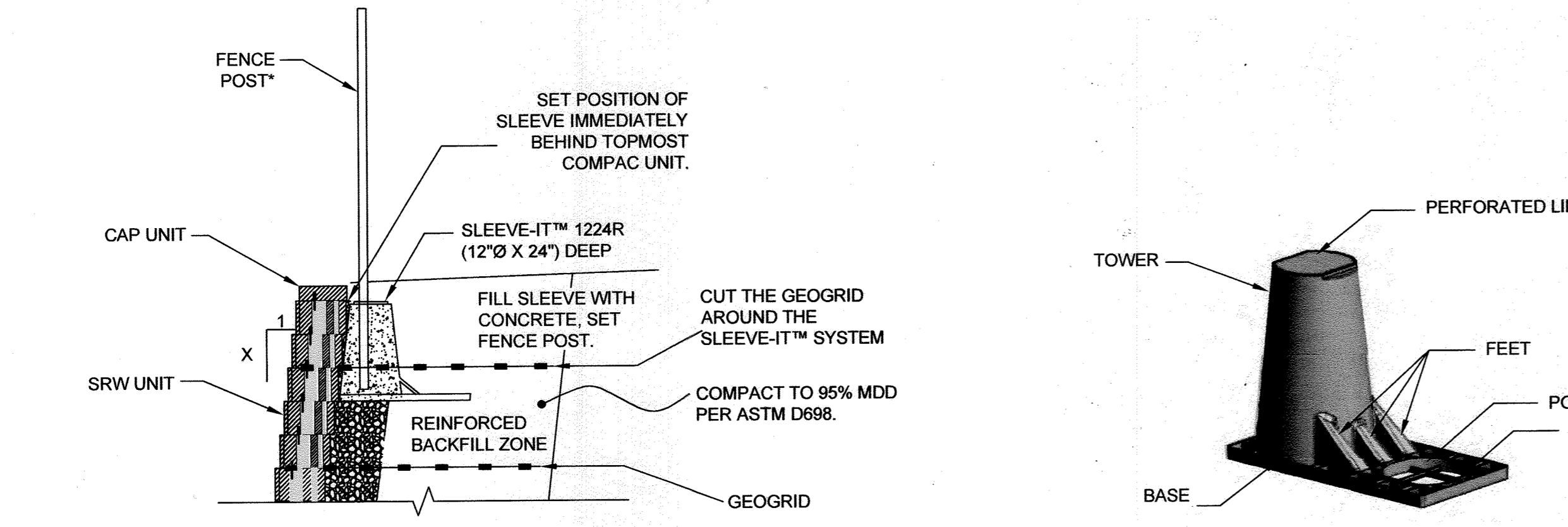


SECTION VIEW

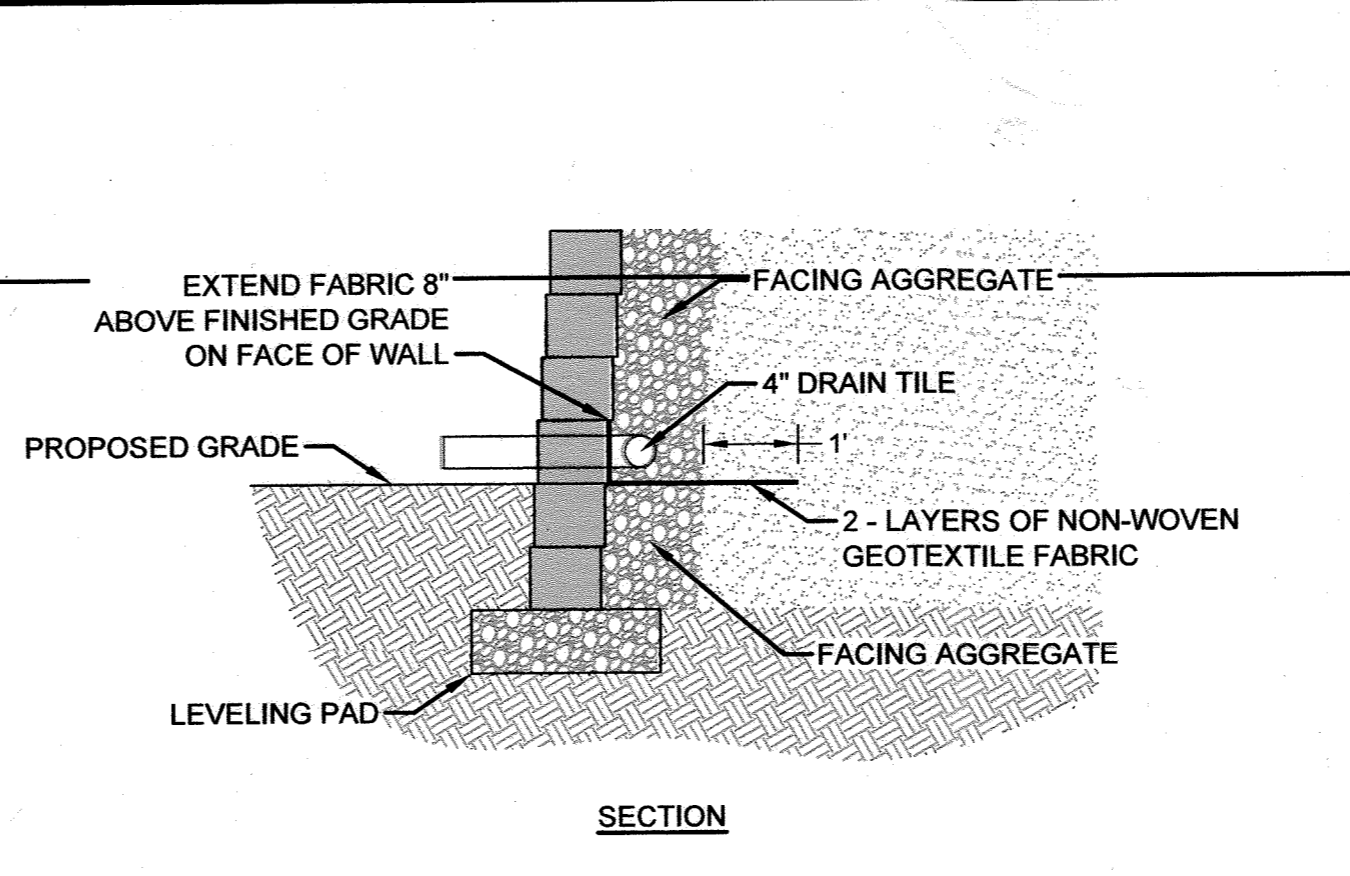


PLAN VIEW

1 TYPICAL PLANTING LIMITS DETAIL NTS

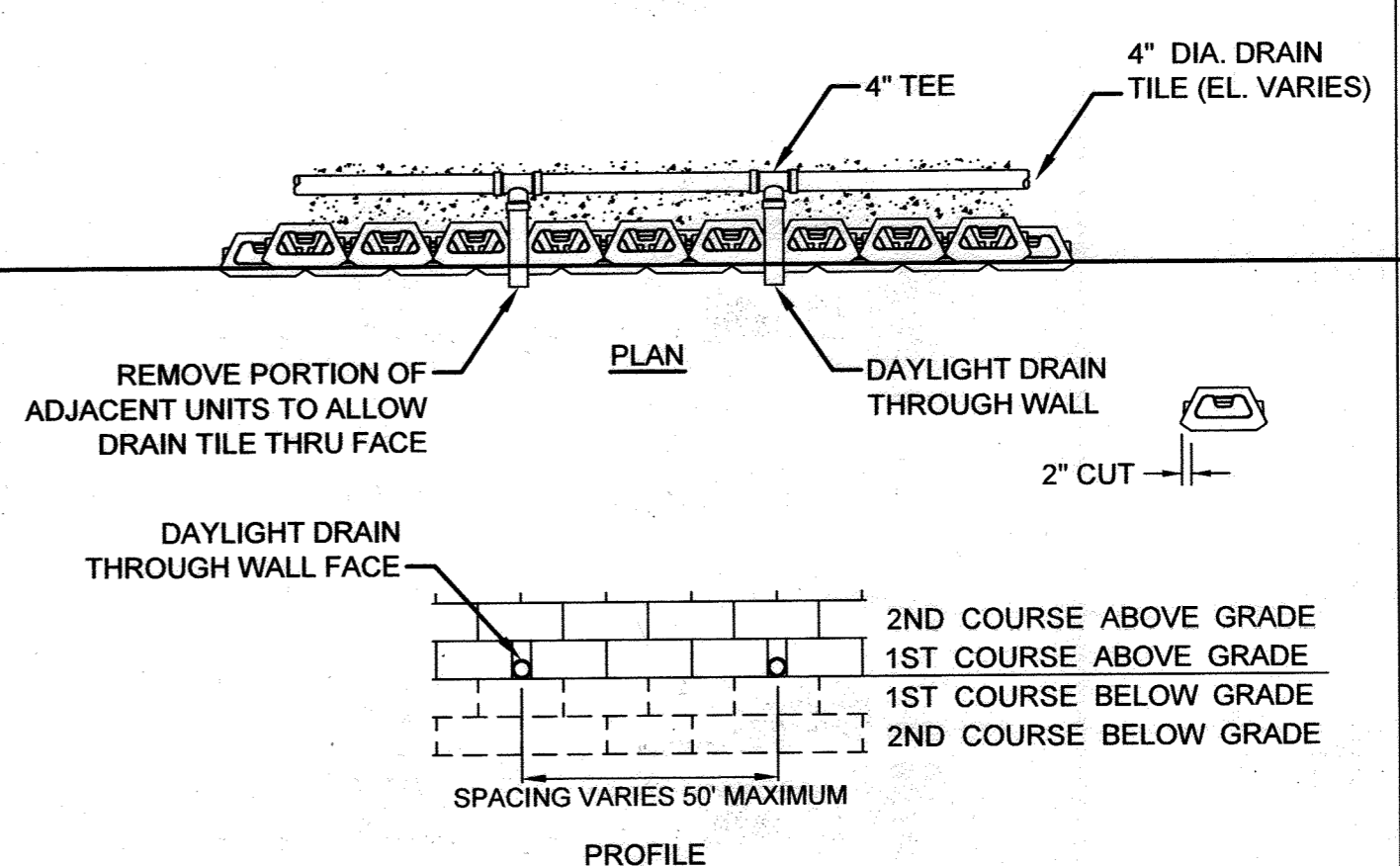


5 FENCE POST INSTALLATION USING SLEEVE-IT™ 1224R NTS



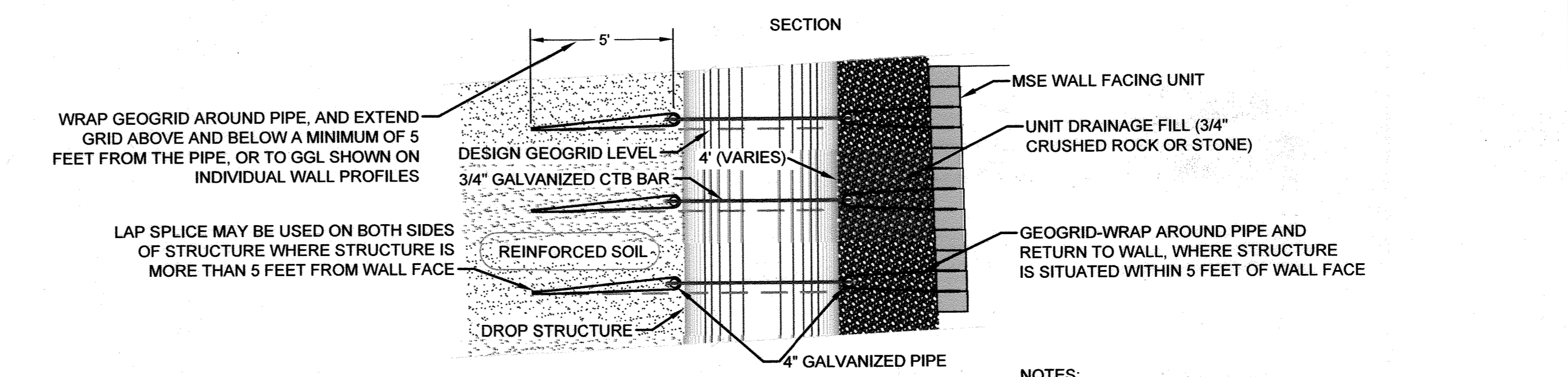
SECTION

2 TYPICAL DRAIN DETAIL NTS



