

GENERAL NOTES

- 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE UNLESS ALTERNATIVE COMPLIANCE REQUESTS HAVE BEEN APPROVED.
2. THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE DAYS BEFORE STARTING WORK ON THESE DRAWINGS:
MISS UTILITY
VERIZON TELEPHONE COMPANY: 1-410-954-6281
HOWARD COUNTY BUREAU OF UTILITIES: 410-313-2366
AT&T CABLE LOCATION DIVISION: 1-800-393-2553
B.G.&E. CO. CONTRACTOR SERVICES: 410-850-4620
B.G.&E. CO. UNDERGROUND DAMAGE CONTROL: 410-331-5533
STATE HIGHWAY ADMINISTRATION: 410-531-5533
3. THE CONTRACTOR SHALL NOTIFY 'MISS UTILITY' AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
4. 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 START OF WORK.
5. THE SUBJECT PROPERTY IS ZONED 'CEF-R' PER ZONING BOARD DECISION AND ORDER FOR CASE ZB1104M, APPROVED ON APRIL 6, 2015 AND IS SUBJECT TO THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS EFFECTIVE 10/2/03 PER COUNCIL BILL 75-2003.
-HOWARD COUNTY ZONING BOARD CASE ZB-1104-M, APPROVED ON APRIL 6, 2015, CONTAINED THE FOLLOWING CONDITIONS OF APPROVAL:
THE ZONING BOARD, WHILE FULLY SUPPORTING THIS COMMUNITY BEING ANNEXED INTO THE VILLAGE OF RIVER HILL WANTS TO ENSURE THAT THE ACCESSORY USE PROVISIONS APPLICABLE TO THIS DEVELOPMENT BE THE SAME AS THOSE APPLICABLE TO RIVER HILL 1 IF THE PROPERTY IS TO BE ANNEXED OR SUBSTANTIALLY SIMILAR TO R-SC TYPE DEVELOPMENTS, IF THE PROPERTY IS NOT ANNEXED, THEREFORE, THE BOARD APPROVED FOR THIS DEVELOPMENT IF IT IS ANNEXED INTO THE VILLAGE OF RIVER HILL THE ACCESSORY USE PROVISIONS APPLICABLE TO RIVER HILL, WHETHER THEY BE ANY SPECIFIC ACCESSORY USE PROVISIONS IN THE RECORDED FINAL DEVELOPMENT PLAN FOR THE SECTION OF RIVER HILL ADJOINING THE SUBJECT PROPERTY, OR THE ACCESSORY USE PROVISIONS OF SECTION 110.0 (R-SC DISTRICT), OR ANY COMBINATION THEREOF; THE BOARD ALTERNATIVELY APPROVES FOR THIS DEVELOPMENT IF IT IS NOT ANNEXED INTO THE VILLAGE OF RIVER HILL, THE PROPOSED ACCESSORY USE PROVISIONS ORIGINALLY PROPOSED IN PETITIONER'S BOOKLET (PETITIONER'S EXHIBIT) AS ACCESSORY USE PROVISIONS WITH THE DELETIONS FOR SECTIONS B.5., 6., AND 8. REMOVED.
\* 'B' THE PETITIONER SHALL PROVIDE ON THE SUBSEQUENT SITE DEVELOPMENT PLAN FOR THE SUBJECT PROPERTY'S DEVELOPMENT PROPOSED ADDITIONAL SCREENING AS NECESSARY ON PIPE STEM LOTS 3, 12, 15, 24, 27, 35, 38, AND 45 TO ENSURE APPROPRIATE YARD SEPARATION.
\* 'C' THE PETITIONER SHALL PROVIDE ON THE SUBSEQUENT SITE DEVELOPMENT PLAN FOR THE SUBJECT PROPERTY'S DEVELOPMENT A CONNECTION BETWEEN THE NEIGHBORHOOD TRAIL AND THE CUL-DE-SAC BETWEEN LOTS 25 AND 26 SIMILAR TO THAT PROVIDED BETWEEN LOTS 13 AND 14 AND LOTS 46 AND 37 AS SHOWN ON THE CONCEPT PLAN.
\* ITEMS B & C ABOVE ARE NO LONGER APPLICABLE DUE TO THE SITE CHANGES ASSOCIATED WITH THE SECOND HEARING.
-IN ACCORDANCE WITH SECTION 121.0, THE HOWARD COUNTY ZONING BOARD HELD A SECOND HEARING FOR A DETERMINATION OF MINOR MODIFICATION (CASE ZB-1104-M) ON NOVEMBER 10, 2016 THE HOWARD COUNTY ZONING BOARD APPROVED THE REQUEST AND DETERMINED:
1. 5-15-007 PROPOSES MINOR MODIFICATIONS TO THE APPROVED DEVELOPMENT CONCEPT PLAN IN THIS MATTER IN ACCORDANCE WITH ZONING REGULATION SEC. 121.0.1.
2. 5-15-007, AS APPROVED, SHALL CONSTITUTE THE NEW DEVELOPMENT CONCEPT PLAN IN THIS CASE.
3. THE PETITIONER IS NOT REQUIRED TO COMMENCE A NEW CEF APPLICATION FOLLOWING THE SAME PROCEDURES USED FOR A PETITION TO CREATE A NEW CEF DISTRICT; AND
4. SECTION C.2 OF THE BULK REGULATIONS IN THIS CASE IS APPROVED TO BE AMENDED FROM SPECIFYING A 10' SETBACK FOR 'BUILDINGS' TO A 10' SETBACK FOR STRUCTURES.
6. THE PROJECT BOUNDARY SHOWN HEREON IS BASED ON PLATS 23334-23337, RECORDED MAY 2015 BY MORRIS & RITCHE ASSOCIATES, INC. THE BOUNDARY HAS BEEN VERIFIED BY VOGEL ENGINEERING-TIMMONS GROUP, SEPTEMBER 2017.
7. TOPOGRAPHY SHOWN HEREON OBTAINED FROM AERIAL PHOTOGRAPHY COMPILED BY POTOMAC SURVEYS INC. JANUARY 2017, AND SUPPLEMENTED WITH FIELD RUN (AUG.-NOV. 2017).
8. SOIL TYPES SHOWN HEREON ARE IN ACCORDANCE WITH THE WEB SOIL SURVEY HOWARD COUNTY, MARYLAND - CLARKSVILLE NE MAP #17.
9. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENTS BM 35HA AND BM 35HB WERE USED FOR THIS PROJECT.
10. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS, CEMETERIES LOCATED ON THE SUBJECT PROPERTY OR THE COUNTY'S CEMETERY SITE MAP.
11. -THE PRE-SUBMISSION MEETING WAS HELD FOR THIS PROJECT ON MARCH 19, 2014 AT THE ROBINSON NATURE CENTER.
-THE DESIGN ADVISORY PANEL MEETING FOR THIS PROJECT WAS HELD MARCH 26, 2014.
GRACE DRIVE IS CLASSIFIED AS A MINOR COLLECTOR.
CROSS CREEK DRIVE- PUBLIC ACCESS STREET, 0+00 - 23+50 / PUBLIC ACCESS PLACE 23+50 - END
MAINSTREAM WAY- PUBLIC ACCESS STREET
OVERVIEW TERRACE- PUBLIC ACCESS STREET
SANBORN WAY- PUBLIC ACCESS PLACE
LAWDALE CIRCLE- PUBLIC ACCESS STREET
PLAINVIEW TERRACE- PUBLIC ACCESS STREET
12. DRIVEWAYS SHALL BE PROVIDED PRIOR TO RESIDENTIAL OCCUPANCY TO ENSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
A) WIDTH- 12 FEET (16 FEET SERVING MORE THAN ONE RESIDENCE).
B) SURFACE - 6 INCHES OF COMPACTED CRUSHER RUN BASE WITH TAR AND CHIP COATING (1"-1.5" MIN).
C) GEOMETRY- MAXIMUM 1.5% GRADE, MAXIMUM 10' DEPTH TURNING RADIUS.
D) STRUCTURES (CULVERTS/BRIDGES) - CAPABLE OF SUPPORTING 25 GROSS TONS (H25 LOADING).
E) DRAINAGE ELEMENTS-CAPABLE OF SAFELY PASSING 100-YEAR FLOOD WITH NO MORE THAN 1 FOOT DEPTH OVER DRIVEWAY SURFACE.
F) STRUCTURE CLEARANCES-MINIMUM 12 FEET.
G) MAINTENANCE - SUFFICIENT TO ENSURE ALL WEATHER USE.
14. LOTS 17-21 UTILIZE A COMMON DRIVEWAY. A USE-IN-COMMON MAINTENANCE AGREEMENT FOR THE SHARED DRIVEWAY SHALL BE RECORDED SIMULTANEOUSLY WITH THE FINAL PLAT.
15. THIS PROPERTY IS WITHIN THE METROPOLITAN DISTRICT.
-WATER FOR THIS PROJECT IS TO BE PUBLIC EXTENSION OF CONTRACT NO. 34-3434-D & 44-3283-D, ZONE 550. (SEE 24-5009-D)
-SEWER FOR THIS PROJECT IS TO BE PUBLIC EXTENSION OF CONTRACT NO. 34-3434-D. (SEE 24-5009-D)
16. THE PROPOSED UNITS SHALL HAVE AN AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM.
17. EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS, TOPOGRAPHIC SURVEY, PUBLIC WATER AND SEWER EXTENSION PLANS, AND AS-BUILT DRAWINGS, CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE.
18. ANY DAMAGE INCURRED TO THE EXISTING UTILITIES, DUE TO CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
19. ANY DAMAGE TO PUBLIC RIGHT-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
20. FLOODPLAINS ARE LOCATED ONSITE.
-THE FLOODPLAIN SHOWN ON THE SUBJECT PROPERTY (MIDDLE PATUXENT RIVER) IS PER HOWARD COUNTY DIRM.
-THE ONSITE FLOODPLAINS ALONG THE VILLAGE OF RIVER HILL AND W.R. GRACE PROPERTY BOUNDARIES WERE DELINEATED BASED ON A REPORT PREPARED BY ROBERT H. VOGEL ENGINEERING, INC. DATED MAY 2017 AND APPROVED ON OCTOBER 5, 2017.
21. STEEP SLOPES OVER 20.00% OF CONTIGUOUS ARE AS SHOWN ON THE DELINEATION BY GEO-TECHNOLOGY ASSOCIATES, INC. DATED MAY 2017.
22. -WETLANDS STRIPES SHOWN FOR THE PROJECT ARE BASED ON THE DELINEATION BY GEO-TECHNOLOGY ASSOCIATES, INC. DATED MAY 2017 AND APPROVED AUGUST 23, 2016.
ALL WORK IN THE NONTIDAL WETLANDS, WETLAND BUFFERS SHALL BE COMPLETED PER THE BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS. REFERENCE MADE TRACKING NUMBER 201681491
-THE PROJECT DOES NOT DRAIN TO TIER II WATERS.
REFERENCE:
http://www.mde.state.md.us/programs/Water/TMDL/WaterQualityStandards/Pages/HighQualityWatersMap.aspx
-THERE ARE NO IMPAIRMENTS TO THE RECEIVING STREAMS (DEC 2018)
REFERENCE:
http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/303d\_mapssearch.aspx?sa=9&ok=BasinName=&ok=BasinCode=0213110&HUC=&CountyName=&WaterType=&QualityCategory=&ImpairmentCategory=&Action=1&B1=&SearchAction=2&Action=3
-STREAM CLOSURE DATES ARE: JUNE 15 (USE 1-4)
-Forest Stand Delineation Report DATED MAY 29, 2015 AND FEBRUARY 2016 WAS PREPARED BY GEO-TECHNOLOGY ASSOCIATES, INC. AND APPROVED AUGUST 23, 2016.
23. NO GRADING, REMOVAL OF VEGETATIVE COVER OR TREES, PAVING AND NEW STRUCTURES SHALL BE PERMITTED WITHIN THE REQUIRED WETLANDS, STREAM(S) OR THEIR BUFFERS, FOREST CONSERVATION EASEMENT AREAS AND 100-YEAR FLOODPLAIN.
24. FOREST STAND DELINEATION REPORT DATED MAY 29, 2015 AND FEBRUARY 2016 WAS PREPARED BY GEO-TECHNOLOGY ASSOCIATES, INC.
-FOREST CONSERVATION EASEMENTS HAVE BEEN ESTABLISHED TO FULFILL A PORTION OF THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE HOWARD COUNTY FOREST CONSERVATION MANUAL.
-NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.
-TOTAL FOREST CONSERVATION OBLIGATION OF THIS PROJECT TO BE FULFILLED BY:
1. ONSITE RETENTION OF 15.31 AC. (13.65 AC. CREDITED) (NO SURETY REQUIRED)
2. ONSITE REFORESTATION OF 2.51 AC. FINANCIAL SURETY SHALL BE POSTED WITH THIS FINAL PLAN DEVELOPER AGREEMENT.
3. THE PURCHASE OF 8.18 ACRES OF REFORESTATION CREDIT IN THE CAPITAL MEADOWS FOREST BANK, SDP-16-027.
26. A TRAFFIC STUDY WAS PREPARED BY TRAFFIC GROUP, ENTITLED "TRAFFIC IMPACT ANALYSIS" WAS APPROVED JANUARY 19, 2016.
27. A NOISE STUDY WAS PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED JANUARY 2017 AND APPROVED ON OCTOBER 5, 2017.
-THE 65 DBA NOISE CONTOUR LINE DRAWN ON THIS SUBDIVISION PLAN IS ADVISORY AS REQUIRED BY THE HOWARD COUNTY DESIGN MANUAL, CHAPTER 5, REVISED FEBRUARY, 1992 AND CANNOT BE CONSIDERED TO EXACTLY LOCATE THE 65 DBA NOISE EXPOSURE. THE 65 DBA NOISE LINE WAS ESTABLISHED BY HOWARD COUNTY TO ALERT DEVELOPERS, BUILDERS AND HOMEOWNERS THAT AREAS BEYOND THIS THRESHOLD MAY EXCEED GENERALLY ACCEPTED NOISE LEVELS ESTABLISHED BY THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT.
28. THE GEOTECHNICAL AND ESD TEST PIT REPORTS WERE PREPARED BY GEO-TECHNOLOGY ASSOCIATES, INC. FEBRUARY 2015 AND JANUARY 2017 RESPECTIVELY.
29. THE ENVIRONMENTAL CONCEPT PLAN (ECP-15-080) WAS APPROVED PER LETTER DATED AUGUST 23, 2016
30. A PRELIMINARY PLAN (P-17-002) WAS APPROVED ON SEPTEMBER 13, 2017.
31. STORM WATER MANAGEMENT PRACTICES ARE REQUIRED IN ACCORDANCE WITH THE DESIGN MANUALS, PRIOR TO SIGNATURE APPROVAL OF THE FINAL PLAT, THE DEVELOPER WILL BE REQUIRED TO EXECUTE THE DECLARATION OF GOVERNANT AND/OR A DEVELOPER'S AGREEMENT FOR THE CONSTRUCTION OF THE STORM WATER MANAGEMENT PRACTICES AND A MAINTENANCE AGREEMENT.
STORMWATER MANAGEMENT FOR THE PROJECT IS PROVIDED BY THE USE OF NON STRUCTURAL AND MICRO-SCALE PRACTICES IN ACCORDANCE WITH ENVIRONMENTAL SITE DESIGN CRITERIA.
-PRIVATE OFF-LOT (OPEN SPACE) MICRO-SCALE FACILITIES, MICRO-BIOTENTION (M-6) AND BIO SWALE (M-8) WHICH RECEIVE NO PUBLIC ROAD RUNOFF) WILL BE PRIVATELY OWNED AND MAINTAINED BY THE H.O.A. AND HOWARD COUNTY.
-OFF-LOT (OPEN SPACE) MICRO-SCALE MICRO-BIOTENTION (M-6) FACILITIES MANAGING ROAD RUNOFF, DESIGNATED AS JOINT MAINTENANCE SHALL BE PRIVATELY OWNED AND JOINTLY MAINTAINED (H.O.A. AND HOWARD COUNTY); HOWARD COUNTY WILL MAINTAIN OUTLET STRUCTURES AND STORM DRAIN PIPES, WHILE THE H.O.A. SHALL MAINTAIN MULCH, WEEDING, PLANTINGS, PERFORATED UNDERDRAINS, FEEDER PIPES, AND ROUTINE BIO-SOIL REPLACEMENT.
-PRIVATE ON-LOT PRACTICES WILL BE PRIVATELY OWNED AND MAINTAINED BY INDIVIDUAL PROPERTY OWNERS. ON-LOT (RESIDENTIAL) MICRO-SCALE PRACTICES INCLUDE THE USE OF RAIN BARRELS (M-1) AND DRYPWELLS (M-5) AS WELL AS THE USE OF THE NON-STRUCTURAL PRACTICE; DISCONNECTION OF ROOFTOP RUNOFF (N-1).
-PER HOWARD COUNTY REQUIREMENT AND IN ACCORDANCE VOLUME 1, CHAPTER 5.2.1.A; 10' & 100' YEAR QUANTITY MANAGEMENT HAS BEEN PROVIDED.
-IN ORDER TO MEET THE PROJECTS QUANTITY MANAGEMENT REQUIREMENTS, THE DEVELOPER PROPOSES THE FOLLOWING:
1. IN COOPERATION WITH W.R. GRACE, THE RECONSTRUCTION OF THE W.R. GRACE YARD FACILITY, AS PREVIOUSLY COMMENTED BY THE HOWARD SOIL CONSERVATION DISTRICT, THIS FACILITY WILL BE RECONSTRUCTED TO CURRENT MD-378 AND HOWARD COUNTY VOLUME 1, CHAPTER 5 SPECIFICATIONS. CURRENTLY, THIS FACILITY IS A WET POND FLOOD FACILITY. THIS FACILITY SHALL BE RECONSTRUCTED AS A P-3 WET EXTENDED DETENTION POND. THIS FACILITY WILL BE OWNED AND MAINTAINED BY W.R. GRACE CO.
2. A LARGE QUANTITY FACILITY (SWMF#2) WHICH SHALL PROVIDE 10' & 100' YEAR QUANTITY MANAGEMENT. THIS FACILITY WILL BE OWNED AND MAINTAINED BY W.R. GRACE CO.
3. A SMALL QUANTITY FACILITY (SWMF#3) WHICH SHALL PROVIDE 10' & 100' YEAR QUANTITY MANAGEMENT AND IS DESIGNED AS A F-1 SAND FILTER FACILITY. THIS FACILITY WILL BE OWNED BY THE H.O.A. AND HOWARD COUNTY.
32. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE LANDSCAPE MANUAL. A FINANCIAL SURETY IN THE AMOUNT OF \$47,550 SHALL BE POSTED AS PART OF THE DEVELOPER'S AGREEMENT.
-PERIMETER PLANTINGS IN THE AMOUNT OF \$20,550 FOR THE REQUIRED 58 SHADE TREES (\$17,400) AND 21 EVERGREENS (\$3,150)
-RESIDENTIAL INTERNAL LANDSCAPING IN THE AMOUNT \$24,800 FOR THE REQUIRED 83 SHADE TREES
-PARKING LOT INTERNAL LANDSCAPING IN THE AMOUNT \$2,100 FOR THE REQUIRED 7 SHADE TREES
33. PUBLIC STREET TREES ARE PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH SECTION 16.124(01) OF THE SUBDIVISION REGULATIONS, LANDSCAPE MANUAL AND THE ZONING BOARD DECISION AND ORDER, ZB-1104-M. FINANCIAL SURETY (\$ 103,800) SHALL BE POSTED AS PART OF THIS FINAL PLAN DEVELOPER'S AGREEMENT FOR THE REQUIRED 346 STREET TREES.
34. -IN ACCORDANCE WITH DESIGN MANUAL VOLUME 3, CHAPTER 2 - SECTION 2.9.B, PARKING IS REQUIRED AT TWO (2) SPACES PER UNIT OFF STREET PARKING TO INCLUDE GARAGE SPACE, DRIVEWAY, PARKING PAD AND COURTS, GARAGES COUNT AS A FULL SPACE. SEE TABULATION THIS SHEET.
-THE ONE (1) GARAGE SPACE MAY NOT BE CONVERTED TO LIVING SPACE AND SHALL ONLY BE UTILIZED FOR VEHICULAR PARKING SPACE.
SEE SHEET 2 FOR ADDITIONAL GENERAL NOTES