PROFILE

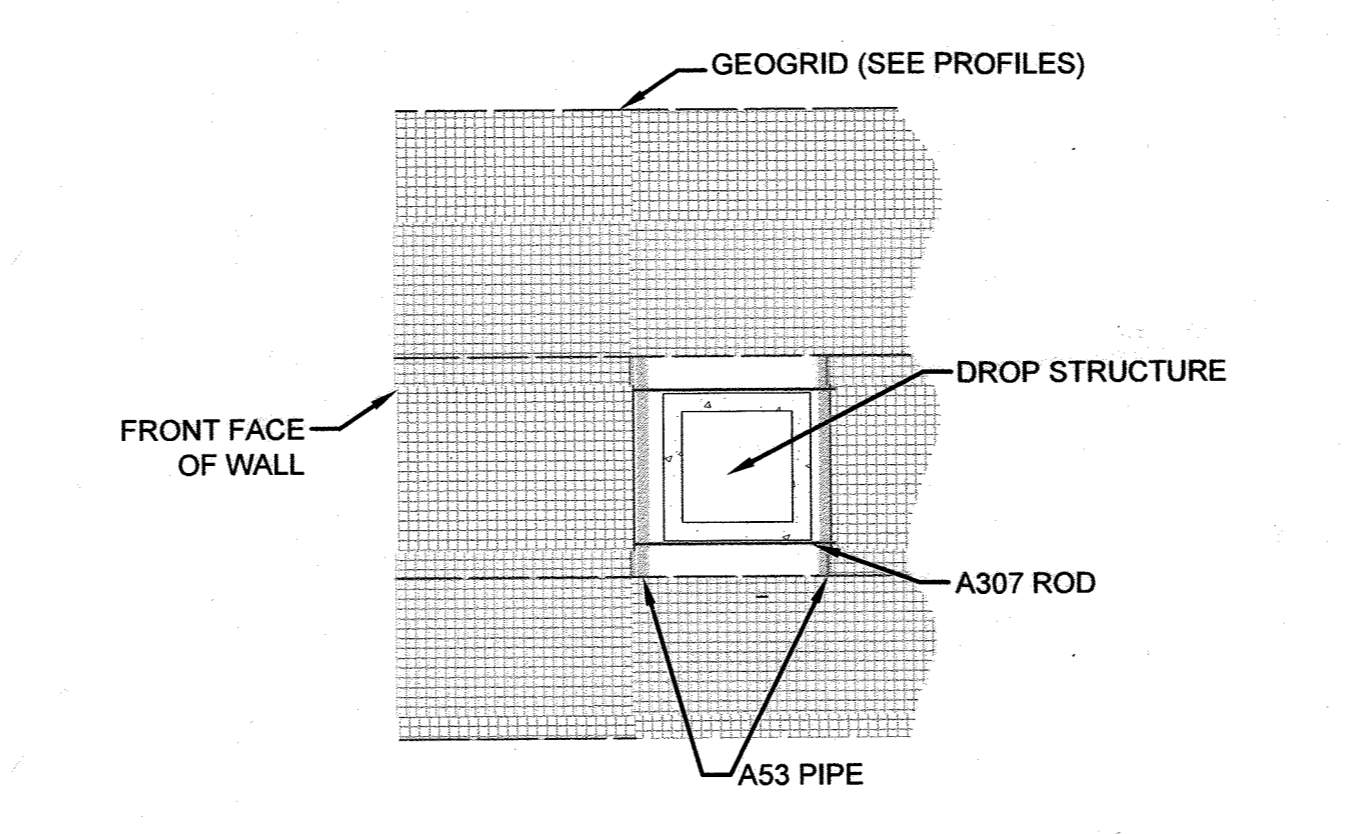
3 TYPICAL DRAIN DETAIL NTS



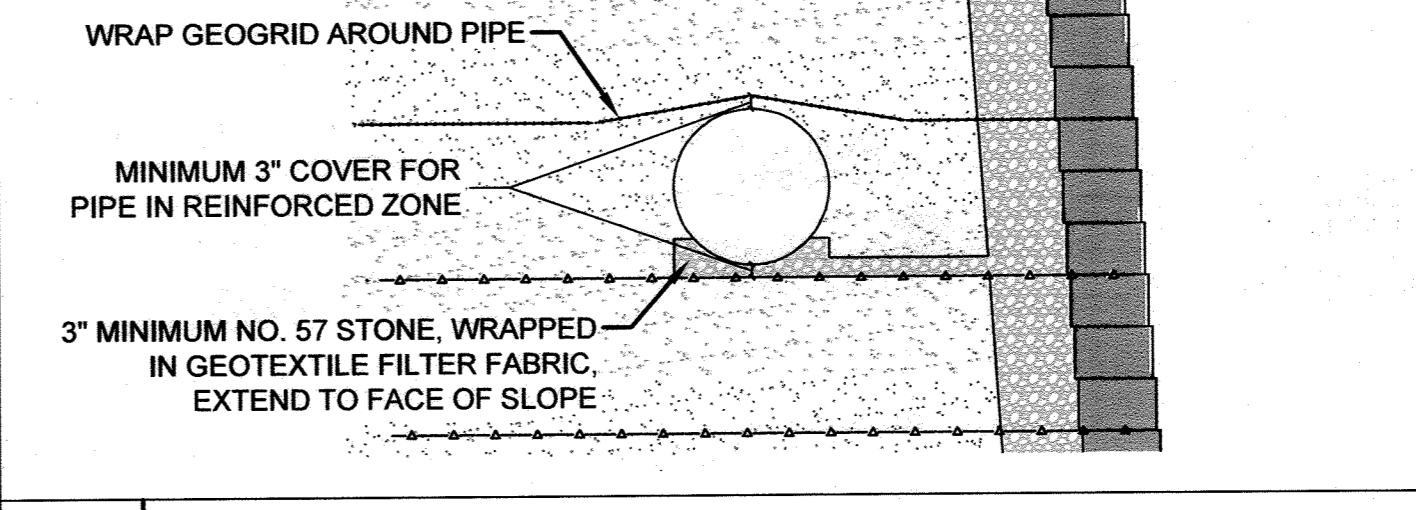
NOTES:

- CONTRACTOR MAY SUBSTITUTE REINFORCEMENT STRAP FOR PIPE AND ROD. CONTRACTOR SHALL USE PVC PIPE WITH 90 DEGREE ELBOWS AT ENDS AS A SUBSTITUTE FOR GALVANIZED PIPE WITH REINFORCEMENT STRAP.

4 TYPICAL DROP STRUCTURE IN REINFORCED ZONE - SECTION VIEW NTS



6 TYPICAL DROP STRUCTURE IN REINFORCED ZONE - PLAN VIEW NTS



7 TYPICAL PIPE IN REINFORCED ZONE DETAIL NTS

OWNER/DEVELOPER  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
COLUMBIA, MD 21046  
410-730-3725

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 10-22-21  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
 [Signature] 11/9/21  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE  
 [Signature] 12-2-21  
 DIRECTOR DATE



AS-BUILT CERTIFICATION FOR PSWM  
 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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.  
 P.E. NAME: [Signature] P.E.#: 16193 DATE: 11-8-23

NO AS-BUILT INFORMATION ON THIS SHEET

NO.	REVISION	DATE

MSE WALL DETAILS

ELLICOTT GARDENS II  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 & 5513 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-064, BA-08-042V PARCEL 428 & 467 1ST ELECTION DISTRICT SDP-07-038, WF-08-111, WF-08-085 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**  
3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com

PROFESSIONAL CERTIFICATE  
 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. 36622 EXPIRATION DATE: 01-31-2022

DESIGN BY: KFB  
 DRAWN BY: KFB  
 CHECKED BY: AM  
 DATE: AUGUST 2021  
 SCALE: AS SHOWN  
 W.O. NO.: 06-01/

26 SHEET OF 28

ANDREW MACLEOD, P.E. No. 36622



1.0 GENERAL

- 1. THE CONSTRUCTION OF THE MECHANICALLY STABILIZED EARTH (MSE) WALL SHOWN ON THESE PLANS SHALL BE MONITORED AND TESTED BY THE OWNER'S INDEPENDENT TESTING AGENCY (ITA) ON A FULL TIME BASIS TO CONFIRM THAT THE CONSTRUCTION IS IN ACCORDANCE WITH THE INTENT OF THE DESIGN.
2. UNLESS INDIVIDUALLY IDENTIFIED THE TERM WALL OR WALLS REFERS TO ANY MSE WALL SHOWN ON THESE DRAWINGS.
3. IF THE ELEVATION, LOCATION, SURCHARGE LOADING, OR GRADING SURROUNDING THE WALL CHANGES FROM THOSE DEPICTED ON THESE PLANS, ECS SHALL BE NOTIFIED SO THAT MODIFICATIONS TO THE GEOTECHNICAL DESIGN CAN BE MADE, IF NECESSARY.
4. THE FINAL GRADES SURROUNDING THE WALL SHALL NOT BE MODIFIED WITHOUT NOTIFYING THE ENGINEER. ANY MODIFICATION TO THE GRADES BELOW OR ABOVE THE WALL MAY POSE CONSIDERABLE RISK TO THE PERFORMANCE/STABILITY OF THE WALLS.
5. WHERE DISCREPANCIES ARE NOTED WITHIN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF SUCH DISCREPANCIES IN WRITING.
6. THESE PLANS SHALL NOT BE SCALED OR USED FOR LOCATION OF PAVEMENTS, STRUCTURES OR RETAINING WALLS. THE CONTRACTOR SHALL PROVIDE LAYOUT AND COORDINATION.
7. BLOCKS, DRAINAGE AGGREGATE, REINFORCED FILL, AND RETAINED FILL SHALL BE BROUGHT UP SIMULTANEOUSLY. NONE OF THESE ITEMS SHOULD LEAD ANOTHER BY MORE THAN ONE COURSE HEIGHT.
8. THE GEOGRID REINFORCEMENT SHALL NOT BE CUT OR AUGERED THROUGH. WHERE THE GEOGRID MUST BE CUT FOR INSTALLATION OF SHALLOW LANDSCAPING, THE GEOGRID REMOVAL MUST BE LIMITED AND PERFORMED WITH CARE.
9. UTILITIES MUST BE INSTALLED CONCURRENT WITH WALL CONSTRUCTION. GEOGRID SHALL NOT BE CUT TO FACILITATE UTILITY CONSTRUCTION. THE LOCATIONS AND ELEVATIONS OF ALL UTILITIES SHALL BE ACCURATELY LOCATED PRIOR TO AND DURING WALL CONSTRUCTION TO ENSURE THE WALL CONSTRUCTION IS IN STRICT CONFORMANCE WITH THESE DRAWINGS.

A. RESPONSIBILITY FOR CONSTRUCTION COMPLIANCE

- 1. THE CONTRACTOR MUST PROVIDE FOR THE CONSTRUCTION OF THE WALL IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, PLANS AND SPECIFICATIONS. THE CONTRACTOR IS ALSO RESPONSIBLE FOR THE VERIFICATION OF LINE, GRADE AND OTHER PHYSICAL FEATURES.
2. ENSURE WALL IS ALONG THE PROPER ALIGNMENT, AND WITHIN APPROPRIATE PROPERTY BOUNDARIES, AND CONSTRUCTION EASEMENTS.
3. CONTRACTOR IS SOLELY RESPONSIBLE FOR QUALITY OF THE WORK, INSPECTION, MONITORING, AND WALL TESTING BY THE OWNER, THEIR DESIGNATED REPRESENTATIVE, OR ECS ARE SOLELY AT THE DISCRETION OF THE OWNER, AND IN NO WAY RELIEVE THE CONTRACTOR OF SOLE RESPONSIBILITY FOR MAINTAINING A QUALITY CONTROL PLAN.
4. CONTRACTOR SHALL CONTACT MISS UTILITY A MINIMUM OF THREE (3) DAYS PRIOR TO START OF WORK.
5. THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, AND MATERIALS TO CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER. DURING THE COURSE OF THE CONSTRUCTION, ALTERNATIVES TO, OR CHANGES IN, THE PLANS AND SPECIFICATIONS MUST BE APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.
6. APPROXIMATE FIELD LOCATION OF EXISTING UTILITIES, FOUNDATIONS AND OTHER STRUCTURES IDENTIFIED TO THE ENGINEER ARE SHOWN ON THESE DRAWINGS. THE ENGINEER IS NOT RESPONSIBLE FOR FIELD VERIFYING THESE LOCATIONS AND DAMAGE TO IDENTIFIED AND UNIDENTIFIED UTILITIES AND FOUNDATION. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND ELEVATIONS OF ALL UTILITIES WITH IN 50 FEET BEHIND AND IN FRONT OF WALLS.
7. WALL HEIGHTS SHOWN ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. IF THE ACTUAL WALL HEIGHTS ARE MORE THAN ONE FOOT GREATER THAN THE WALL HEIGHTS SHOWN ON THE DRAWINGS, THE WALL CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER OF HIS REPRESENTATIVE WHO WILL DETERMINE IF ADDITIONAL WALL MODIFICATIONS ARE REQUIRED.
8. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS, GRADES AND DIMENSIONS AT THE SITE PRIOR TO WALL CONSTRUCTION. IF THE WALL CONTRACTOR DISCOVERS ANY ERRORS, OMISSIONS OR DISCREPANCIES, HE SHALL CONTACT THE ENGINEER PRIOR TO CONTINUING WALL CONSTRUCTION. THE ENGINEER WILL THEN ISSUE THE INSTRUCTIONS AS HOW TO PROCEED.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY AND UNDER NO CIRCUMSTANCES SHALL THE ENGINEER BE RESPONSIBLE FOR CONSTRUCTION SITE SAFETY.
10. CONSTRUCTION OPERATIONS BEHIND AND IN FRONT OF PREVIOUSLY CONSTRUCTED PORTIONS FOR WALLS SHALL BE RESTRICTED TO PREVENT DAMAGE TO EXISTING WALLS. ONLY LIGHT COMPACTION EQUIPMENT SHALL BE USED WITHIN 5 FEET BEHIND WALL TO PREVENT EXCESSIVE LATERAL STRESS ON CONSTRUCTED PORTIONS OF THE WALLS.

B. CLEARING AND SUBGRADE PREPARATION

- 1. CLEARING AND STRIPPING LIMITS SHALL BE EXTENDED TO THE LIMITS SHOWN ON THE CIVIL DRAWINGS AND TO A MINIMUM OF 1 FOOT IN FRONT OF THE RETAINING WALLS AND 2 FEET BEHIND THE REINFORCED ZONE.
2. ALL EXISTING TOPSOIL, ROOTMATT, AND ANY OTHER SOFT OR UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE CLEARING AND STRIPPING LIMITS.
3. PRIOR TO INITIATION OF RETAINING WALL CONSTRUCTION, THE STRIPPED AREA SHALL BE OBSERVED BY THE OWNER'S ITA TO DETERMINE THE EXTENT OF ANY REQUIRED REMEDIAL WORK. THESE MAY INCLUDE BUT ARE NOT LIMITED TO PROOFROLLING WITH A HEAVY RUBBER Tired VEHICLE HAVING A SINGLE-AXLE WEIGHT OF AT LEAST 20,000 POUNDS, OR OTHER METHODS DETERMINED APPROPRIATE BY THE OWNER'S ITA. PROOFROLLING SHALL INCLUDE MULTIPLE PASSES IN PERPENDICULAR DIRECTIONS OVER THE EXPOSED SUBGRADE.
4. CONSTRUCTION PHASE DEWATERING MAY BE NECESSARY TO SATISFACTORILY COMPLETE THESE SUBGRADE PREPARATION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING SATISFACTORY CONSTRUCTION PHASE DEWATERING.