SIMPSON OAKS APFO PHASING
PHASE NUMBER, ALLOCATION YEAR, TOTAL NO. OF ALLOCATIONS

LEGEND

- PROPERTY LINE
RIGHT-OF-WAY LINE
ADJACENT PROPERTY LINE
CENTERLINE OF EXISTING STREAM
EXISTING TREETREE
EXISTING CURB AND GUTTER
PROPOSED CURB AND GUTTER

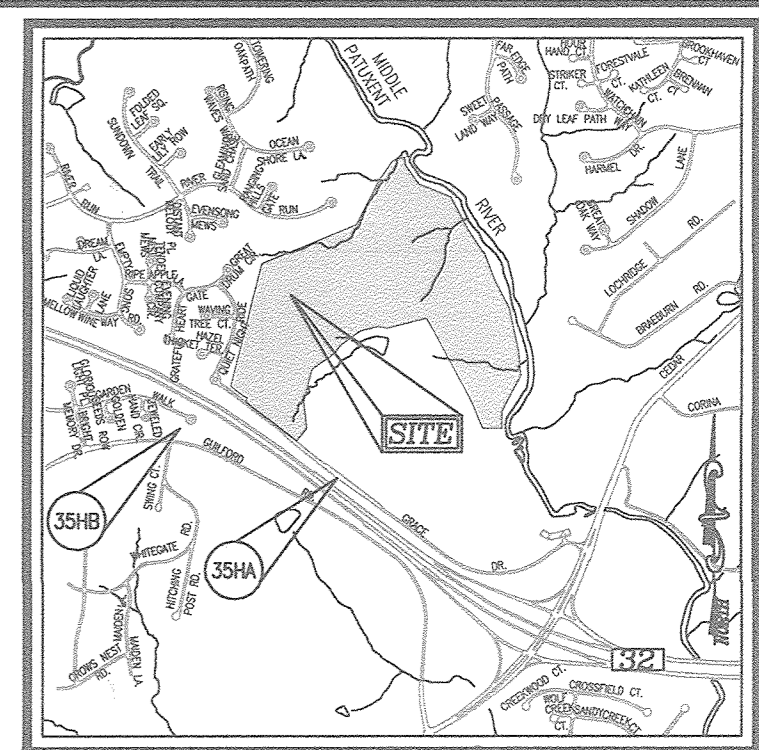
FINAL ROAD CONSTRUCTION PLANS
CEDAR CREEK - PHASE 1

LOTS 1 - 129, OPEN SPACE LOTS 130 - 141,
NON-BUILDABLE BULK PARCELS A - F AND PARCEL C-1
A RESUBDIVISION OF GRACE TECH PARK - PARCELS 'B-1' & 'C'
HOWARD COUNTY, MARYLAND



BENCHMARKS

- BM 35HA\*
N 553,966.7457 E 1,340,476.9524
NAD 83 (Adj. 07)
NAVD 88
ELEV. 404.584
BM 35HB\*
N 554,836.4156 E 1,337,888.3861
NAD 83 (Adj. 07)
NAVD 88
ELEV. 449.699



VICINITY MAP
SCALE: 1"=2000'
ADC MAP COORDINATE: 32
GRID B-3, C-3, B-4 & C-4

SHEET INDEX

Table with 3 columns: DESCRIPTION, SHEET NO., and SHEET NO. listing various site plan components and their corresponding sheet numbers.

PARKING TABULATION:

DETAILS OF PARKING SPACES REQUIRED, INCLUDING OFF-STREET AND VISITOR PARKING, AND REFERENCES TO DESIGN MANUALS.

OPEN SPACE TABULATION:

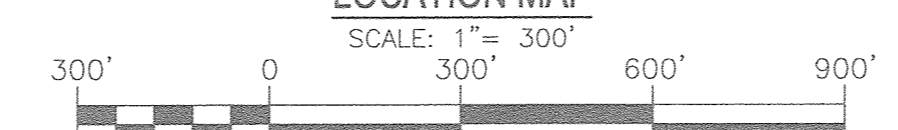
DETAILS OF OPEN SPACE REQUIREMENTS, INCLUDING AREAS FOR BIOTENTION, SWALES, AND OTHER LANDSCAPING FEATURES.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
CHIEF, BUREAU OF HIGHWAYS
CHIEF, DEVELOPMENT ENGINEERING DIVISION
CHIEF, DIVISION OF LAND DEVELOPMENT

SITE DATA

DEED REFERENCE: PARCEL 145 L 16600 / F 157
ELECTION DISTRICT: 5TH
LOCATION: GRACE DRIVE
WEST OF CEDAR LANE
EXISTING ZONING: CEF-R
GROSS AREA: 66.81 AC +/-
RESUB. NON-BUILDABLE BULK PARCELS A-F
AREA OF STEEP SLOPES (25% & GREATER): 1.63 AC.
AREA OF WETLAND & WETLAND BUFFER AREA: 0.39 AC.
NET AREA (GROSS-STEEP SLOPES & FLOODPLAIN): 63.50 ACRES±
AREA OF PROPOSED RESIDENTIAL LOTS: 184 LOTS
AREA OF ROAD RIGHT OF WAY (ON-SITE): 7.98 AC

LOCATION MAP



NOTE:

THE CEDAR CREEK TRAIL, CONNECTING THE PROJECT TO THE ROBINSON NATURE CENTER AS DETAILED ON THE SDP-19-025 PLAN SHALL BE CONSTRUCTED WITH THESE PHASE 1 INFRASTRUCTURE IMPROVEMENTS.

CEF NOTE - ZONING BOARD CASE ZB-1104-M NOTE:

IN ACCORDANCE WITH THE REFERENCED ZONING BOARD DECISION AND ORDER, THIS PLAN PROVIDES:
A. ROAD CONSTRUCTION, B. STORM DRAINAGE, C. STORMWATER MANAGEMENT, D. LANDSCAPING, E. FOREST CONSERVATION AND F. OPEN SPACE AS REQUIRED FOR THE 101 SINGLE FAMILY DETACHED AND 83 SINGLE FAMILY ATTACHED UNITS (DIFFERENT WIDTHS) PROPOSED FOR THE PROJECT.
IN ADDITION, THE PLAN DETAILS: A. MULTIPLE RECREATION OPEN SPACE AREAS WITH A. TOT LOTS, B. OPEN PLAY AREA, C. PICNIC AREA, D. CEDAR CREEK NEIGHBORHOOD TRAIL, CONNECTED FROM THE VILLAGE OF RIVER HILL TO THAT KNOWN AS THE MIDDLE PATUXENT ENVIRONMENTAL TRAIL AND DETAILED ON THE SDP-19-025 PLAN.
THE SDP-19-025 PLAN PROVIDES THE LINK TO THE ROBINSON NATURE CENTER. CONCURRENTLY WITH THE RECORDING OF THE CEDAR CREEK FINAL PLATS, THE DEDICATION OF THE 'OVERLOOK' PARCEL KNOWN AS TAX MAP 35 PARCEL 412 / COLUMBIA - VILLAGE OF HICKORY RIDGE - SECTION 3 AREA 14 - PARCEL A (PLAT 13640) SHALL OCCUR. ADDITIONALLY, OPEN SPACE LOT 132 SHALL BE DEDICATED TO HOWARD COUNTY AS PARK AREA TO PROTECT WETLANDS, STREAMS AND THEIR BUFFERS AND FLOODPLAINS. THIS PLAN ALSO PROVIDES THE REQUIRED DETAILING OF THE GRACE DRIVE BIKEWAY. MIHU UNITS SHALL BE 'DISPERSED THROUGHOUT THE SINGLE FAMILY ATTACHED COMMUNITY' AND SHALL BE 'INDISTINGUISHABLE FROM THE OTHER NON-MIHU UNITS'
DURING THE FINAL PLAN (F-18-041) REVIEW, HOWARD COUNTY WILL NOT ACCEPT OPEN SPACE LOT 132 AND THEREFORE IT SHALL BE A H.O.A. OPEN SPACE LOT

STORMWATER MANAGEMENT NOTE:

REFER TO SHEET 2 FOR THE STORMWATER MANAGEMENT PRACTICE CHAITS WHICH DETAIL THE TYPES OF FACILITIES REQUIRED FOR EACH RESIDENTIAL AND OPEN SPACE LOT

OWNER / DEVELOPER
T.M. 35 - P.145 (PARCEL B-1)
OWNER
T.M. 35 - P.145 (PARCEL C)
W.R. GRACE & CO.
4750 OWINGS MILLS GROVE ROAD
OWINGS MILLS, MARYLAND 21104-4098
(410) 531-4000

Table with 3 columns: NO., REVISION, and DATE, detailing the revision history of the plan.

Professional seal and signature of Robert H. Vogel, Engineer, and project information including design and check dates.

GENERAL NOTES (CONTINUED)

35. THIS PROJECT IS SUBJECT TO WP-16-073. ON JANUARY 4, 2016, THE PLANNING DIRECTOR APPROVED THE REQUEST, TO FOR AN ALTERNATIVE COMPLIANCE TO SECTION 16.144(D)(2) FOR A REVISED SUBMISSION OF A SKETCH PLAN WITHIN 45 DAYS AND SECTION 16.104(G)(1) FOR A REVISED SUBMISSION OF AN ALTERNATIVE COMPLIANCE REQUEST WITHIN 45 DAYS. APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
- 1. WITHIN 90 DAYS FROM THE DATE OF THE APPROVAL LETTER (APRIL 3, 2016) THE DEVELOPER SHALL RESUBMIT TO THE DEPARTMENT OF PLANNING AND ZONING THE REVISED SKETCH PLAN, S-15-007, AND REVISED ALTERNATIVE COMPLIANCE WP-16-038. IF THE SKETCH PLAN AND ALTERNATIVE COMPLIANCE REQUEST ARE NOT RESUBMITTED WITHIN 90 DAYS, THE SKETCH PLAN WILL BE VOIDED AND THE ALTERNATIVE COMPLIANCE REQUEST WILL BE VOIDED. AFTER 90 DAYS ANY PLANS RESUBMITTED MUST BE PROCESSED AS A NEW SKETCH PLAN AND A NEW ALTERNATIVE COMPLIANCE REQUEST.
36. THIS PROJECT IS SUBJECT TO A ALTERNATIVE COMPLIANCE. ON OCTOBER 22, 2015, THE CHIEF OF THE DEVELOPMENT ENGINEERING DIVISION DEFERRED THE REQUEST FOR AN ALTERNATIVE COMPLIANCE TO THE REQUIREMENTS OF SECTION 2.5.B OF DESIGN MANUAL VOLUME III, WHICH REQUIRES A MINIMUM OF 250 FEET SPACING BETWEEN INTERSECTING ROAD CENTERS.
- 1. A REQUEST FOR RECONSTRUCTION WAS SUBMITTED AND ON APRIL 23, 2016, THE CHIEF OF THE DEVELOPMENT ENGINEERING DIVISION APPROVED THE REQUEST FOR ALTERNATIVE COMPLIANCE TO SECTION 2.5.B.1 TO REDUCE THE INTERSECTION SPACING FROM 250 FEET TO 240.79 FEET AND SECTION 2.3.A.3.E WHICH REQUIRES A SECOND MEANS OF ACCESS WHICH VOLUME EXCEEDS 1,000 ADT, PROVIDING AN ALTERNATE DESIGN AND SECTION 2.3.A.1 FOR REDUCTIONS IN CENTERLINE RADIUS. APPROVAL IS SUBJECT TO THE CONDITION TO PROVIDE THE PAVEMENT WIDTH OF 22 FEET ON NORTH AND SOUTHWARD ROAD & BETWEEN ROAD B & GRACE DRIVE AND PARKING ALONG REDUCED HORIZONTAL CURVES BE RESTRICTED.
37. IN ACCORDANCE WITH SECTION 121.0 OF THE HOWARD COUNTY ZONING REGULATIONS AND THE BULK REGULATIONS APPROVED UNDER HOWARD COUNTY ZONING BOARD CASE ZB-1104-M BULK REGULATIONS, THE OPEN SPACE REQUIREMENTS FOR THIS CEF-R PROJECT IS 33% OF GROSS AREA. SEE TABULATION HEREON.
- 1. OPEN SPACE LOTS 130-141 SHALL BE OWNED AND MAINTAINED BY THE H.O.A.
  - 2. PARCEL C-1 SHALL BE OWNED AND MAINTAINED BY W.R. GRACE.
  - 3. REFER TO ZB-1104-M
38. ADDITIONAL OPEN SPACE IS BEING PROVIDED ON THE VILLAGE OF HICKORY RIDGE - SECTION 3 AREA 14 - PARCEL A - PLAT MDR NO. 13640. PARCEL A SHALL BE DEDICATED TO HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS BY W.R. GRACE. PARCEL A IS SHOWN AS THE MAP 85, PARCEL #12. PARCEL #12 (PARCEL A) IS CONVEYING 31.39 ACRES OF OPEN SPACE TO THE "CEDAR CREEK" PROJECT.
39. IN ACCORDANCE WITH SECTION 121.0 OF THE HOWARD COUNTY ZONING REGULATIONS AND THE BULK REGULATIONS APPROVED UNDER HOWARD COUNTY ZONING BOARD CASE ZB-1104-M BULK REGULATIONS, THE RECREATION OPEN SPACE FOR THIS CEF-R PROJECT IS 1,000 SF / UNIT. SEE TABULATION HEREON.
- 1. THE OVERALL REQUIREMENT SHALL BE MET PER REGULATION IN COMBINATION WITH THE JUNE 2012 POLICY REGARDING THE ALLOWANCE OF A MAXIMUM 50% CREDIT FOR RECREATIONAL OPEN SPACE IN LIEU OF LAND AREA.
40. ALL SIDEWALKS ADJACENT TO PUBLIC STORMWATER MANAGEMENT EASEMENTS SHALL BE TRAFFIC BEARING FOR THE LIMITS OF THE PUBLIC EASEMENT. REINFORCEMENT SHALL BE IN ACCORDANCE WITH HOWARD COUNTY DETAIL R-6-03.
41. THIS PROJECT IS SUBJECT TO WP-16-038. ON DECEMBER 5, 2016, THE PLANNING DIRECTOR APPROVED THE REQUEST FOR ALTERNATIVE COMPLIANCE TO SECTION 16.1205(A)(7)&(10) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, WHICH REQUIRES THE RETENTION OF STATE CHAMPION TREES, TREES 75% OF THE DIAMETER OF STATE CHAMPION TREES, AND TREES 30" IN DIAMETER OR LARGER.
- APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
1. APPROVAL IS TO REMOVE SPECIMEN TREES IDENTIFIED ON THE ALTERNATIVE COMPLIANCE EXHIBIT. A SEPARATE ALTERNATIVE COMPLIANCE REQUEST MUST BE SUBMITTED AND APPROVED BY THE DEPARTMENT OF PLANNING AND ZONING FOR ANY OTHER SPECIMEN TREE TO BE REMOVED, UNLESS OTHERWISE NOTED IN THESE CONDITIONS OF APPROVAL.
  2. SPECIMEN TREES WHERE THE CRITICAL ROOT ZONE IS IMPACTED BY THE LIMIT OF DISTURBANCE WILL REQUIRE PRE, DURING, AND POST-CONSTRUCTION PRACTICES AND MEASURES TO MINIMIZE IMPACT TO THE TREES. THESE SPECIFIC PRACTICES WITHIN THE FINAL SUBDIVISION PLAN AND SHALL BE IMPLEMENTED AND/OR SUPERVISED IN THE FIELD BY A CERTIFIED ARBORIST.
  3. SPECIMEN TREES WHERE THE CRITICAL ROOT ZONE IS IMPACTED BY THE LIMIT OF DISTURBANCE, AND INDICATED IN THE ALTERNATIVE COMPLIANCE EXHIBIT TO BE IN POOR OR FAIR CONDITION, MAY BE REMOVED UNDER THIS ALTERNATIVE COMPLIANCE REQUEST IF A CERTIFIED ARBORIST DETERMINES SURVIVAL OF THE TREE IS IMPROBABLE OR THE TREE MAY BE A POTENTIAL HAZARD TO THE DEVELOPMENT. PRIOR TO REMOVING THE TREE, THE APPLICANT SHALL SUBMIT A REPORT FROM THE CERTIFIED ARBORIST TO THE DEPARTMENT OF PLANNING AND ZONING DETAILING THE TREE'S CONDITION, THE PRACTICES EXAMINED TO SAVE THE TREE, AND THE REASONING FOR THE TREE'S REMOVAL.
  4. REMOVAL OF THE 41 SPECIMEN TREES WILL REQUIRE MITIGATION AS ADDITIONAL LANDSCAPE PLANTINGS OR 1" CALIPER FOREST CONSERVATION PLANTINGS, OR A COMBINATION THEREOF. MITIGATION WILL BE DETERMINED BY THE DEPARTMENT OF PLANNING AND ZONING DURING THE REVIEW OF THE PRELIMINARY PLAN WHEN THE DESIGN IS FURTHER ENGINEERED.
42. TRAFFIC CONTROL DEVICES:
- A. THE R1-(15)TOP SIGNS AND STREET NAME SIGN (SNS) ASSEMBLIES FOR THIS DEVELOPMENT MUST BE INSTALLED BEFORE THE BASE PAVING IS COMPLETE.
  - B. THE TRAFFIC CONTROL DEVICES LOCATED 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.
  - C. ALL TRAFFIC CONTROL DEVICES AND THEIR LOCATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE 'MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES' (MDMUTCD).
  - D. ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL, PERFORATED, ("BUCK PUNCH") SQUARE TUBE POST (1/4 GAUGE) INSERTED INTO A 2-3/8" GALVANIZED STEEL, PERFORATED, SQUARE TUBE SLEEVE (1/2 GAUGE - 3" LONG). THE ANCHOR SHALL NOT EXTEND MORE THAN TWO "BUCK PUNCH" HOLES ABOVE GROUND LEVEL. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON THE TOP OF EACH POST.
43. THIS PROJECT WILL REQUIRE STREET LIGHTING IN ACCORDANCE WITH SECTION 16.135 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS, THE HOWARD COUNTY DESIGN MANUAL AND THE ZONING BOARD DECISION AND ORDER, ZB-1104-M. STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURES SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III, SECTION 5.5.A. A MINIMUM OF 20 FEET SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
44. IN ACCORDANCE WITH SECTION 121.0 OF THE 10/08/13 COMPREHENSIVE ZONING REGULATIONS, AND THE BULK REGULATIONS APPROVED UNDER HOWARD COUNTY ZONING BOARD CASE ZB-1104-M BULK REGULATIONS, THIS SUBDIVISION IS SUBJECT TO MODERATE INCOME HOUSING UNITS. AT LEAST 10% OF THE DWELLINGS SHALL BE MODERATE INCOME HOUSING UNITS (MIHU). ZONING R-14 X 10% = 19 UNITS SHALL BE PROVIDED FOR THIS PROJECT.
- 1. PHASE 1 REQUIRES: 13 MIHU UNITS (129 X 10% = 13)
  - 2. PHASE 2 REQUIRES: 6 MIHU UNITS (55 LOTS X 10% = 6)
  - 3. IN ACCORDANCE WITH CEF-R REGULATIONS, 19 SFA UNITS SHALL BE DESIGNATED AS MIHU UNITS.
  - 4. A MIHU AGREEMENT WILL BE RECORDED SIMULTANEOUSLY WITH THE RECORDING OF THIS PLAN.
45. ON APRIL 19, 2017 THE HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING DETERMINED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OCCURRING ALONG GRACE DRIVE, THE DISTURBANCE REQUIRED TO CONSTRUCT TO PUBLIC SEWER, AND THE RECONSTRUCTION OF THE OFF SITE POND TO MEET MD-378 STANDARDS ARE NECESSARY DISTURBANCE.
46. ON JUNE 22, 2017 THE HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING DETERMINED THAT THE DISTURBANCE OF STEEP SLOPES FOR INSTALLATION OF A SANITARY SEWER IS NECESSARY FOR REASONABLE DEVELOPMENT OF THE PROPERTY.
47. A PRIVATE RANGE OF ADDRESS SIGN ASSEMBLIES FOR PRIVATE LOTS 17-21 SHOWN ON SHEET 21 SHALL BE FABRICATED AND INSTALLED BY HOWARD COUNTY BUREAU OF HIGHWAYS AT THE DEVELOPERS/OWNERS EXPENSE. CONTACT HOWARD COUNTY TRAFFIC DIVISION AT 410-313-2752 FOR DETAILS AND COST ESTIMATES.
48. NO STREET TREE CAN BE PLANTED WITHIN 40' OF A PROPOSED "STOP" SIGN LOCATION (APPROACH DIRECTION).
49. THIS PROJECT IS SUBJECT TO WP-17-108. ON JULY 20, 2017, THE PLANNING DIRECTOR APPROVED THE REQUEST FOR ALTERNATIVE COMPLIANCE WITH SUBSECTION 16.144(G) OF THE CODE, REQUIRING A PRELIMINARY PLAN FOR PHASE 2.
- APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:
1. APPLICANT SHALL SUBMIT A FINAL PLAN APPLICATION BASED ON P-17-002, ONCE APPROVED, AND SHALL RECORD A SUBDIVISION PLAT WITH THE LAND RECORDS OFFICE OF HOWARD COUNTY BASED ON SAID FINAL PLAN. THE FINAL PLAT SHALL INDICATE PHASE 1 AND PHASE 2 OF THE SUBDIVISION. PHASE 1 AND PHASE 2 OF THE SUBDIVISION SHALL INCLUDE BUILDING LOTS, NON-BUILDABLE BULK PARCELS, OPEN SPACE LOTS AND ROAD CONSTRUCTION DRAWINGS FOR THE ENTIRE PROJECT. THE PHASE 2 FINAL PLAT WILL ONLY SHOW THE RESUBDIVISION OF NON-BUILDABLE PARCELS INTO THE REMAINING BUILDABLE LOTS.
  2. THE DEVELOPER WILL BE RESPONSIBLE FOR CONSTRUCTING A NATURAL SURFACE TRAIL AND SUSPENSION BRIDGE FROM THIS SUBDIVISION THROUGH OPEN SPACE LOT 140 TO THE ROBINSOIN NATURE CENTER. REFER TO SHEETS 7 AND 19 FOR BEGINNINGS OF THE TRAIL NETWORK FROM CROSS CREEK DRIVE. SEE ALSO SDP-19-025 FOR DETAILS.
  3. STREET LIGHTING IS REQUIRED FOR THIS SITE IN ACCORDANCE WITH SECTION 16.135 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. STREET LIGHT PLACEMENT AND THE TYPE OF FIXTURES AND POLES SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL, VOLUME III, SECTION 5.5.A. A MINIMUM OF 20 FEET SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.
  4. THE GROUNDWATER USE RESTRICTION AREA (APPROXIMATE) SHOWN HEREON AS TAKEN FROM THE PREVIOUS PLAT OF GRACE TECH PARK - PARCELS 18-1 & 10' (PLAT #23332) IS DESCRIBED IN A TITLE NOTICE DATED APRIL 7, 2008 AND RECORDED AMONG THE LAND RECORDS OF HOWARD COUNTY, MARYLAND IN LIBER 11163 FOLD 568. THE TITLE NOTICE DECLARES THAT THE AREA IS SUBJECT TO A RESOURCE CONSERVATION AND RECOVERY CORRECTIVE ACTION PERMIT AND THE PROHIBITION AGAINST THE DEVELOPMENT OF ONSITE WELLS FOR DRINKING WATER OR OTHER DOMESTIC USES.
50. ON APRIL 1, 2019 THE PLANNING DIRECTOR APPROVED THE THIRTEEN (13)