C. EXCAVATION SUPPORT AND SLOPES

- 1. TEMPORARY SLOPES SHALL BE NO STEEPER THAN 1 1/2 H:1 V AND PURSUANT TO OSHA.
2. THE DRAWINGS DO NOT PROVIDE A TEMPORARY EXCAVATION SUPPORT SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY EXCAVATION SUPPORT SYSTEMS REQUIRED TO CONSTRUCT THE RETAINING WALL SHOWN ON THESE DRAWINGS AND ENSURING THAT SUCH SYSTEMS ARE IN STRICT ACCORDANCE WITH CURRENT OSHA REQUIREMENTS.
3. EXCAVATIONS SHALL BE CONSTRUCTED AND BRACED IN ACCORDANCE WITH CURRENT OSHA REQUIREMENTS. EXCAVATION AND SITE SAFETY SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL NOT STOCKPILE EXCAVATED MATERIALS OR EQUIPMENT IMMEDIATELY ADJACENT TO THE EXCAVATION WALLS OR SLOPES. ALL SUCH MATERIALS SHALL BE KEPT BACK FROM THE TOP OF THE EXCAVATION A MINIMUM DISTANCE EQUAL TO THE EXCAVATION DEPTH. WHERE EQUIPMENT OR MATERIALS MUST BE PLACED IMMEDIATELY ADJACENT TO THE EXCAVATION WALLS, THE EXCAVATION WALLS SHALL BE DESIGNED FOR THE ANTICIPATED SURCHARGE LOADING, OR ADDITIONAL BRACING MUST BE PROVIDED TO SUPPORT THE ANTICIPATED SURCHARGE LOADING.

D. DEWATERING AND SITE DRAINAGE

- 1. THE CONTRACTOR SHALL PROVIDE SUMP PIT AND PUMPING OPERATIONS AS REQUIRED FOR DEWATERING THE RETAINING WALL AREA WHERE NEEDED.
2. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN ADEQUATE SITE DRAINAGE DURING SITE PREPARATION, EARTHWORK OPERATION, INCLUDING PROVIDING FOR DRAINAGE OF SURFACE WATER AWAY FROM THE CONSTRUCTION AREAS, AND ENHANCEMENT OF NATURAL DRAINAGE PATHS WITHOUT INTERRUPTING ITS PATTERN.
3. ALL EROSION AND SEDIMENTATION CONTROL SHALL BE CONTROLLED IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AND CURRENT STATE, COUNTY AND MUNICIPAL REQUIREMENTS.
4. PROVIDE AND MAINTAIN POSITIVE DRAINAGE FROM BACK OF WALL AT ALL TIMES DURING CONSTRUCTION.
5. THE DESIGN ASSUMES PERMANENT EROSION CONTROL MEASURES WILL BE IMPLEMENTED AT THE TOP AND BOTTOM OF THE WALL IMMEDIATELY UPON COMPLETION OF WALL CONSTRUCTION. THESE EROSION CONTROL MEASURES SHOULD BE SPECIFIED BY THE PROJECT CIVIL ENGINEER, IMPLEMENTED BY THE GENERAL CONTRACTOR, AND SHOULD BE MAINTAINED BY THE OWNER. FAILURE TO IMPLEMENT AND MAINTAIN PERMANENT EROSION CONTROL MEASURES MAY RESULT IN DAMAGE OF THE MSE WALL.
6. APPROXIMATE FIELD LOCATION OF EXISTING UTILITIES, FOUNDATIONS AND OTHER STRUCTURES IDENTIFIED TO THE ENGINEER ARE SHOWN ON THESE DRAWINGS. THE ENGINEER IS NOT RESPONSIBLE FOR FIELD VERIFYING THESE LOCATIONS AND DAMAGE TO IDENTIFIED AND UNIDENTIFIED UTILITIES AND FOUNDATION. THE CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND ELEVATIONS OF ALL UTILITIES WITH IN 50 FEET BEHIND AND IN FRONT OF WALLS.
7. WALL HEIGHTS SHOWN ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN. IF THE ACTUAL WALL HEIGHTS ARE MORE THAN ONE FOOT GREATER THAN THE WALL HEIGHTS SHOWN ON THE DRAWINGS, THE WALL CONTRACTOR SHALL IMMEDIATELY INFORM THE ENGINEER OF HIS REPRESENTATIVE WHO WILL DETERMINE IF ADDITIONAL WALL MODIFICATIONS ARE REQUIRED.
8. THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS, GRADES AND DIMENSIONS AT THE SITE PRIOR TO WALL CONSTRUCTION. IF THE WALL CONTRACTOR DISCOVERS ANY ERRORS, OMISSIONS OR DISCREPANCIES, HE SHALL CONTACT THE ENGINEER PRIOR TO CONTINUING WALL CONSTRUCTION. THE ENGINEER WILL THEN ISSUE THE INSTRUCTIONS AS HOW TO PROCEED.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SITE SAFETY AND UNDER NO CIRCUMSTANCES SHALL THE ENGINEER BE RESPONSIBLE FOR CONSTRUCTION SITE SAFETY.
10. CONSTRUCTION OPERATIONS BEHIND AND IN FRONT OF PREVIOUSLY CONSTRUCTED PORTIONS FOR WALLS SHALL BE RESTRICTED TO PREVENT DAMAGE TO EXISTING WALLS. ONLY LIGHT COMPACTION EQUIPMENT SHALL BE USED WITHIN 5 FEET BEHIND WALL TO PREVENT EXCESSIVE LATERAL STRESS ON CONSTRUCTED PORTIONS OF THE WALLS.

E. DESIGN CRITERIA

- 1. CONSTRUCT MSE WALL IN ACCORDANCE WITH THESE DRAWINGS.
2. THE DESIGN OF THE MSE WALL FOR THIS PROJECT CONTEMPLATES INTERNAL STABILITY, EXTERNAL STABILITY, COMPOUND AND GLOBAL STABILITY.
3. THE MSE WALL HAS BEEN DESIGNED IN GENERAL ACCORDANCE WITH NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA) RECOMMENDATIONS.
4. THE MSE WALL HAS BEEN DESIGNED FOR FACTORS OF SAFETY FOR PERMANENT LOADING CONDITIONS OF 1.5 FOR INTERNAL STABILITY, 1.5 FOR DIRECT SLIDING, 2.0 FOR OVERTURNING, AND 1.3 FOR COMPOUND AND LONG TERM GLOBAL STABILITY.
5. THE WALLS HAVE BEEN DESIGNED FOR FACTORS OF SAFETY OF 1.3 FOR TEMPORARY LOADING CONDITIONS SUCH AS SHORT TERM STORM EVENTS.
6. THE MSE WALLS ARE DESIGNED FOR PERMANENT SURCHARGE LOADING OF 250 PSF TO ACCOUNT FOR VEHICULAR LOADS. SEE WALL PARAMETER SHEETS FOR INDIVIDUAL WALL LOADINGS.
7. TEMPORARY SURCHARGE LOADS ABOVE THE WALL DURING CONSTRUCTION HAVE BEEN ANTICIPATED. IF EQUIPMENT OR MATERIAL STORAGE ABOVE THE WALL IS ANTICIPATED TO BE ABOVE 250 PSF, THE SURCHARGE LOADING SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.

- 8. THE DESIGN REFLECTED ON THESE DRAWINGS IS INTENDED FOR THE CONSTRUCTION OF PERMANENT WALLS. AS WITH ANY REINFORCED EARTH SYSTEM, SOME LIMITED LATERAL AND VERTICAL MOVEMENT MAY OCCUR ABOVE AND BEHIND THE WALLS.
9. SOIL PARAMETERS USED IN THE DESIGN OF THE WALLS WERE BASED ON THE GEOTECHNICAL REPORT COMPLETED BY ECS DATED NOVEMBER 9, 2019.
10. GROUNDWATER IS NOT EXPECTED WITHIN THE EXCAVATION FOR THE WALLS. HOWEVER, WEEP DRAINS WILL BE INSTALLED AS SHOWN ON THESE DRAWINGS. IF GROUNDWATER IS ENCOUNTERED, THE DESIGN ENGINEER MUST BE NOTIFIED TO MODIFY DESIGN IF REQUIRED.