- AREA #1: HW-114 (OPEN SPACE LOT 131) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL WITHIN THE 50' INTERMITTENT STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #2: ES-108 (OPEN SPACE LOT 131) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL WITHIN THE 50' INTERMITTENT STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #3: ES-32 (OPEN SPACE LOT 132) FOR A STORM DRAIN OUTFALL PIPE AND RIP-RAP CHANNEL WITHIN THE 100' PERENNIAL STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #4: HW-10 (OPEN SPACE LOT 134) FOR A STORM DRAIN OUTFALL PIPE AND RIP-RAP CHANNEL WITHIN THE 100' PERENNIAL STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #5: ES-1 (OPEN SPACE LOT 134) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL WITHIN THE 100' PERENNIAL STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #6: EH-C (OPEN SPACE LOT 140) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL AND GRADING WITHIN THE 50' INTERMITTENT STREAM BUFFER
- AREA #7: STORM DRAIN OUTFALL RIP-RAP CHANNEL AND PEDESTRIAN PATH AND FOOT BRIDGE LOCATED BELOW SWM FACILITY #2 POND DAM WITHIN PARCEL C-1 WITHIN THE 50' INTERMITTENT STREAM BUFFER
- AREA #8: EW-A (GRACE TECH PARK, PARCEL A) FOR A STORM DRAIN OUTFALL PIPE AND RIP-RAP CHANNEL AND GRADING WITHIN THE 100' PERENNIAL STREAM BUFFER AND 25' WETLANDS BUFFER
- AREA #9: HW-38 (GRACE TECH PARK, PARCEL A) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL AND GRADING WITHIN THE 100' PERENNIAL STREAM BUFFER AND 25' WETLANDS BUFFER
- AREA #10: ES-191 (GRACE TECH PARK, PARCEL A) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL WITHIN THE 100' PERENNIAL STREAM BUFFER AND 25' WETLANDS BUFFER
- AREA #11: HW-203 (OPEN SPACE LOT 130) FOR A STORM DRAIN OUTFALL RIP-RAP CHANNEL WITHIN THE 50' INTERMITTENT STREAM BUFFER AND 100-YEAR FLOODPLAIN
- AREA #12: ES-244 (OPEN SPACE LOT 130) FOR A STORM DRAIN OUTFALL PIPE AND RIP-RAP CHANNEL WITHIN THE 50' INTERMITTENT STREAM BUFFER AND 25' WETLANDS BUFFER
- AREA #13: HW-89 (GRACE TECH PARK, PARCEL A) FOR A STORM DRAIN OUTFALL PIPE AND RIP-RAP CHANNEL WITHIN 25' WETLANDS BUFFER AND 100-YEAR FLOODPLAIN.

REQUESTS FOR APPROVAL OF ENVIRONMENTAL DISTURBANCES TO ALLOW THE STORM DRAIN OUTFALL PIPES, RIP-RAP CHANNELS, ASSOCIATED GRADING AND A PEDESTRIAN PATHWAY AND FOOT BRIDGE WITHIN THE 50' AND 100' STREAM BUFFERS, 25' WETLANDS BUFFER AND 100-YEAR FLOODPLAIN AS ESSENTIAL OR NECESSARY DISTURBANCES IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. APPROVAL WAS BASED ON THE FOLLOWING:

- THE DETAILED JUSTIFICATIONS PROVIDED BY VOGEL ENGINEERING +TIMMONS GROUP IN A LETTER DATED MARCH 21, 2019.
- THE PROPOSED SWM OUTFALL DESIGN IS REQUIRED BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT TO MINIMIZE DISTURBANCES TO THE STREAM AND WETLANDS BUFFERS AND 100-YEAR FLOODPLAIN AS REQUIRED BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT TO PROVIDE STABLE NON-EROSIVE OUTFALLS FOR THE STORM WATER MANAGEMENT FACILITIES TO THE INVERTS OF STREAMS AT THE BOTTOM OF STEEP SLOPES.
- THE PROPOSED PATHWAY AND FOOT BRIDGE WILL SERVE AS A PEDESTRIAN PATHWAY FOR THE COMMUNITY AS REQUIRED AS A COMMUNITY ENHANCEMENT UNDER THE DECISION AND ORDER FOR ZONING BOARD CASE NO. 11044.
- THE STREAM AND WETLANDS BUFFERS AND FLOOD PLAN AREAS DISTURBED WILL BE STABILIZED, RE-VEGETATED AND PLANTED WITH GRASS, GROUND COVER AND/OR NATIVE TREES AND SHRUBS.

APPROVAL OF THE ABOVE DESCRIBED ESSENTIAL OR NECESSARY DISTURBANCES ARE SUBJECT TO THE FOLLOWING:

- THE RE-STABILIZATION AND PLANTING OF NATURAL VEGETATION (GRASSES, GROUND COVER AND NATIVE TREES AND SHRUBS) FOR THE IMPACTED STREAM AND WETLAND BUFFERS.
- THE APPLICANT SHALL OBTAIN AUTHORIZATION FROM THE MARYLAND DEPARTMENT OF THE ENVIRONMENT AND U.S. ARMY CORPS OF ENGINEERS FOR ACTIVITIES IN REGULATED WETLAND AND STREAM AREAS PRIOR TO SUBMISSION OF THE BUILDING OR GRADING PERMIT APPLICATIONS. REFERENCE THE APPLICABLE EDC, USE PERMITS OR TRACKING NUMBERS ON ANY ASSOCIATED SUBDIVISION AND SITE DEVELOPMENT PLANS, AND DRIVING OR GRADING PERMITS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