2.0 MATERIALS

- 1. MSE WALL FACING UNITS SHALL CONSIST OF KEYSTONE COMPAC III STRAIGHT SPLIT MASONRY UNITS. ALL RETAINING WALL FACING UNITS SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY KEYSTONE RETAINING WALL SYSTEMS, INC. MINNEAPOLIS, MINNESOTA.
2. FIBERGLASS PINS SHALL BE NYLON RESIN RODS WITH FIBERGLASS AS SUPPLIED BY KEYSTONE RETAINING WALL SYSTEMS, INC., AND SHALL BE IN ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY KEYSTONE.
3. GEOGRID REINFORCEMENT SHALL CONSIST OF MIRAFI MIRAGRID 5XT, 7XT, AND 10XT BY TENCATE. ALL GEOGRID SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY TENCATE. NO GEOGRID REINFORCEMENT SUBSTITUTIONS SHALL BE PERMITTED UNLESS APPROVED BY ECS.
4. GEOTEXTILES SHALL CONSIST OF MIRAFI 140N BY TENCATE. ALL GEOTEXTILES SHALL BE IN STRICT ACCORDANCE WITH THE LATEST SPECIFICATIONS FURNISHED BY TENCATE.
5. CRUSHED STONE SHALL CONSIST OF MDOT NO. 57 STONE CRUSHED AGGREGATE. CONTRACTOR SHALL SUBMIT A MATERIAL SOURCE AND GRADATION TO THE ENGINEER.
6. LEVELING PAD SHALL BE CONSTRUCTED OF CRUSHED STONE AS SHOWN IN THE DETAIL ON SHEET 25.
7. FILL AREAS WHERE CRUSHED STONE IS NOT REQUIRED, SHALL CONSIST OF SOILS HAVING A UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) DESIGNATION OF SM, SC, SP, SW, GM, GC, OR GW, BE FREE OF ORGANIC MATTER, COBBLES GREATER THAN 3 INCHES IN MAXIMUM DIMENSION, CONTAIN LESS THAN 45 PERCENT MATERIAL PASSING THE 200 SIEVE, OR DEBRIS, AND HAVE MAXIMUM LIQUID LIMIT AND PLASTICITY INDEX OF 30 AND 10, RESPECTIVELY. FURTHERMORE, THE REINFORCED AND RETAINED FILL ZONES SHALL CONSIST OF MATERIALS THAT MEET OR EXCEED THE REQUIREMENTS OF THE DESIGN PARAMETERS. THE OWNER'S ITA SHALL CONFIRM THE SOIL PROPERTIES AND SHEAR STRENGTH PARAMETERS SHOWN ON THESE PLANS PRIOR TO THE START OF WALL CONSTRUCTION. WHEN SHEAR STRENGTH TESTING IS DEEMED NECESSARY BY THE ITA, TRIAXIAL OR DIRECT SHEAR TESTING SHALL BE PERFORMED. CONTRACTOR SHALL SUBMIT MATERIAL SOURCES, GRADATIONS AND SHEAR STRENGTH TEST RESULTS TO THE ENGINEER.
8. UNACCEPTABLE FILL MATERIAL INCLUDE TOPSOIL, ORGANIC MATERIALS (OH, OL), PLASTIC SILTS AND CLAYS (CL, CH, ML AND MH), AND SOILS NOT MEETING THE CRITERIA OF THE PREVIOUS PARAGRAPH.
9. ON SITE SOILS MAY BE USED AS FILL MATERIALS IN THE RETAINED FILL ZONE PROVIDED THE MATERIALS MEET REQUIREMENTS OF THESE NOTES AND THE PROJECT SPECIFICATIONS.
10. DRAINAGE PIPES SHALL CONSIST OF 4" CORRUGATED HDPE PIPE.
11. ALL MATERIALS SHALL BE STORED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

3.0 FOUNDATIONS

- 1. THE MSE WALL FOUNDATION SUBGRADE SOILS SHALL BE PREPARED IN ACCORDANCE WITH THE CLEARING AND SUBGRADE PREPARATION SECTION OF THESE SPECIFICATIONS.
2. THE BEARING CAPACITY OF THE SUBGRADE SUPPORTING MSE WALLS, INCLUDING MASONRY BLOCKS AND REINFORCED FILL ZONE, SHALL BE VERIFIED TO BE EQUAL TO OR GREATER THAN VALUES SHOWN ON THESE DRAWINGS AT THE TIME OF CONSTRUCTION BY THE OWNER'S ITA AT A MINIMUM FREQUENCY OF 25 FEET ON CENTER.
3. THE REQUIRED EMBEDMENT DEPTH FOR EACH SECTION OF WALL IS SPECIFIED ON THE DETAILS AND WALL PROFILE.
4. FOUNDATIONS SUBGRADE SOILS NOT MEETING THE MINIMUM BEARING REQUIREMENTS SHALL BE IMPROVED AS DIRECTED IN THE FIELD BY THE ENGINEER.

4.0 COMPACTIVE EFFORT AND FILL PLACEMENT

- 1. NO. 57 STONE - TAMP AND COMPACT WITH A SMOOTH PLATE WALK-BEHIND VIBRATORY PLATE COMPACTOR.
2. REINFORCED FILL ZONE - THIS ZONE SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-698 STANDARD PROCTOR METHOD, TO NOT LESS THAN 5 FEET BEYOND THE ENDS OF THE GEOGRID. WHERE REINFORCED FILL CONSISTS OF CRUSHED STONE, THE CRUSHED STONE SHALL BE COMPACTED WITH A SMOOTH PLATE WALK BEHIND VIBRATORY PLATE COMPACTOR OR SMOOTH DRUM VIBRATORY ROLLER.
3. RETAINED FILL ZONE - THIS ZONE SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D-698 STANDARD PROCTOR METHOD.

- 4. FILL MATERIALS SHALL NOT BE PLACED WHEN WET, FROZEN OR FROST HEAVED SOILS. ALL SUCH SOILS SHALL BE REMOVED PRIOR TO CONTINUATION OF FILL OPERATIONS.
5. FILL MATERIALS SHALL NOT CONTAIN FROZEN MATERIALS AT THE TIME OF PLACEMENT. ALL SUCH MATERIALS SHALL BE REMOVED PRIOR TO CONTINUATION OF FILL OPERATIONS.
6. FILL SOILS SHOULD BE PLACED IN LIFTS NOT EXCEEDING 6 INCHES IN LOOSE THICKNESS.
7. AT THE TIME OF COMPACTION, FILL SOILS SHALL BE WITHIN 3 PERCENT OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED IN ACCORDANCE WITH THE STANDARD PROCTOR METHOD.
8. ALL FILL AND BACKFILL OPERATIONS SHALL BE OBSERVED ON A FULL-TIME BASIS BY THE OWNER'S ITA TO DETERMINE IF MINIMUM PLACEMENT AND COMPACTION REQUIREMENTS ARE BEING MET AND THAT MATERIALS MEETING OR EXCEEDING THE SPECIFICATION REQUIREMENTS ARE USED.
9. IN-PLACE DENSITY TESTS SHALL BE PERFORMED WITH A MINIMUM OF 1 TEST PER 2500 SQUARE FEET OF SOIL FILL AREA OR EACH LIFT OF FILL PLACE. THE ELEVATION AND LOCATION OF THE TESTS SHOULD BE CLEARLY IDENTIFIED AT THE TIME OF FILL PLACEMENT.
10. GRANULAR SOILS (UNIFIED SOIL CLASSIFICATION SM, SC OR COARSER) SHALL BE COMPACTED WITH VIBRATORY COMPACTION EQUIPMENT.
11. CARE SHOULD BE EXERCISED REGARDING THE USE OF RELATIVELY HEAVY MACHINERY CLOSE TO THE WALL. LIGHTER HAND OPERATED COMPACTION WITHIN 5 FEET OF THE WALL.
12. THE FILL AREA SHALL BE GRADED AT THE END OF EACH DAY TO FACILITATE THE POSITIVE DRAINAGE OF SURFACE WATER ASSOCIATED WITH PRECIPITATION AWAY FROM IT.

5.0 CONSTRUCTION SEQUENCE

A. GENERAL

- 9. CONTRACTOR WILL COORDINATE AND SEQUENCE WORK IN SUCH A MANNER AS TO MINIMIZE DISTURBANCE OF PREVIOUSLY CONSTRUCTED WALLS.
10. FINISH GRADE IN ACCORDANCE WITH THE CIVIL AND LANDSCAPE DRAWINGS.

B. CONSTRUCTION SEQUENCE - MECHANICALLY STABILIZED EARTH WALL

STEP 1 - EXCAVATION AND LEVELING PAD

- a. WALL LAYOUT AND GENERAL EXCAVATION
1. SURVEY STAKE WALL LOCATION AND GENERAL EXCAVATION LIMITS FOR WALL CONSTRUCTION.
2. PERFORM GENERAL EXCAVATION FOR WALL AS REQUIRED.
b. LEVELING PAD CONSTRUCTION
1. STAKE WALL LOCATION FOR LEVELING PAD EXCAVATION.
2. EXCAVATE TRENCH TO CREATE THE MINIMUM LEVELING PAD THICKNESS AND TO THE MINIMUM WIDTH SHOWN.
3. PLACE, LEVEL AND COMPACT LEVELING PAD MATERIAL FOR RETAINING WALL UNITS.