6/11/2019

CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

6/17/19

CHIEF, DEVELOPMENT ENGINEERING DIVISION

6/20/19

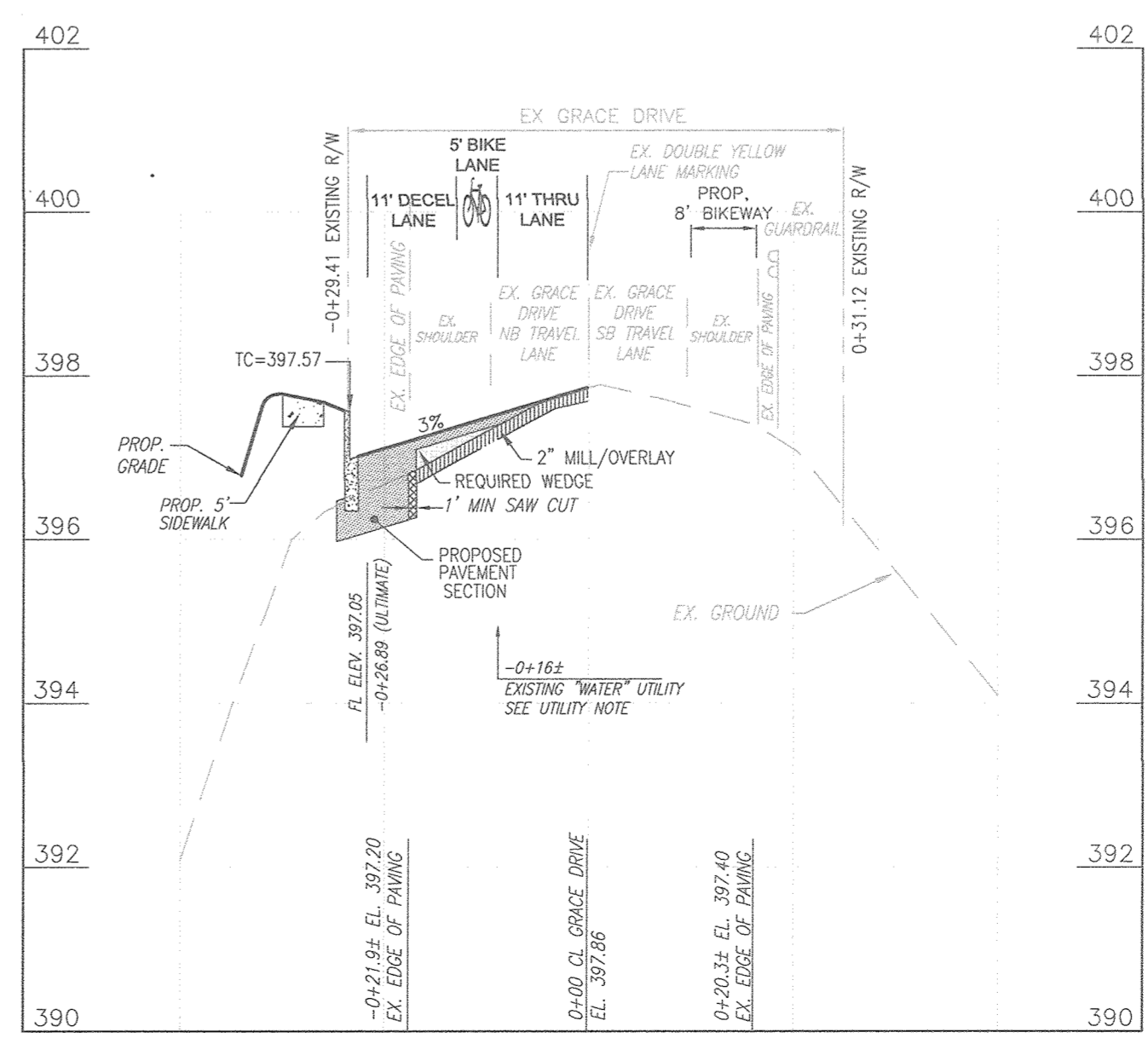
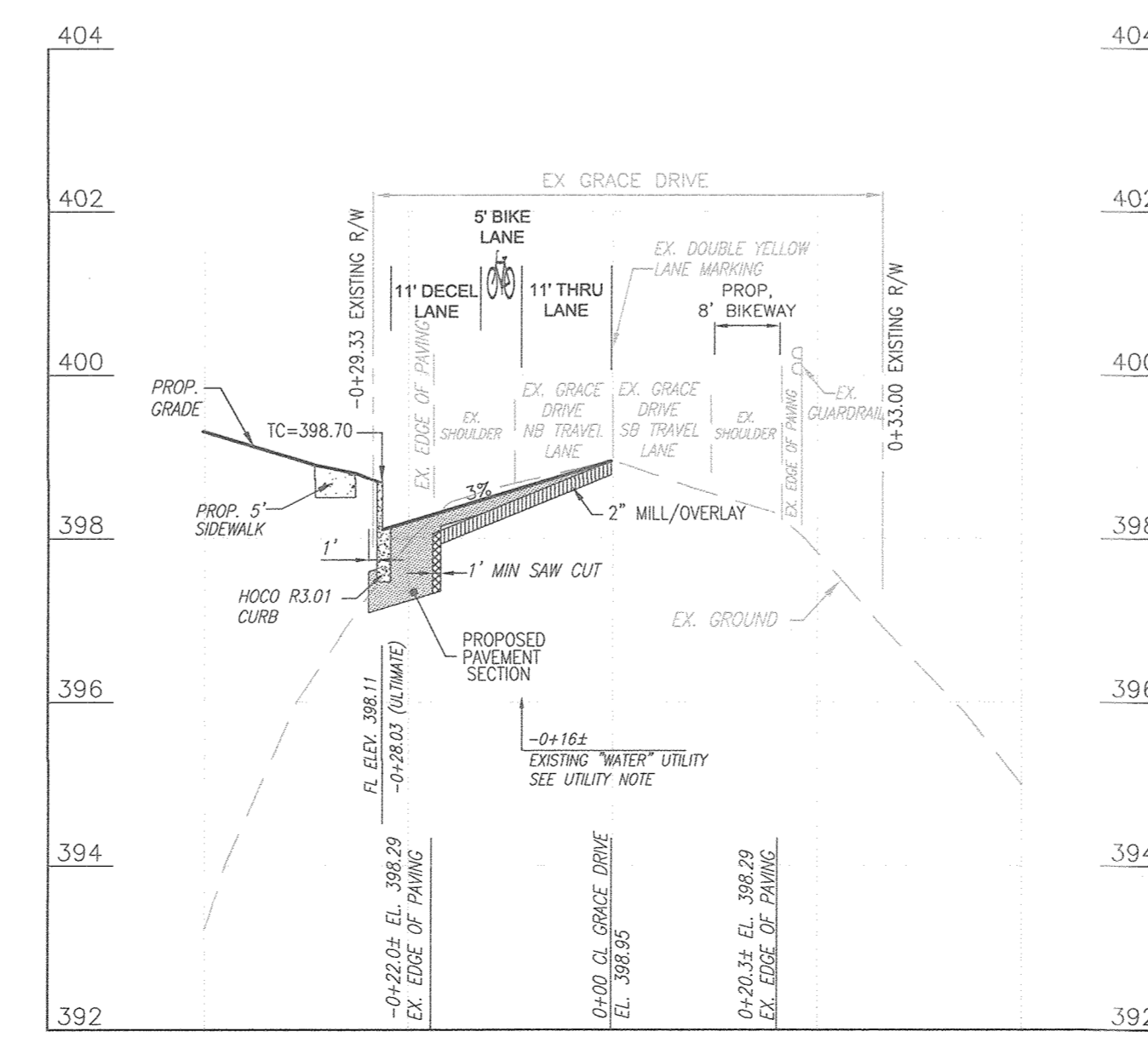
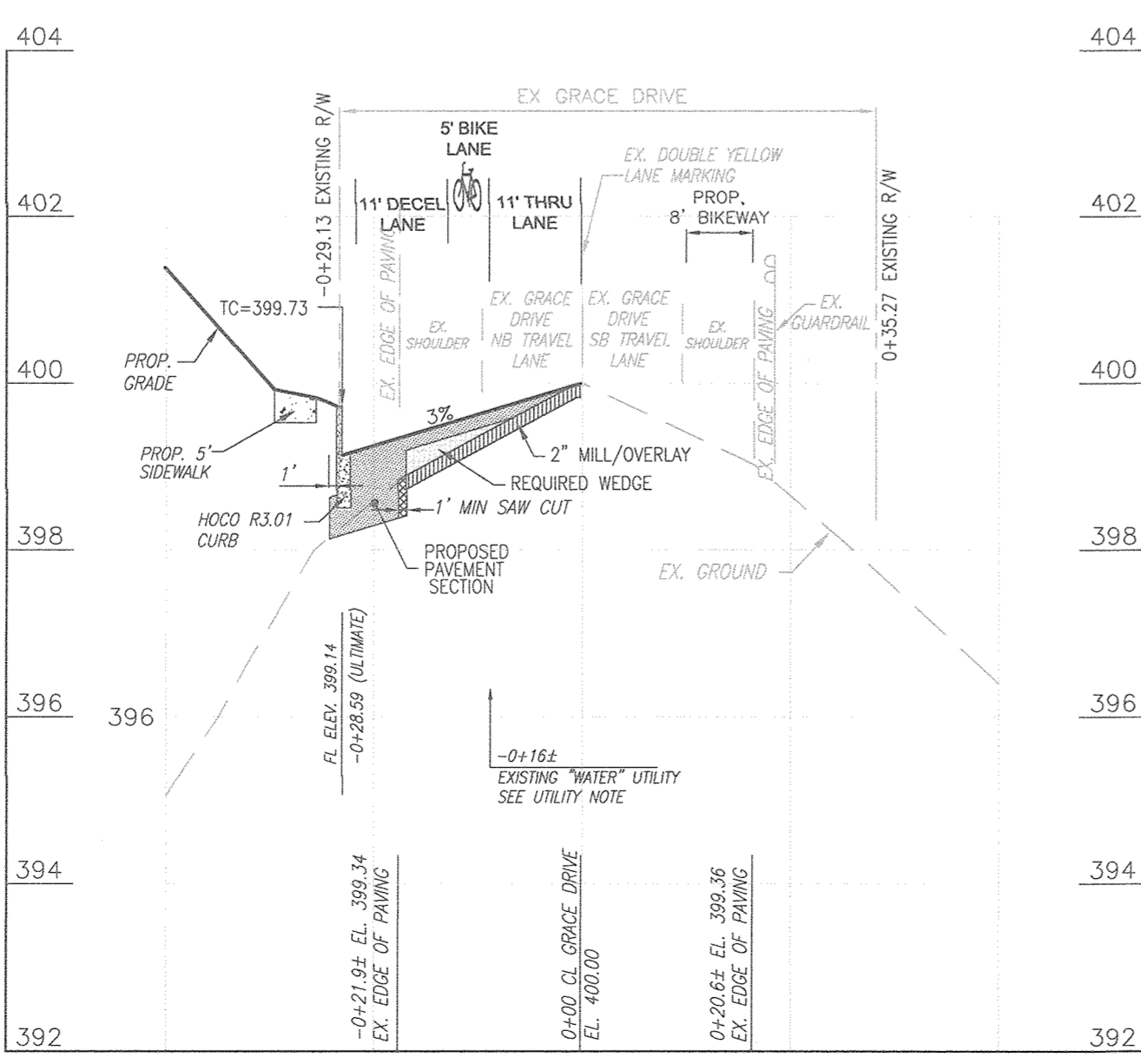
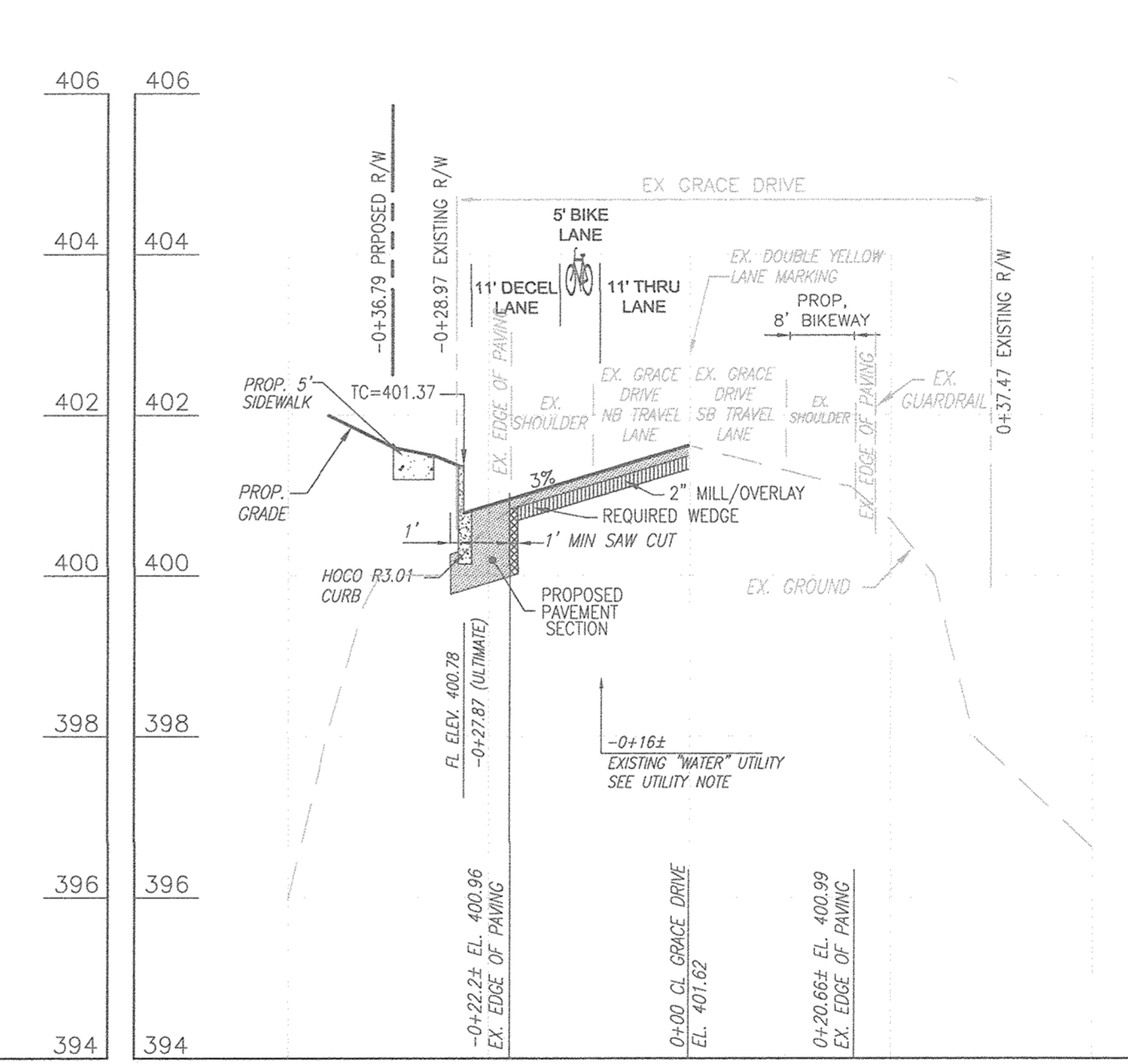
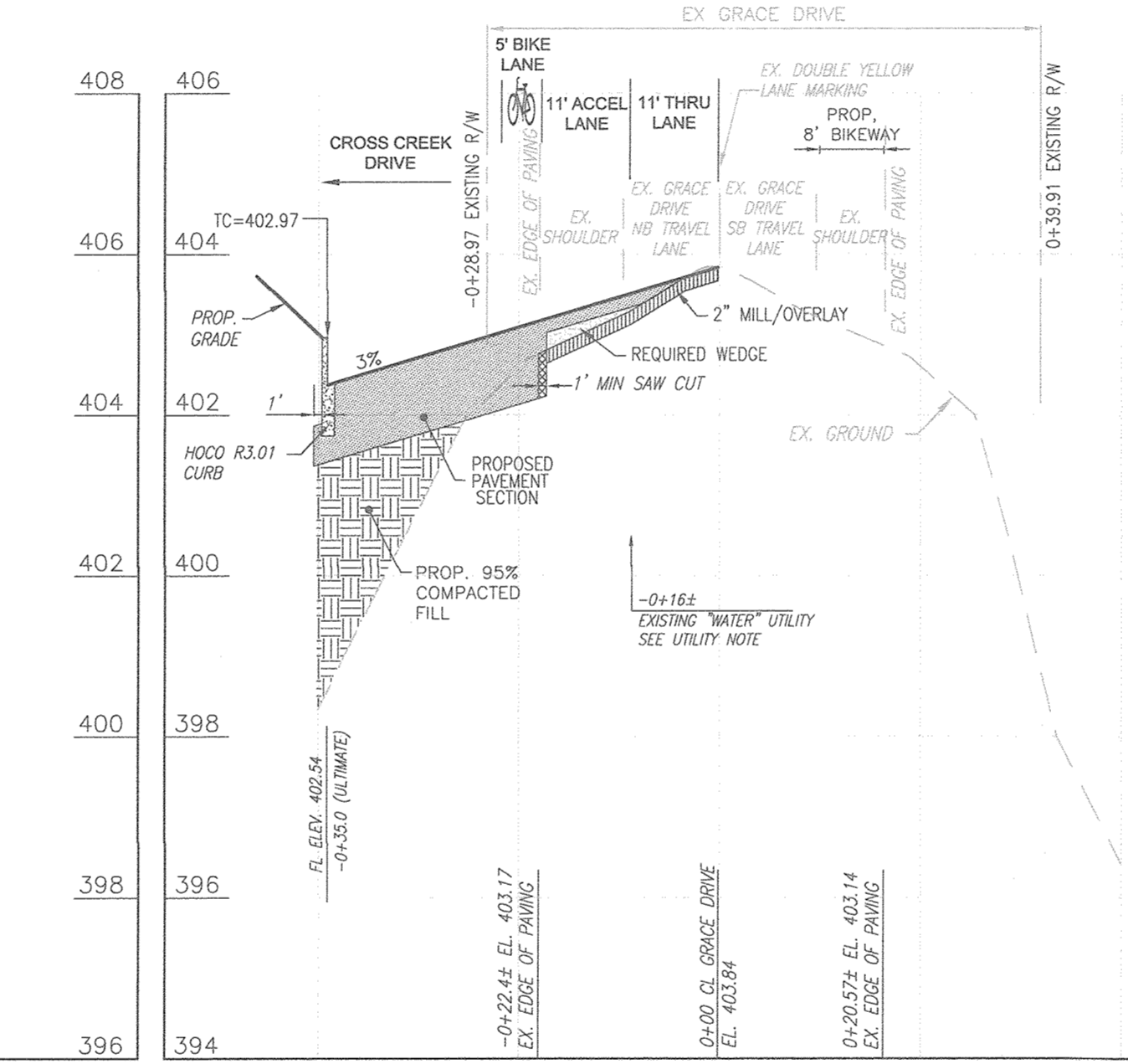
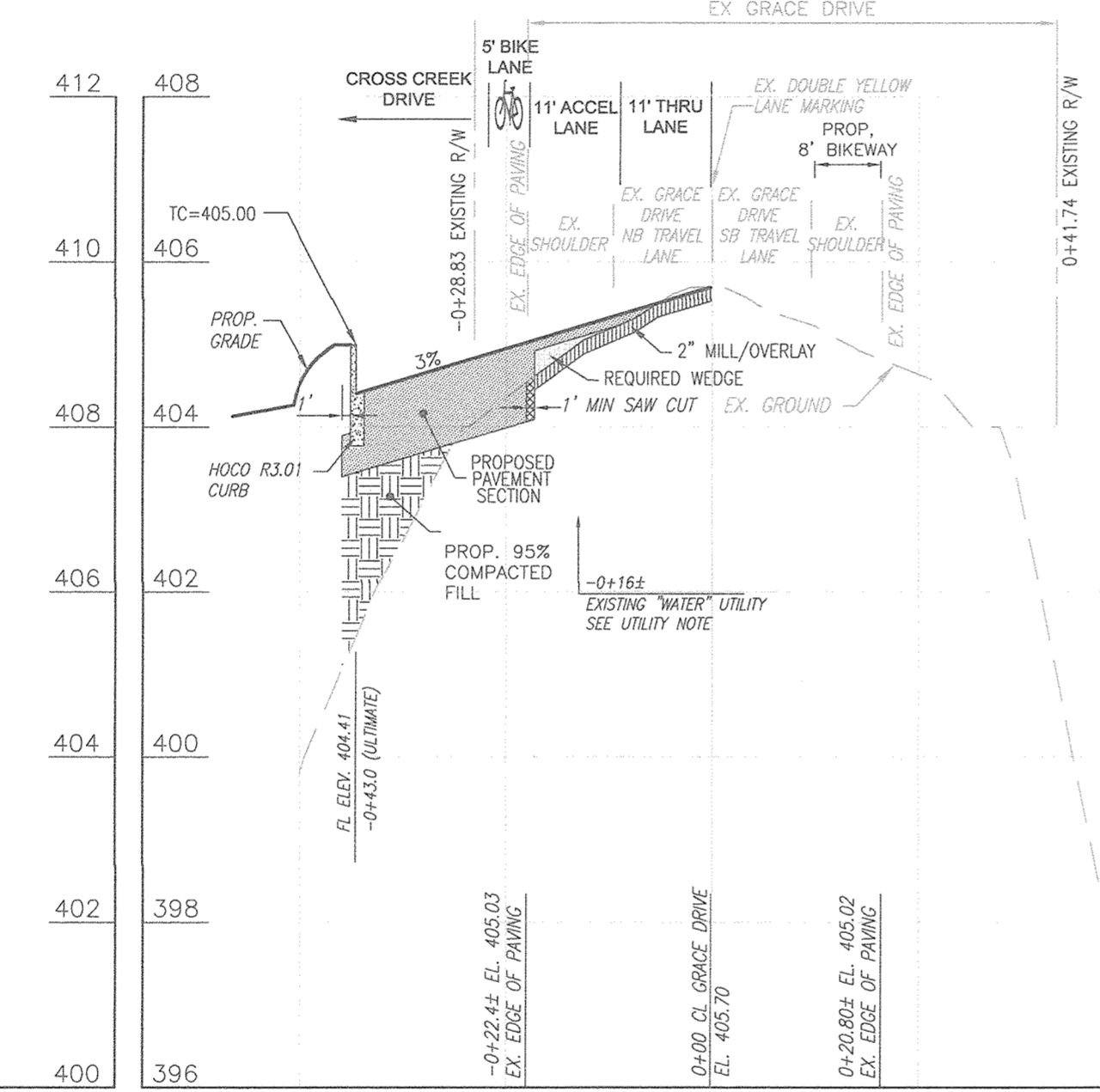
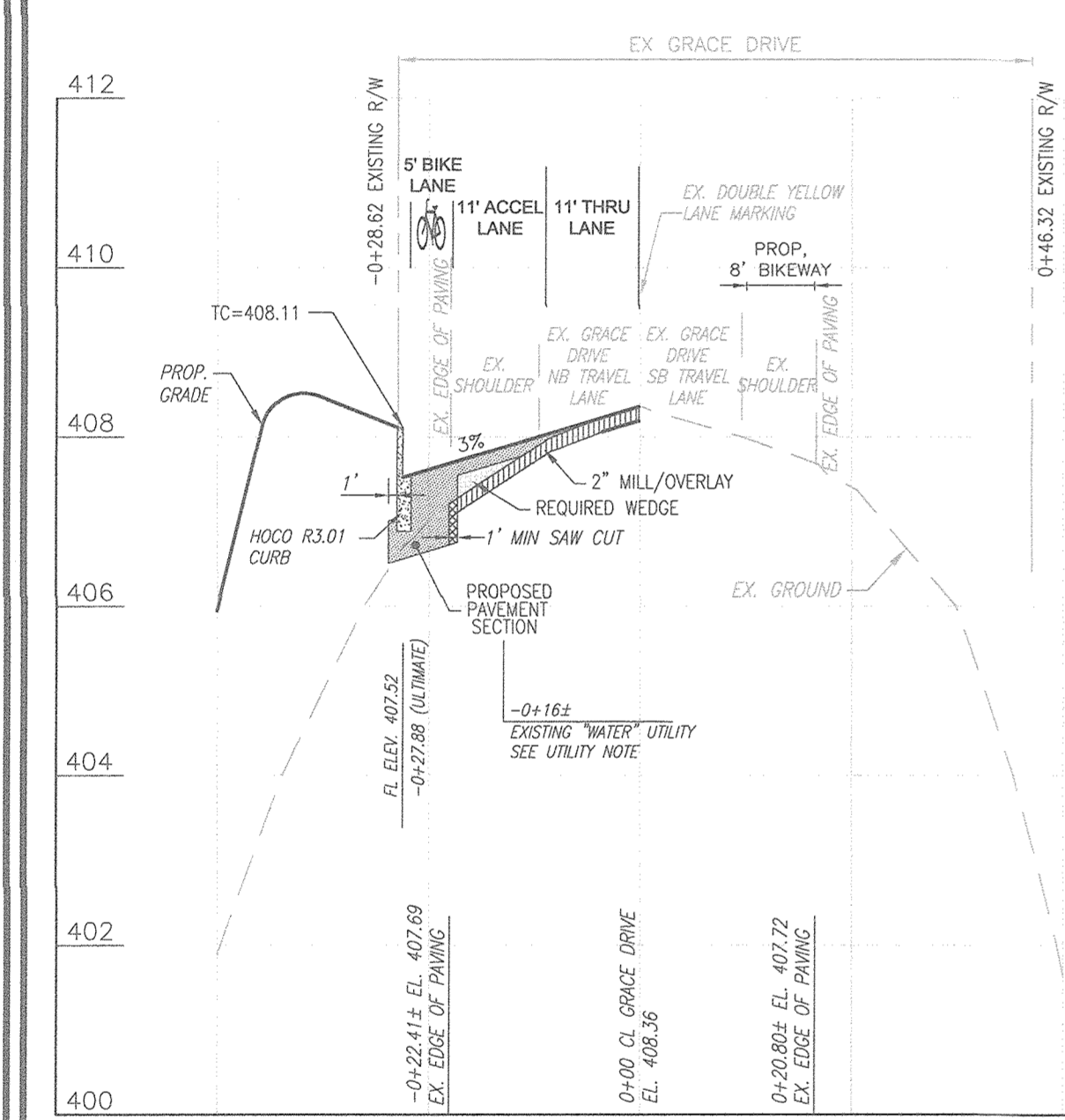
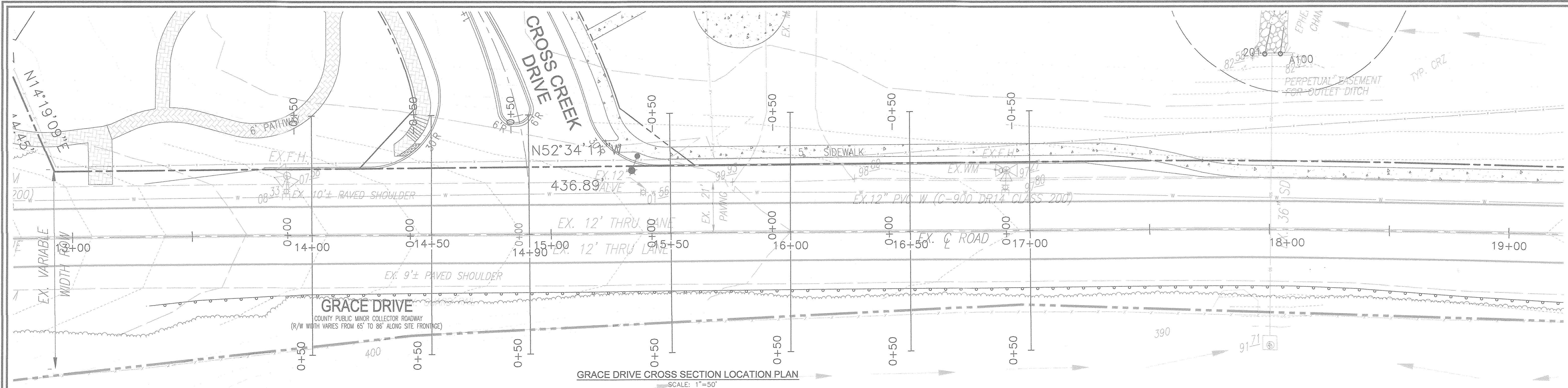
CHIEF, DIVISION OF LAND DEVELOPMENT