STEP 2 - INSTALLING FIRST COURSE OF BLOCK UNITS

- a. SETTING FIRST COURSE OF BLOCK UNITS
1. CHECK LEVELING PAD ELEVATIONS AND SMOOTH LEVELING PAD SURFACE.
2. STAKE AND STRING LINE THE WALL LOCATION PAYING CLOSE ATTENTION TO EXACT LOCATION OF CURVES, CORNERS, AND VERTICAL AND HORIZONTAL STEPS. STRING LINE MUST BE ALONG THE MOLDED FACE (BACK) OF THE BLOCK UNIT, AND NOT BEHIND THE BROKEN BLOCK FINISH SURFACE.
3. INSTALL FIRST COURSE OF BLOCKS, CHECKING LEVEL AS PLACED.
b. BACKFILLING FIRST COURSE OF BLOCK UNITS
1. RECHECK WALL LOCATION.
2. USE NO. 57 STONE TO FILL ANY OPENINGS IN AND BETWEEN BLOCK UNITS.
3. CAREFULLY PLACE FACING AGGREGATE BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
4. PLACE AND COMPACT THE REINFORCED FILL SOIL.
5. PLACE AND COMPACT FILL SOILS IN FRONT OF BLOCK UNIT.
6. PLACE AND COMPACT RETAINED FILL SOILS.

STEP 3 - PLACEMENT AND BACKFILLING OF BLOCK UNITS WITHOUT GEOGRID REINFORCEMENT

- a. INSTALLING SUCCESSIVE COURSE OF BLOCK UNITS
1. ENSURE THAT DRAINAGE AGGREGATE IS LEVEL WITH, OR SLIGHTLY BELOW TOP OF BLOCK UNIT BELOW.
2. THOROUGHLY CLEAN DEBRIS AND AGGREGATE OFF OF TOP OF BLOCK UNITS.
3. INSTALL CONNECTING SHEAR PINS.
4. PLACE NEXT COURSE OF BLOCK AND PUSH UNITS FORWARD AS FAR AS POSSIBLE TO ENGAGE SHEAR PINS AND TO ESTABLISH PROPER SETBACK CONSISTENT WITH SETBACK SHOWN ON THE DETAILS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

b. FILL PLACEMENT AND COMPACTION

- 1. RECHECK WALL LOCATION.
2. USE NO. 57 STONE TO FILL ANY OPENINGS IN AND BETWEEN BLOCK UNITS.
3. CAREFULLY PLACE FACING AGGREGATE BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
4. PLACE GEOTEXTILE AS SHOWN.
5. PLACE AND COMPACT THE REINFORCED FILL SOIL.
6. PLACE AND COMPACT FILL SOILS IN FRONT OF BLOCK UNIT TO ELEVATIONS SHOWN ON THE DRAWINGS.
7. PLACE AND COMPACT RETAINED FILL SOILS.

STEP 4 - PLACEMENT AND BACKFILLING OF BLOCK UNITS WITH GEOGRID REINFORCEMENT CONNECTION

- a. INSTALLING SUCCESSIVE COURSE OF BLOCK UNITS
1. ENSURE THAT NO. 57 STONE IS LEVEL WITH OR SLIGHTLY BELOW TOP OF BLOCK UNIT BELOW.
2. THOROUGHLY CLEAN DEBRIS AND NO. 57 STONE OFF OF TOP OF BLOCK UNITS.
3. CUT GEOGRID TO DESIGN LENGTH SHOWN ON PLANS AND INSTALL WITH MACHINE STRENGTH DIRECTION PERPENDICULAR TO THE WALL FACE. PLACE GEOGRID TO FACE OF BLOCKS AS SHOWN ON DETAILS.
4. PLACE NEXT COURSE OF BLOCK ON GEOGRID AND PUSH UNITS FORWARD TO ENGAGE SHEAR PINS AND TO ESTABLISH PROPER SETBACK, CONSISTENT WITH SETBACK SHOWN ON DETAILS AND IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

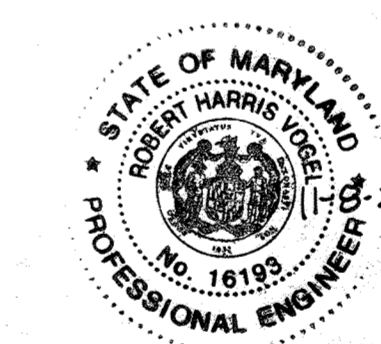
b. FILL PLACEMENT AND COMPACTION

- 1. PULL GEOGRID TIGHT USING UNIFORM TENSION SO THAT THERE ARE NO WRINKLES IN THE GEOGRID. HOLD OR STAKE IN PLACE TO MAINTAIN TENSION THROUGHOUT FILL PLACEMENT PROCESS.
2. PLACE NO. 57 STONE IN AND BETWEEN BLOCK UNITS AS REQUIRED.
3. CAREFULLY PLACE FACING AGGREGATE BEHIND AND UP TO THE HEIGHT OF THE BLOCK UNIT.
4. PLACE AND COMPACT REINFORCED FILL STONE BEHIND WALL WORKING FROM THE WALL BACK TOWARDS THE FREE END OF THE GEOGRID.
5. PLACE AND COMPACT RETAINED FILL SOILS.

NOTE: CONTINUE CONSTRUCTION OF THE WALL TO FULL HEIGHT USING STEPS 3 AND 4.

STEP 5 - CAPPING AND GRADING

- 1. INSTALL CAP/CAPPING UNIT AND SECURE IN PLACE PER MANUFACTURER'S RECOMMENDATIONS.
2. PLACE AND COMPACT FINAL BACKFILL.
3. ROUGH GRADE FOR POSITIVE DRAINAGE AWAY FROM THE WALL FACE.
4. FINAL GRADING AND RESTORATION PER CIVIL DRAWINGS.



AS-BUILT CERTIFICATION FOR PSWM
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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.
P.E. NAME: [Signature] 16193 P.E.# 11-8-23 DATE

OWNER/DEVELOPER
HOWARD COUNTY HOUSING COMMISSION
9770 PATRIOT WOODS DRIVE
COLUMBIA, MD 21046
410-730-3725

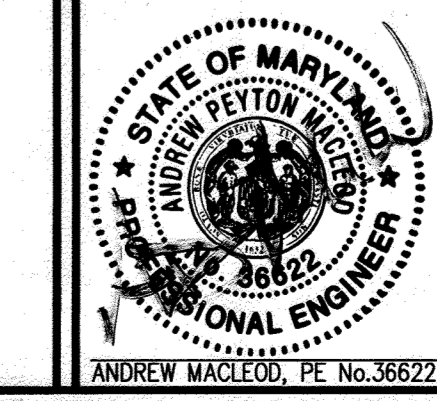
Table with 3 columns: NO., REVISION, DATE

MSE WALL NOTES

ELLICOTT GARDENS II
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS
5511 & 5513 WATERLOO ROAD
TAX MAP 31 BLOCK 19 BA-06-005V, SDP-07-038, F-08-06A, BA-08-042V ZONE: PDR
1ST ELECTION DISTRICT SDP-07-038, WP-08-111, WP-09-085 HOWARD COUNTY, MARYLAND PARCEL 428 & 461

ECS MID-ATLANTIC, LLC

3490 CHARWOOD ROAD, SUITE B, HANOVER, MD 28176
P: 410.859.4300 F: 410.859.4324 www.ECSLIMITED.com



DESIGN BY: KFB
DRAWN BY: KFB
CHECKED BY: AM
DATE: AUGUST 2021
SCALE: AS SHOWN
W.O. NO.: 06-01/
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 36622, EXPIRATION DATE: 01-31-2022
27 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
Chief, Development Engineering Division DATE 10-22-21
Chief, Division of Land Development DATE 11/19/21
Director DATE 12-2-21

NO AS-BUILT INFORMATION ON THIS SHEET

AS-BUILT SEPTEMBER 2023



**Ellicott Gardens II - Parapet Wall and Moment Slab Design Structural Specifications**

**I. Overview**

These structural drawings provide direction for the construction of one (1) parapet wall and moment slab of cast-in-place (c.i.p.) concrete construction for the above-noted project. Construction means and methods are not addressed. Refer to the project's Civil drawings for overall site layout information. Refer to the project's Geotechnical report for earth-related information (including geotechnical requirements affecting the wall. If / where discrepancies of a Civil nature exist, the Civil drawings govern; if / where discrepancies of a Geotechnical nature exist, the Geotechnical report governs. If field conditions differ from the structural information provided, ECS must be contacted so that, if necessary, a revision of the wall design can be developed and issued.