CEF-R REGULATIONS:

- PERMITTED USES:
- SINGLE FAMILY ATTACHED DWELLING UNITS
  - SINGLE FAMILY DETACHED DWELLING UNITS
- ACCESSORY USES:
- THE FOLLOWING ARE PERMITTED ACCESSORY USES IN THIS CEF-R DISTRICT. MORE THAN ONE ACCESSORY USE SHALL BE PERMITTED ON A LOT. PROVIDED THAT THE COMBINATION OF ACCESSORY USES REMAINS SECONDARY, INCIDENTAL, AND SUBORDINATE TO THE PRINCIPAL USE.
1. ANY USE NORMALLY AND CUSTOMARILY INCIDENTAL TO SINGLE FAMILY DETACHED AND SINGLE FAMILY ATTACHED DWELLINGS. ACCESSORY STRUCTURES ARE SUBJECT TO THE REQUIREMENT OF HOWARD COUNTY ZONING REGULATIONS SECTION 128.0.A.
  2. THE HOUSING BY A RESIDENT FAMILY OF:
    - a. NOT MORE THAN FOUR NON-TRANSIENT ROOMERS OR BOARDERS; OR
    - b. NOT MORE THAN FOUR NON-TRANSIENT PERSONS OR PERSONS 62 YEARS OF AGE OR OLDER, PROVIDED THE USE IS REGISTERED, LICENSED OR CERTIFIED BY THE STATE OF MARYLAND; OR
    - c. A COMBINATION OF A AND B ABOVE, PROVIDED THAT THE TOTAL NUMBER OF PERSONS HOUSED IN ADDITION TO THE RESIDENT FAMILY DOES NOT EXCEED EIGHT
  3. HOME OCCUPATIONS, SUBJECT TO THE REQUIREMENTS OF HOWARD COUNTY ZONING REGULATIONS SECTION 128.0.C.
  4. HOME CARE PROVIDED THAT IF HOME CARE IS COMBINED WITH HOUSING OF MENTALLY OR PHYSICALLY DISABLED PERSONS OR PERSONS 62 YEARS OF AGE OR OLDER, AS ALLOWED BY PARAGRAPH 2.B ABOVE, THE TOTAL NUMBER OF PERSONS RECEIVING HOME CARE AT ANY ONE TIME PLUS THE NUMBER OF PERSONS BEING HOUSED SHALL NOT EXCEED EIGHT.
  5. SMALL WIND ENERGY SYSTEM, BUILDING MOUNTED, ON SINGLE FAMILY DETACHED DWELLINGS, SUBJECT TO THE REQUIREMENTS OF HOWARD COUNTY ZONING REGULATIONS SECTION 128.0.L.
  6. ACCESSORY SOLAR COLLECTORS.
- GENERAL BULK REGULATIONS (PARCEL 145, B-1 & C ONLY):
- |  |                                 |                                 |
|--|---------------------------------|---------------------------------|
| 1. MAXIMUM DENSITY:  | 2.75 DWELLING UNITS/ GROSS ACRE | 2.75 DWELLING UNITS/ GROSS ACRE |
| 2. PRINCIPAL STRUCTURE (SEE ITEM 1):   | 100'                            | 100'                            |
| a. FROM EXTERIOR PROPERTY LINES (ADJACENT TO SPD UNITS):   | 100'                            | 100'                            |
| b. FROM EXTERIOR PROPERTY LINES (ADJACENT TO ALL OTHERS):  | 30'                             | 30'                             |
| 3. MINIMUM DISTANCE BETWEEN SINGLE FAMILY ATTACHED BUILDINGS AND SINGLE FAMILY DETACHED BUILDINGS: | 30'                             | 30'                             |
| a. FROM FRONT:   | 30'                             | 30'                             |
| b. FACE TO SIDE/REAR TO SIDE:  | 30'                             | 30'                             |
| c. SIDE TO SIDE:   | 15'                             | 15'                             |
| d. REAR TO REAR:   | 100'                            | 100'                            |
| e. REAR TO FACE:   | 30'                             | 30'                             |
- SINGLE FAMILY DETACHED BULK REGULATIONS (PARCEL 145, B-1 & C ONLY):
- |   |          |          |
|---|----------|----------|
| 1. MINIMUM LOT SIZE:                            | 7,200 SF | 7,200 SF |
| 2. MINIMUM WIDTH AT BUILDING RESTRICTION LINES: | 60'      | 60'      |
| 3. BUILDING SETBACKS (SEE ITEM 1):              | 20'      | 20'      |
| a. FRONT:                                       | 20'      | 20'      |
| b. SIDE (ENTIRE LOTS):                          | 15'      | 15'      |
| c. FROM RIGHT-OF-WAY:                           | 15'      | 15'      |
| d. TOTAL OF BOTH SIDE YARDS:                    | 25'      | 25'      |
| e. FROM LOT LINES:                              | 7.5'     | 7.5'     |
| f. TOTAL OF BOTH SIDE YARDS:                    | 20'      | 20'      |
| g. REAR - PRINCIPAL STRUCTURE:                  | 10'      | 10'      |
| h. REAR - ACCESSORY STRUCTURE:                  | 10'      | 10'      |
4. SEAR - SETBACKS: \*USES INCLUDE DRIVEWAYS, PATIOS, AND LANDSCAPE STRUCTURES (PERGOLAS AND ARBORS INCLUDED)
5. MAXIMUM HEIGHT:
- a. PRINCIPAL STRUCTURE: 34'
  - b. HOWEVER, THE MAXIMUM HEIGHT FOR PRINCIPAL STRUCTURES WITH GABLE, HIP, OR GAMBLE ROOFS SHALL BE 40'
  - c. ACCESSORY STRUCTURES: 15'
6. SINGLE FAMILY BULK REGULATIONS (PARCEL 145, B-1 & C ONLY):
- |  |          |          |
|--|----------|----------|
| 1. MINIMUM LOT SIZE:                               | 1,840 SF | 1,840 SF |
| 2. MAXIMUM UNITS PER STRUCTURE:                    | 7 UNITS  | 7 UNITS  |
| 3. BUILDING SETBACKS (SEE ITEM 1):                 | 20'      | 20'      |
| a. FRONT:  | 20'      | 20'      |
| b. FROM ADJACENT TO RIGHT-OF-WAY:                  | 5'       | 5'       |
| c. SIDE (EXTERNAL LOT LINES):                      | 5'       | 5'       |
| d. SIDE (INTERNAL LOT LINES):                      | 5'       | 5'       |
| e. REAR - PRINCIPAL STRUCTURE:                     | 20'      | 20'      |
| f. REAR - ACCESSORY STRUCTURE:                     | 10'      | 10'      |
| 4. MAXIMUM HEIGHT:                                 | 40'      | 40'      |
| a. PRINCIPAL STRUCTURE:                            | 40'      | 40'      |
| b. ACCESSORY STRUCTURES:                           | 15'      | 15'      |
| 5. MAXIMUM LOT COVERAGE:                           | 60%      | 60%      |
| 6. MAXIMUM BUILDING LENGTH:                        | 180'     | 180'     |
| 7. CREEK DETAIL: *SEE DETAILS FOR DECKS & PORCHES: | 1'       | 1'       |
| a. EXTERNAL LOT LINE:                              | 13"      | 13"      |
| b. INTERNAL LOT LINE:                              | 3"       | 3"       |
- F. OPEN SPACE: \*SEE DETAILS FOR DECKS & PORCHES
- |   |  |                    |
|---|--|--------------------|
| PARCEL 145, B-1:  | 30.69 AC.  | 30.69 AC. F-18-041 |
| ADDITIONAL 2.58-HA PARCEL 412 - PARCEL A (W.R. GRACE TO HOWARD COUNTY): | 31.39 AC. 566 GENERAL NOTE 37 AND OPEN SPACE TABULATION. |                    |
| PARCEL 145, C-1 - (W.R. GRACE):   | 3.001 AC.  |                    |
| ADDITIONAL 1.84-HA PARCEL 412 - PARCEL B (W.R. GRACE TO HOWARD COUNTY): | 3.001 AC.  |                    |
| ADDITIONAL 1.84-HA PARCEL 412 - PARCEL C (W.R. GRACE TO HOWARD COUNTY): | 3.001 AC.  |                    |
- G. OPEN SPACE AREA/RECREATIONAL AREA (184 UNITS X 1,000 SF = 184,000 SF OF 4.22 ACRES)
- H. MIHU (MODERATE INCOME HOUSING UNITS)
- 1. NUMBER OF UNITS TO BE MIHU: 10% (19 UNITS)
  - 2. 10% (19 SFA UNITS)
- I. CERTAIN EXCEPTIONS TO SETBACKS ARE APPLICABLE PURSUANT TO HOWARD COUNTY ZONING REGULATIONS, SECTION 128.0.A.1.