The structures have been designed in accordance with the 2015 Maryland Building Performance Standards and the 2015 International Building Code (IBC), ACI 318 - Building Code Requirements for Structural Concrete and Commentary, ASCE 7-10 - Minimum Design Loads for Buildings and Other Structures, and AASHTO LFRD Bridge Design Specifications, using the following design loads:

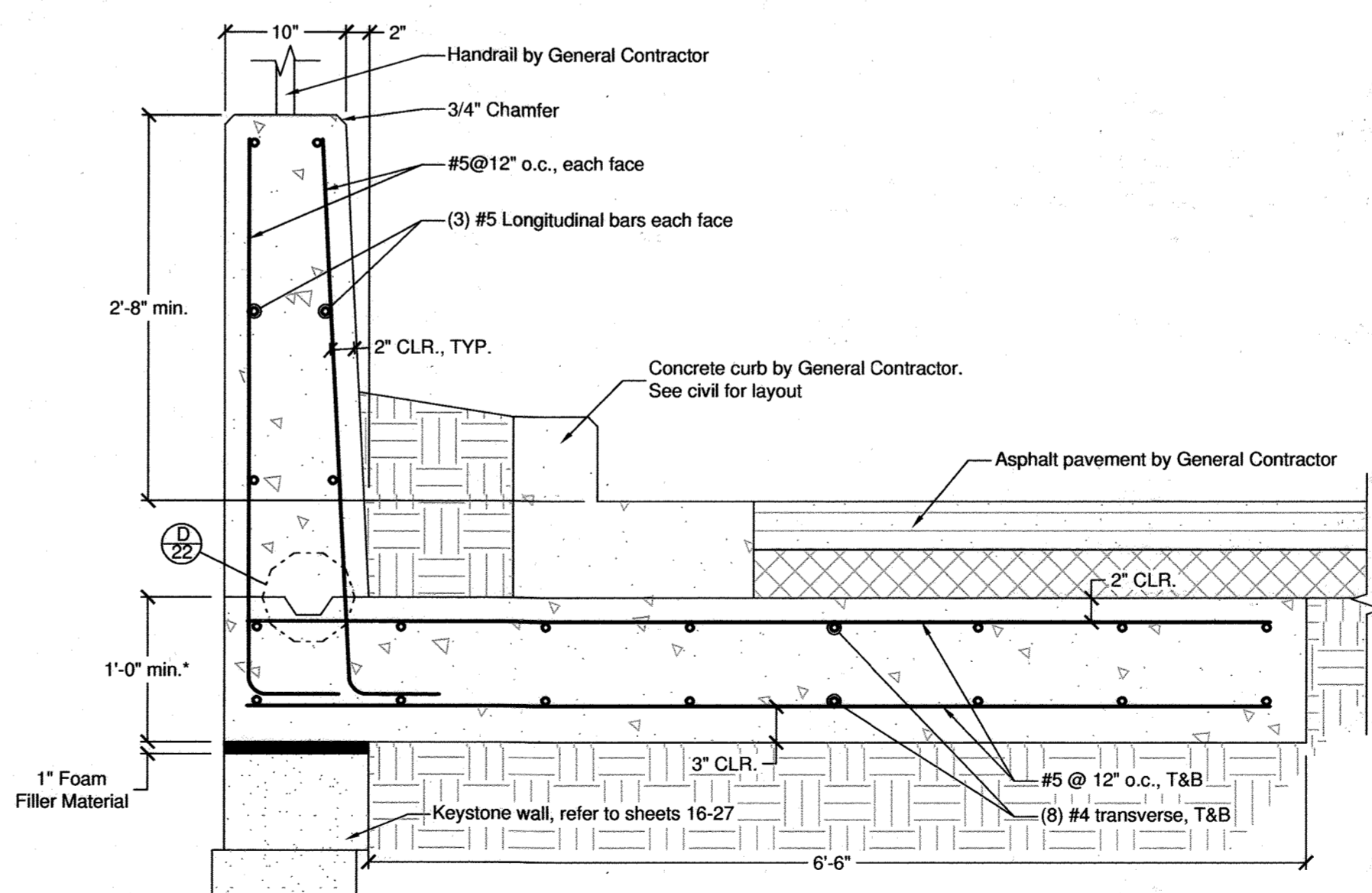
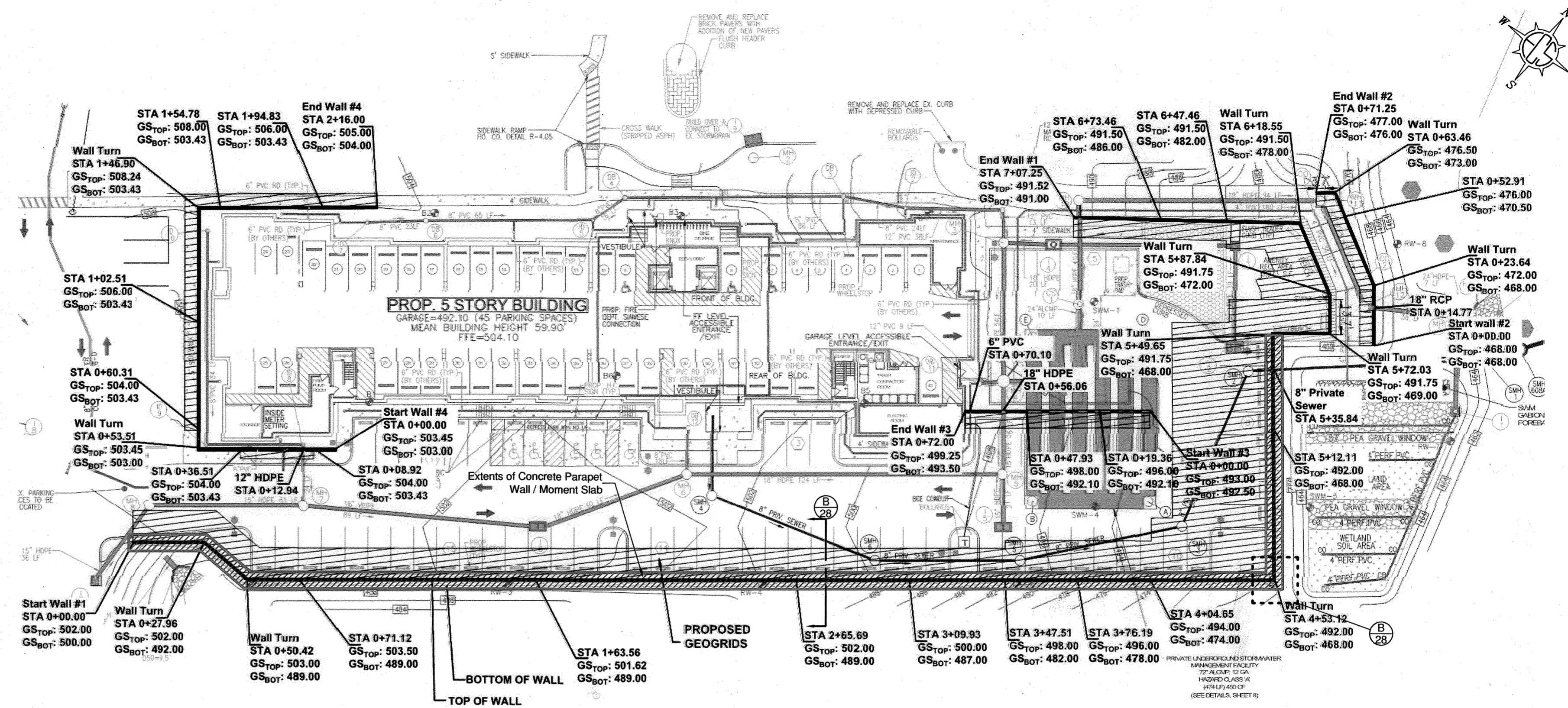
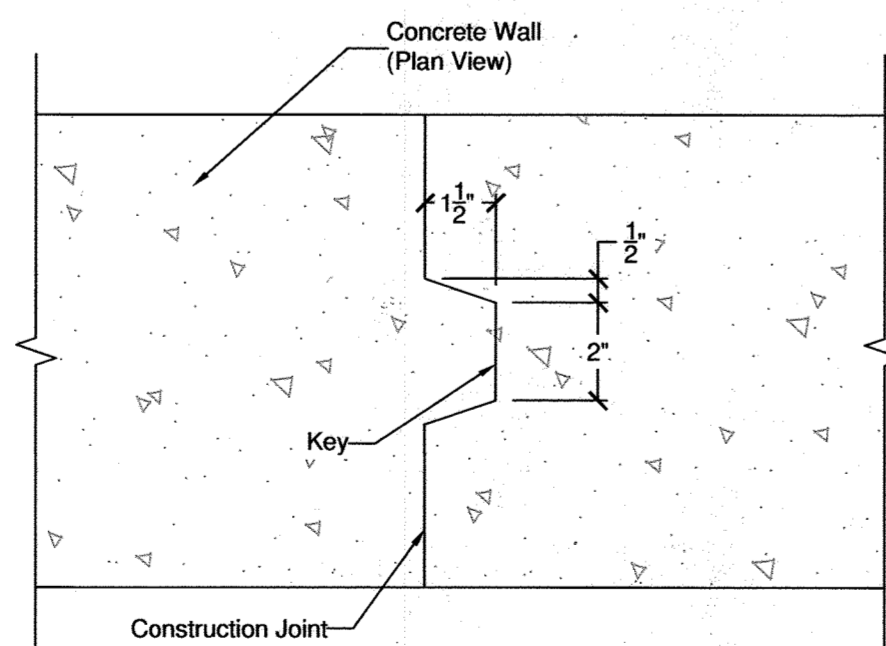
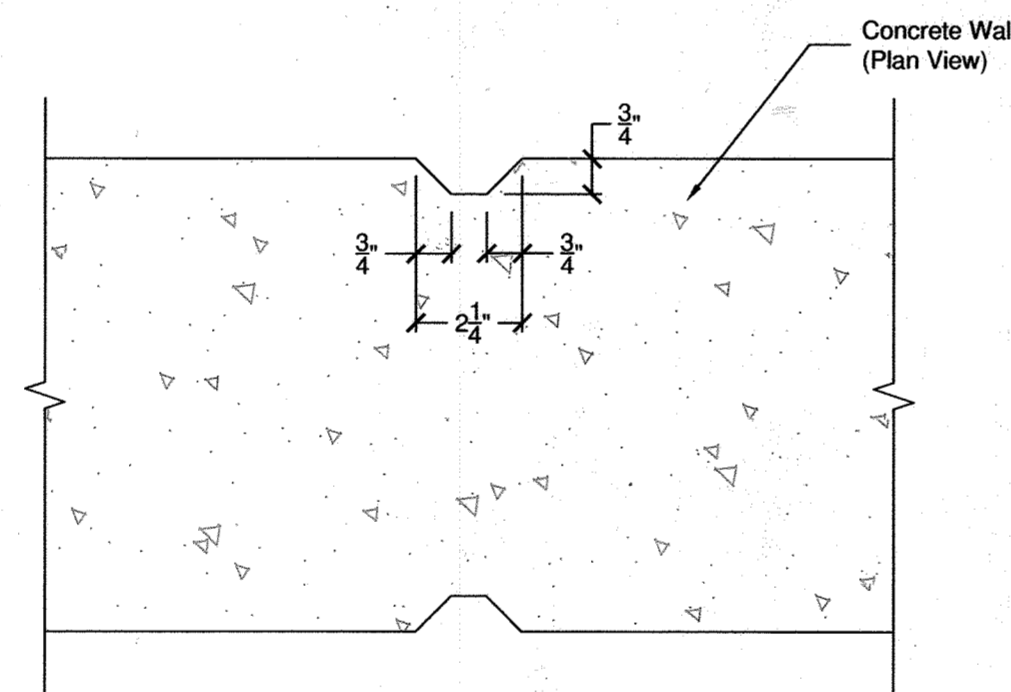
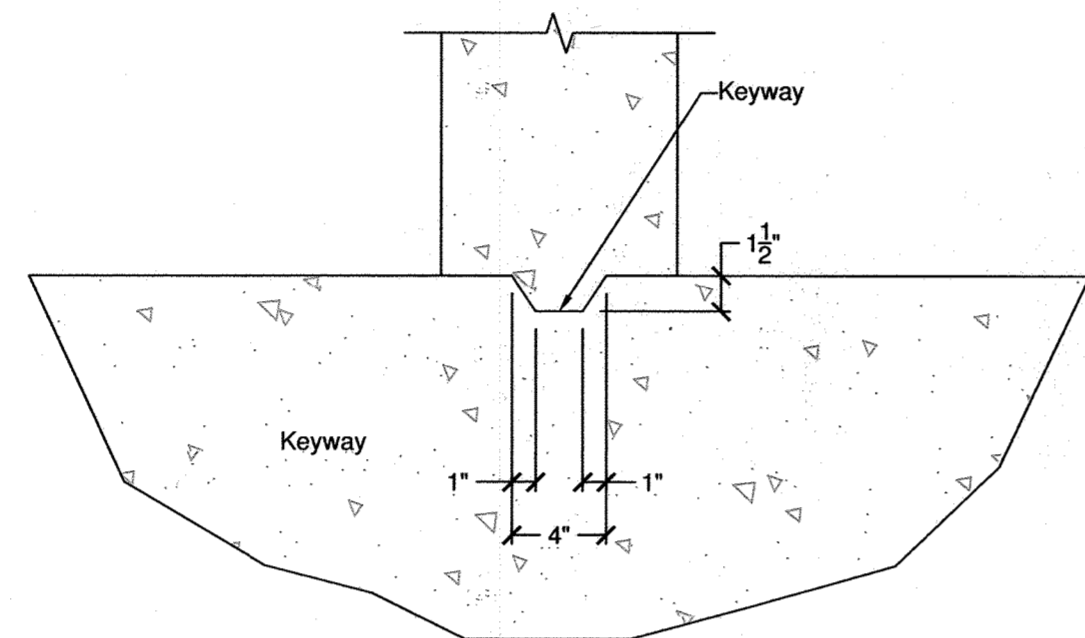
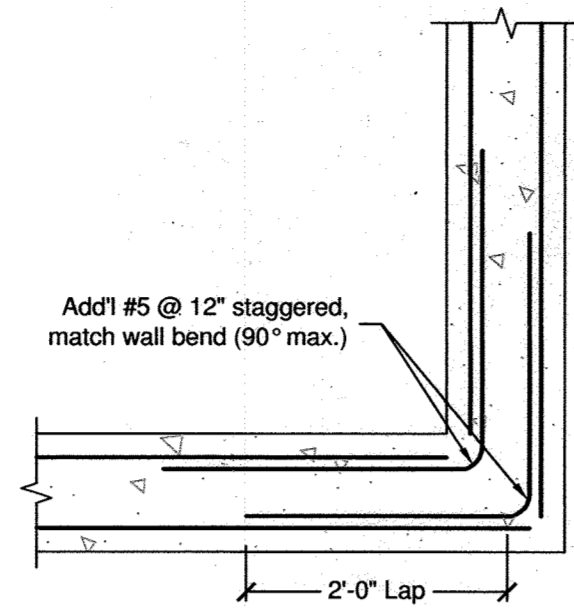
- Dead Load - As needed
- Traffic Impact Load - 10 kip (Static Equivalent for TL-4 Load)
- Live Load Surcharge - 40 psf (IBC parking load)

**II. Material Specifications**

- Concrete:**
1. Normal-weight, 4,500 psi compressive strength at 28 days w/4% to 6% entrained air content and a slump between 3" and 5". Calcium chloride admixtures are not permitted.
  2. Concrete shall have a sand fine aggregate and normal weight coarse aggregate conforming to ASTM-C150.
  3. Unless submitted and approved otherwise, ASTM C150, Type II cement shall be used.
  4. Concrete shall be air-entrained as specified above and shall have a slump as specified above. The maximum batch-to-placement time for the wall concrete is 90 minutes. Concrete shall be placed with an ambient temperature range of 55 to 90 degrees Fahrenheit. If ambient temperatures are to be outside of this range, concrete to be placed in accordance with ACI 306R for cold weather concreting, and ACI 305.1 for hot weather concreting.
  5. Vibrate concrete in accordance with ACI-309.
  6. Materials used for forming shall be straight, smooth, and - where possible from a constructability standpoint - be continuous with the number of provided joints and seams minimized.
  7. Provide vertical control joints along wall at 20 foot spacing (min.) per detail E/28, and construction joints at the end of each day's concrete pour, and at the discretion of the parapet wall contractor, per detail F/28.

**Reinforcing Steel:**

1. Reinforcing bars shall conform to ASTM-A615, Grade 60. Reinforcing bars shall not be tack welded, welded, heated, or thermally cut without prior approval by ECS.
2. Horizontal reinforcing shall be continuous around corners (or "bends") and shall be properly lap spliced as indicated on the drawings.
3. Detailing of concrete reinforcing bars and accessories shall conform to the recommendations of ACI 315, "Details and Detailing of Concrete Reinforcement" and ACI SP-66, "Detailing Manual". Placing of reinforcing bars shall conform to the recommendations of ACI 315R, "Manual of Engineering and Placing Drawings for Reinforced Concrete Structures" and CRSI, "Manual of Standard Practice".



**A SITE PLAN**  
28 1/32"=1'-0"

Note: Base drawing provided by vogel engineering + timmons group, inc.

**B PARAPET AND MOMENT SLAB DETAIL**  
28 1"=1'-0"

\*Note: Slab thickness should be increased to match the top of Keystone wall units.

NO AS-BUILT INFORMATION ON THIS SHEET



AS-BUILT CERTIFICATION FOR PSWM

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. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE UNDERGROUND SWM FACILITY.

DATE: 11-8-23  
P.E. # 16193

**OWNER/DEVELOPER**  
HOWARD COUNTY HOUSING COMMISSION  
9770 PATUXENT WOODS DRIVE  
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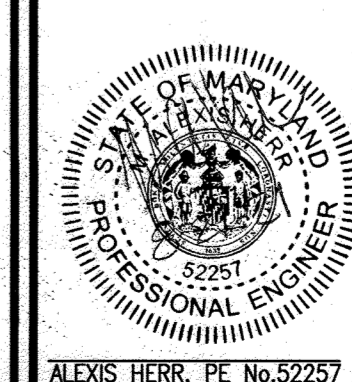
NO.	REVISION	DATE

**PLANS AND PARAMETERS**

**ELICOTT GARDENS II**  
HOUSING COMMISSION HOUSING DEVELOPMENT: 70 APARTMENTS  
5511 & 5513 WATERLOO ROAD  
TAX MAP 31 BLOCK 19 BA-06-005V SDP-07-036 F-08-064 BA-08-042V PARCEL 428 & 467  
1ST ELECTION DISTRICT SDP-07-036, WP-08-111, WP-09-065 HOWARD COUNTY, MARYLAND

**ECS MID-ATLANTIC, LLC**

3400 CHARWOOD ROAD, SUITE B, HANOVER, MD 20176  
P: 410.859.4300 F: 410.859.4324 WWW.ECSLIMITED.COM



**PROFESSIONAL CERTIFICATE**  
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. 15193, EXPIRATION DATE: 02-28-2025

DESIGN BY: CNH  
DRAWN BY: CNH  
CHECKED BY: MAP  
DATE: AUGUST 2021  
SCALE: AS SHOWN  
W.O. NO.: 06-01/

28 SHEET OF 28

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chief, Development Engineering Division 10-27-21  
Chief, Division of Land Development 11/1/21  
Director 12-2-21

AS-BUILT SEPTEMBER 2023

SDP-20-027