ON-LOT STORMWATER PRACTICE CHART - PHASE 1

LOT # / STREET ADDRESS	FACILITY TYPE	LOT #	FACILITY TYPE	LOT # / STREET ADDRESS	FACILITY TYPE
7603 CROSS CREEK DRIVE	DRYWELL (M-S)	44	RAINBARREL (M-S)	87	ROOFTOP DISCONNECT (N-1)
7603 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7212 MAINSTREAM WAY	RAINBARREL (M-S)	88	ROOFTOP DISCONNECT (N-1)
7603 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7208 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	7245 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)
7611 CROSS CREEK DRIVE	DRYWELL (M-S)	46	RAINBARREL (M-S), ROOFTOP DISCONNECT (N-1)	89	ROOFTOP DISCONNECT (N-1)
7611 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7204 MAINSTREAM WAY	RAINBARREL (M-S)	90	ROOFTOP DISCONNECT (N-1)
7615 CROSS CREEK DRIVE	DRYWELL (M-S)	47	RAINBARREL (M-S)	91	ROOFTOP DISCONNECT (N-1)
7615 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7203 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	92	ROOFTOP DISCONNECT (N-1)
7619 CROSS CREEK DRIVE	DRYWELL (M-S)	48	ROOFTOP DISCONNECT (N-1)	93	ROOFTOP DISCONNECT (N-1)
7619 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7205 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	94	ROOFTOP DISCONNECT (N-1)
7625 CROSS CREEK DRIVE	DRYWELL (M-S)	49	ROOFTOP DISCONNECT (N-1)	95	ROOFTOP DISCONNECT (N-1)
7625 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7207 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	96	ROOFTOP DISCONNECT (N-1)
7633 CROSS CREEK DRIVE	DRYWELL (M-S)	50	ROOFTOP DISCONNECT (N-1)	97	ROOFTOP DISCONNECT (N-1)
7633 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7209 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	98	ROOFTOP DISCONNECT (N-1)
7635 CROSS CREEK DRIVE	DRYWELL (M-S)	51	ROOFTOP DISCONNECT (N-1)	99	ROOFTOP DISCONNECT (N-1)
7635 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7211 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	100	ROOFTOP DISCONNECT (N-1)
7639 CROSS CREEK DRIVE	DRYWELL (M-S)	52	ROOFTOP DISCONNECT (N-1)	101	ROOFTOP DISCONNECT (N-1)
7639 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7215 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	102	ROOFTOP DISCONNECT (N-1)
7643 CROSS CREEK DRIVE	DRYWELL (M-S)	53	ROOFTOP DISCONNECT (N-1)	103	ROOFTOP DISCONNECT (N-1)
7643 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7217 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	104	ROOFTOP DISCONNECT (N-1)
7647 CROSS CREEK DRIVE	DRYWELL (M-S)	54	ROOFTOP DISCONNECT (N-1)	105	ROOFTOP DISCONNECT (N-1)
7647 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7219 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	106	ROOFTOP DISCONNECT (N-1)
7651 CROSS CREEK DRIVE	DRYWELL (M-S)	55	ROOFTOP DISCONNECT (N-1)	107	ROOFTOP DISCONNECT (N-1)
7651 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7221 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	108	ROOFTOP DISCONNECT (N-1)
7659 CROSS CREEK DRIVE	DRYWELL (M-S)	56	ROOFTOP DISCONNECT (N-1)	109	ROOFTOP DISCONNECT (N-1)
7659 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7223 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	110	ROOFTOP DISCONNECT (N-1)
7663 CROSS CREEK DRIVE	DRYWELL (M-S)	57	ROOFTOP DISCONNECT (N-1)	111	ROOFTOP DISCONNECT (N-1)
7663 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7225 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	112	ROOFTOP DISCONNECT (N-1)
7667 CROSS CREEK DRIVE	DRYWELL (M-S)	58	ROOFTOP DISCONNECT (N-1)	113	ROOFTOP DISCONNECT (N-1)
7667 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7227 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	114	ROOFTOP DISCONNECT (N-1)
7671 CROSS CREEK DRIVE	DRYWELL (M-S)	59	ROOFTOP DISCONNECT (N-1)	115	ROOFTOP DISCONNECT (N-1)
7671 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7229 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	116	ROOFTOP DISCONNECT (N-1)
7675 CROSS CREEK DRIVE	DRYWELL (M-S)	60	ROOFTOP DISCONNECT (N-1)	117	ROOFTOP DISCONNECT (N-1)
7675 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7231 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	118	ROOFTOP DISCONNECT (N-1)
7679 CROSS CREEK DRIVE	DRYWELL (M-S)	61	ROOFTOP DISCONNECT (N-1)	119	ROOFTOP DISCONNECT (N-1)
7679 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7233 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	120	ROOFTOP DISCONNECT (N-1)
7683 CROSS CREEK DRIVE	DRYWELL (M-S)	62	ROOFTOP DISCONNECT (N-1)	121	ROOFTOP DISCONNECT (N-1)
7683 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7235 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	122	ROOFTOP DISCONNECT (N-1)
7687 CROSS CREEK DRIVE	DRYWELL (M-S)	63	ROOFTOP DISCONNECT (N-1)	123	ROOFTOP DISCONNECT (N-1)
7687 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7237 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	124	ROOFTOP DISCONNECT (N-1)
7691 CROSS CREEK DRIVE	DRYWELL (M-S)	64	ROOFTOP DISCONNECT (N-1)	125	ROOFTOP DISCONNECT (N-1)
7691 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7239 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	126	ROOFTOP DISCONNECT (N-1)
7695 CROSS CREEK DRIVE	DRYWELL (M-S)	65	ROOFTOP DISCONNECT (N-1)	127	ROOFTOP DISCONNECT (N-1)
7695 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7241 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	128	ROOFTOP DISCONNECT (N-1)
7703 CROSS CREEK DRIVE	DRYWELL (M-S)	66	ROOFTOP DISCONNECT (N-1)	129	ROOFTOP DISCONNECT (N-1)
7703 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7243 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	130	ROOFTOP DISCONNECT (N-1)
7707 CROSS CREEK DRIVE	DRYWELL (M-S)	67	ROOFTOP DISCONNECT (N-1)	131	ROOFTOP DISCONNECT (N-1)
7707 CROSS CREEK DRIVE	ROOFTOP DISCONNECT (N-1)	7245 MAINSTREAM WAY	ROOFTOP DISCONNECT (N-1)	132	ROOFTOP DISCONNECT (N-1)
7711 CROSS CREEK DRIVE	DRYWELL (M-S)	68	ROOFTOP DISCONNECT (N-1)	133	ROOFTOP DISCONNECT (N-1)
77					

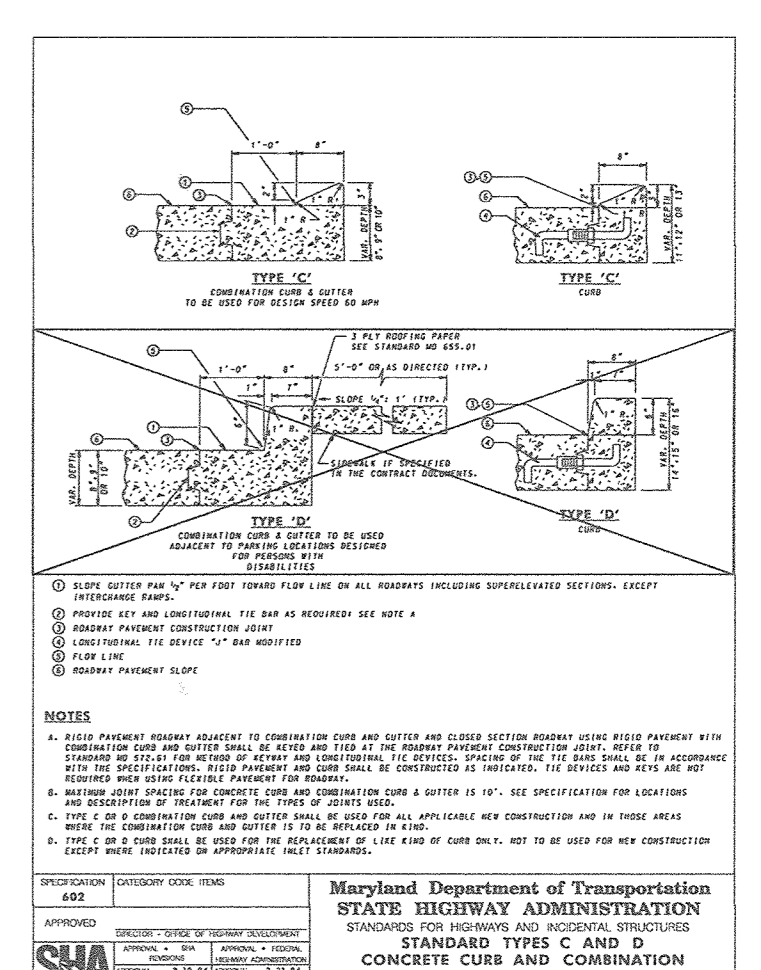
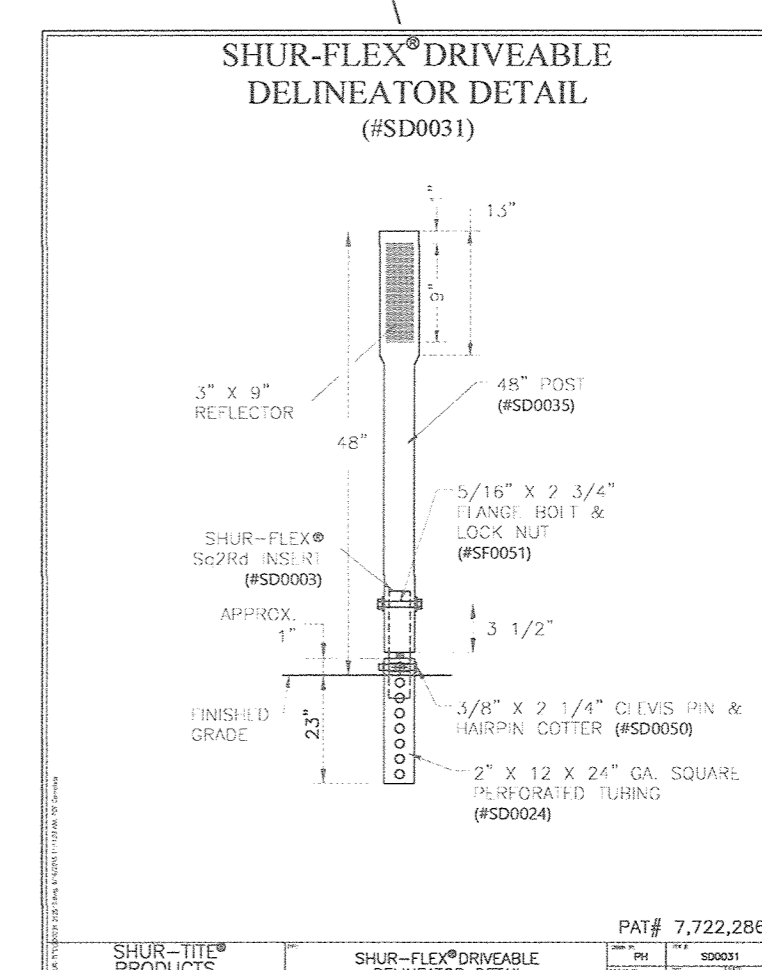
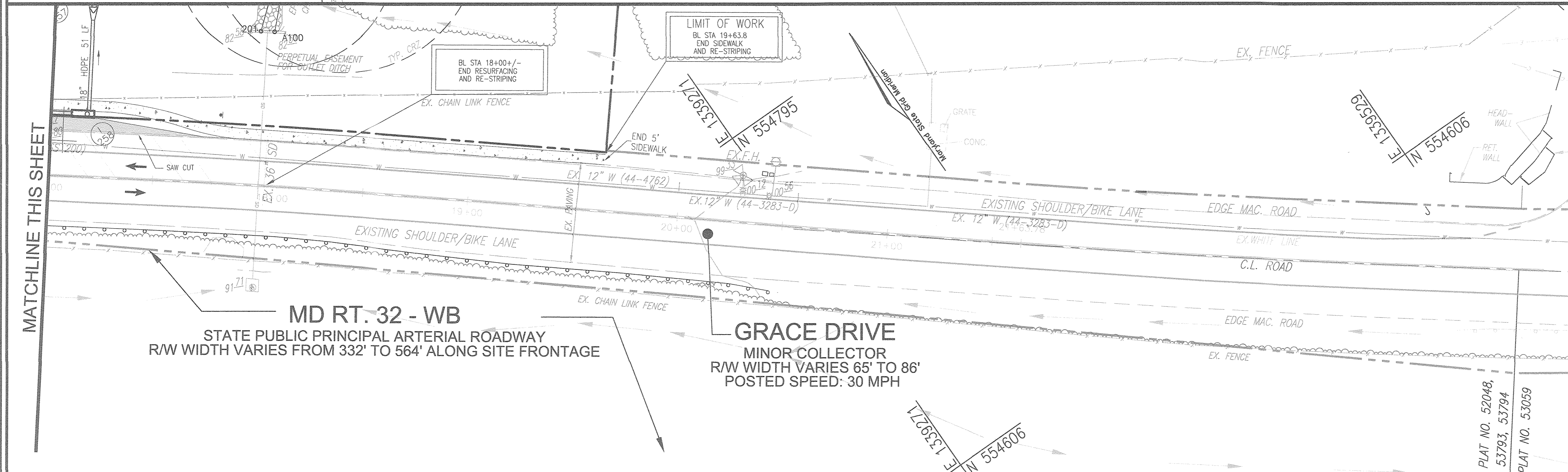
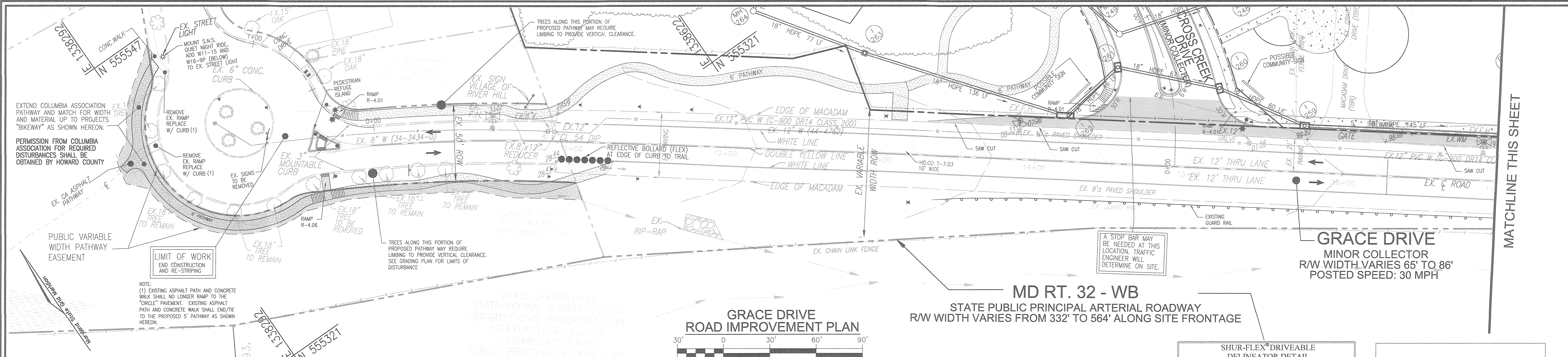


APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

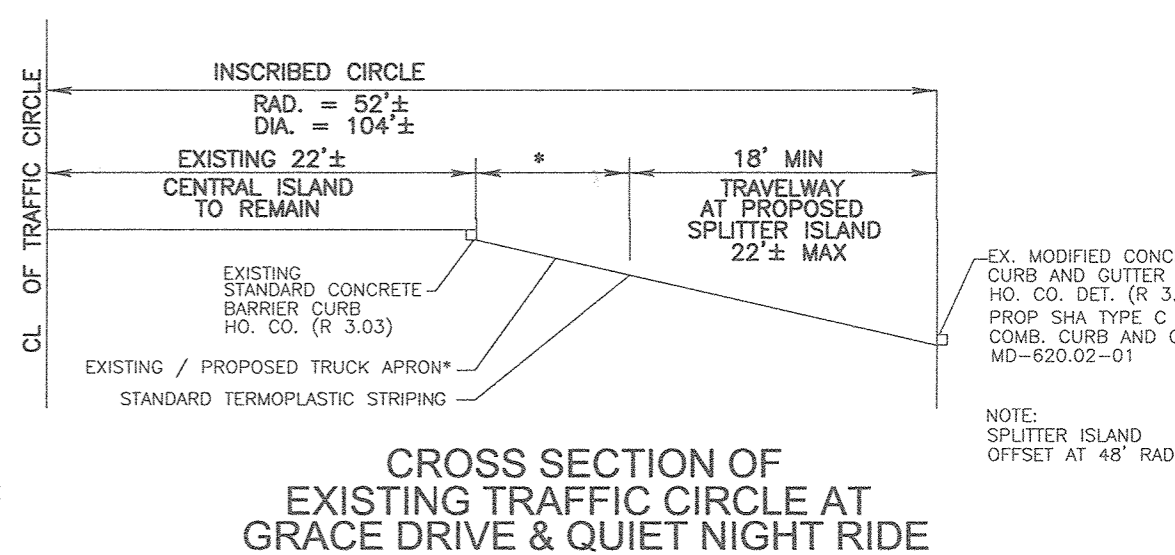
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Al* 6/17/19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Kap* 6-20-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER / DEVELOPER <b>T.M. 35 - P.145 (PARCEL B-1)</b>		OWNER <b>T.M. 35 - P.145 (PARCEL C)</b>	
SIMPSON OAKS CRP3, LLC 4750 OWINGS MILLS BOULEVARD OWINGS MILLS, MARYLAND 21117 410-356-9900		W.R. GRACE & CO. 7500 GRACE DR COLUMBIA, MD 21044-4098 (410) 531-4000	
FINAL ROAD CONSTRUCTION PLAN			
GRACE DRIVE - CROSS SECTION LOCATION PLAN			
<b>CEDAR CREEK - PHASE 1</b>			
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C" PLATS 25334-25337			
TAX MAP 35, GRID 21 5TH ELECTION DISTRICT BPZ REFERENCE: SEE SITE DATA		ZONED: CEF-R 9/0 PARCEL 145 HOWARD COUNTY, MARYLAND	
		<b>ROBERT H. VOGEL ENGINEERING, INC.</b> ENGINEERS • SURVEYORS • PLANNERS 3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043 TEL: 410.461.7666 FAX: 410.461.8961	
DESIGN BY: VE+TG DRAWN BY: VE+TG CHECKED BY: RHV DATE: APRIL 2019 SCALE: AS SHOWN W.O. NO.: 15-55		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: 09-27-2020	
3		74	

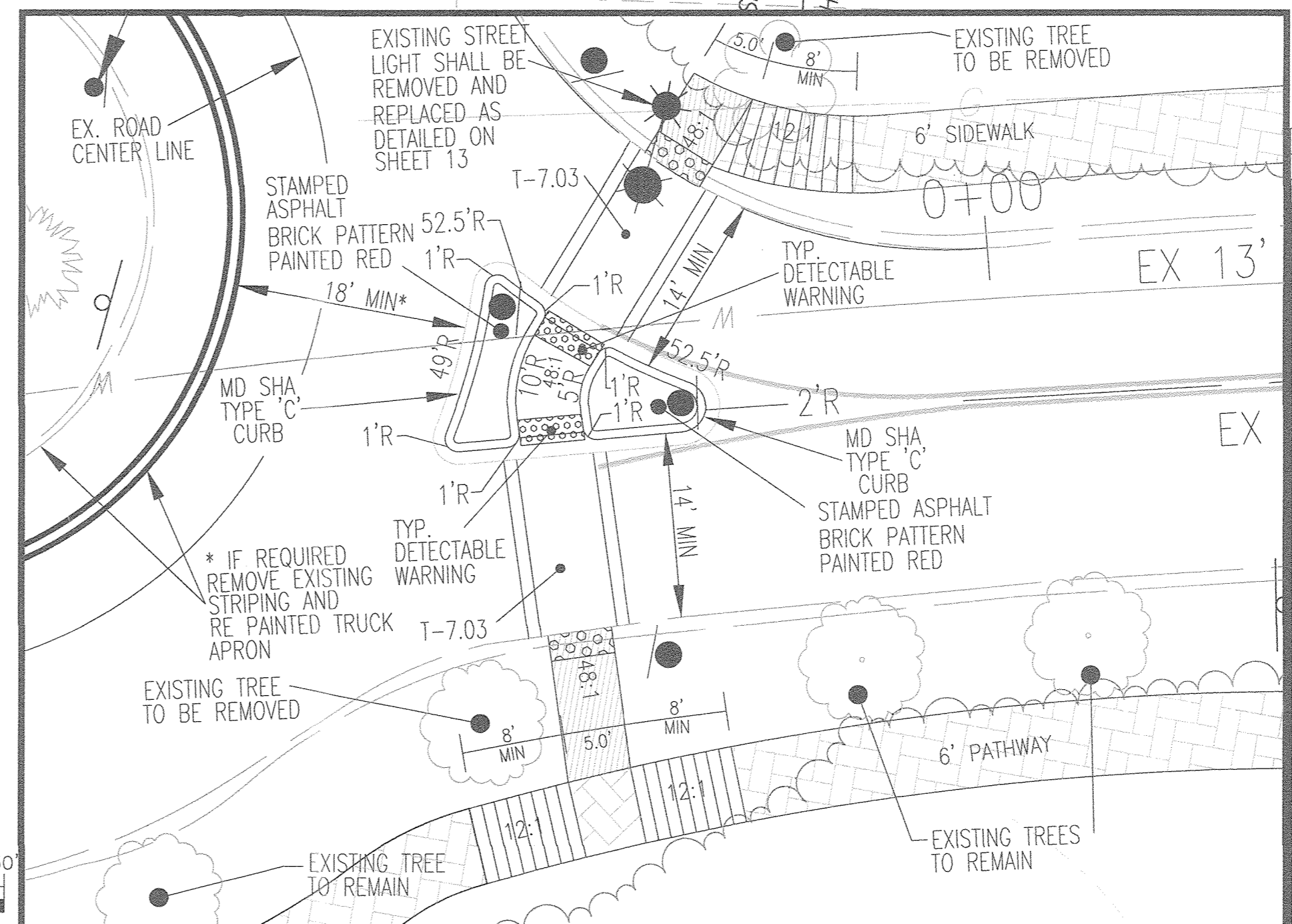
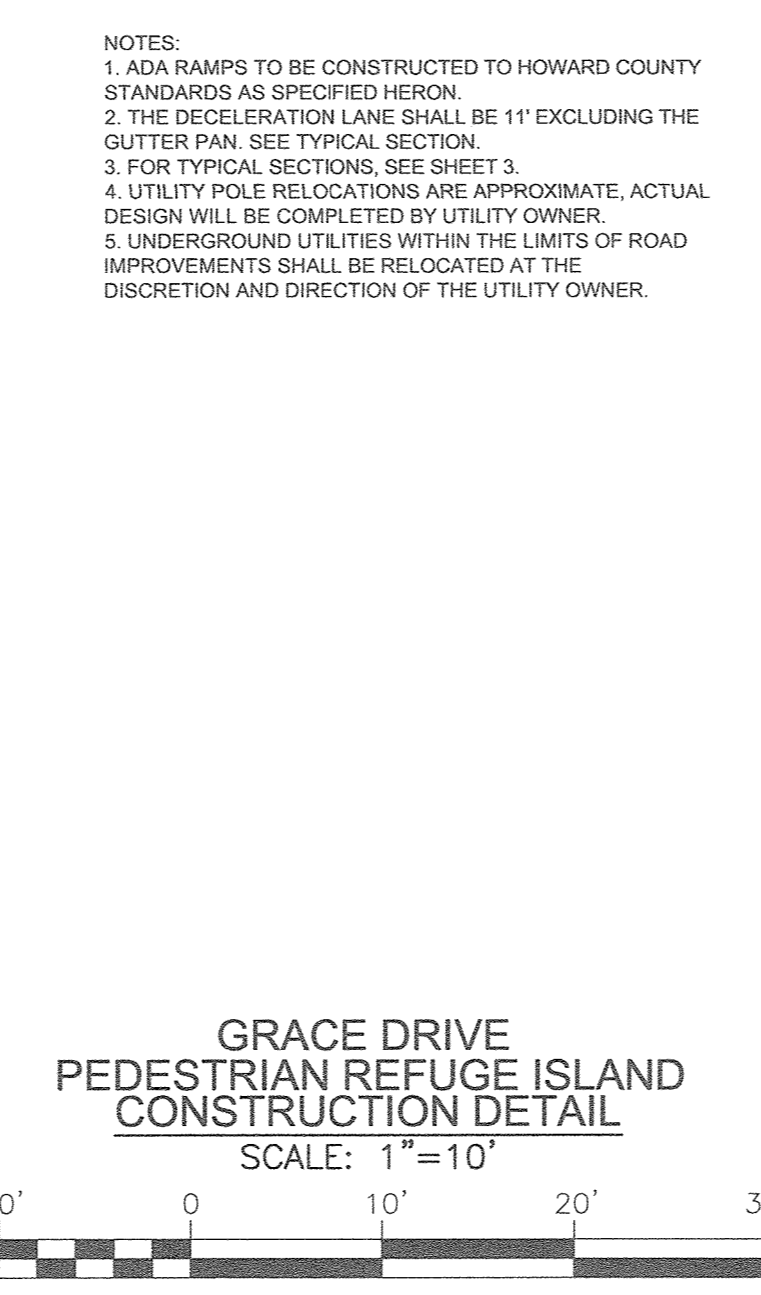
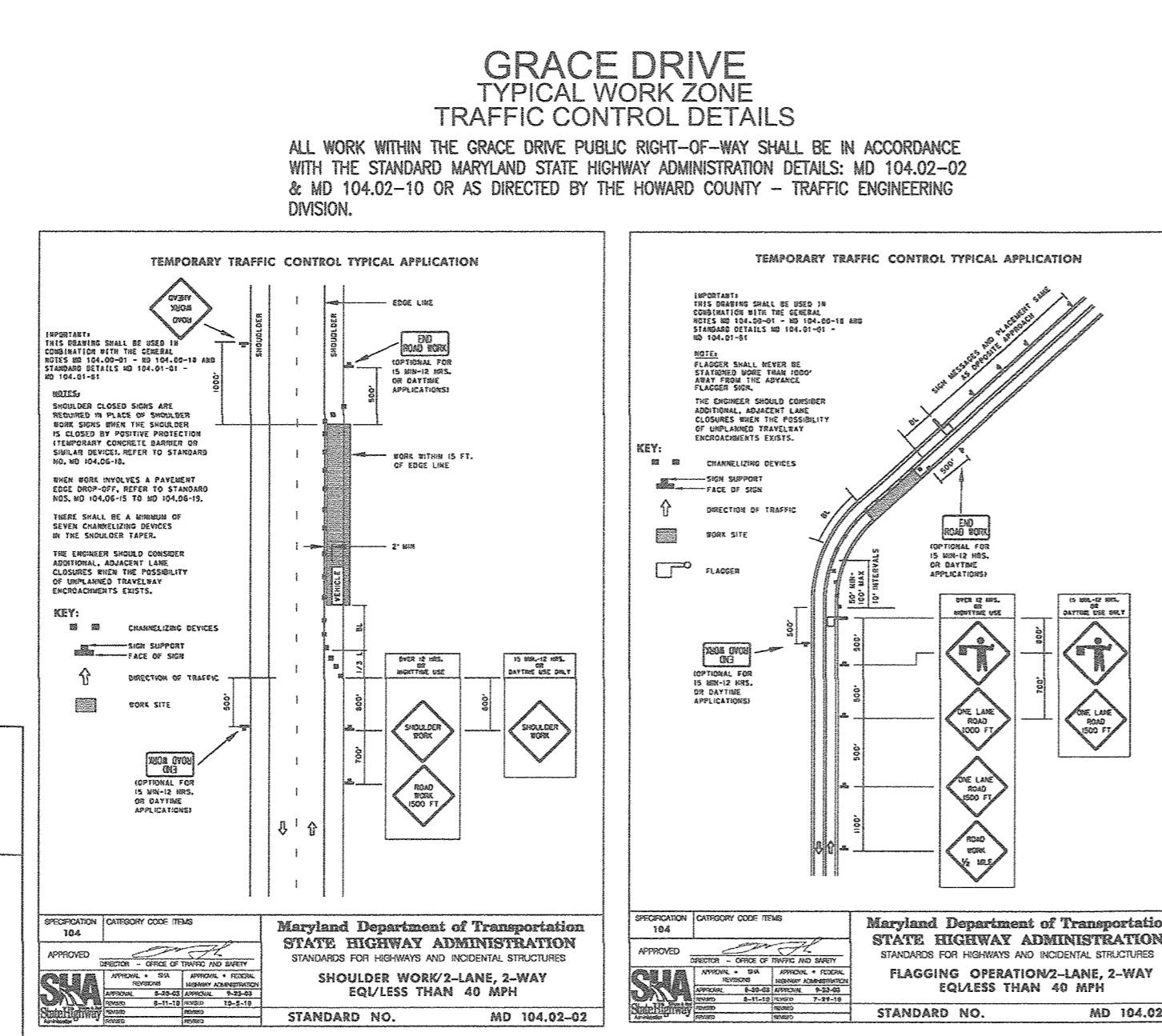


NOTE:  
1. THE DEVELOPER ASSUMES NO WARRANTY OR RESPONSIBILITY FOR TRAFFIC BOLLARDS ONCE INSTALLED.  
\* TRAVEL WAY SHALL BE 18" MINIMUM BETWEEN THE EXISTING R-3.01 / PROPOSED TYPE "C" ISLAND CURBING AND THE PAINTED TRUCK APRON.  
- PROVIDE REQUIRED ADJUSTMENT TO THE EXISTING PAINTED TRUCK APRON AS NECESSARY AND DIRECTED BY HOWARD COUNTY TRAFFIC DIVISION (410) 313-5752



**LEGEND:**

	PROPERTY LINE
	RIGHT-OF-WAY LINE
	ADJACENT PROPERTY LINE
	EXISTING CURB AND GUTTER
	EXISTING UTILITY POLE
	EXISTING LIGHT POLE
	EXISTING MAILBOX
	EXISTING SIGN
	EXISTING FENCE
	EXISTING TREE LINE
	PROPOSED CURB
	PROPOSED STANDARD SIDEWALK
	FULL DEPTH PAVEMENT SECTION REQUIRED
	GRINDING, RES'G, 2" MILL, VARIABLE DEPTH WEDGE/LEVEL AND RESURFACING



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.26.19

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SHIMSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7300 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

FINAL ROAD CONSTRUCTION PLAN  
 GRACE DRIVE  
 ROAD IMPROVEMENTS PLAN  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
 PLATS 233534-233537

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

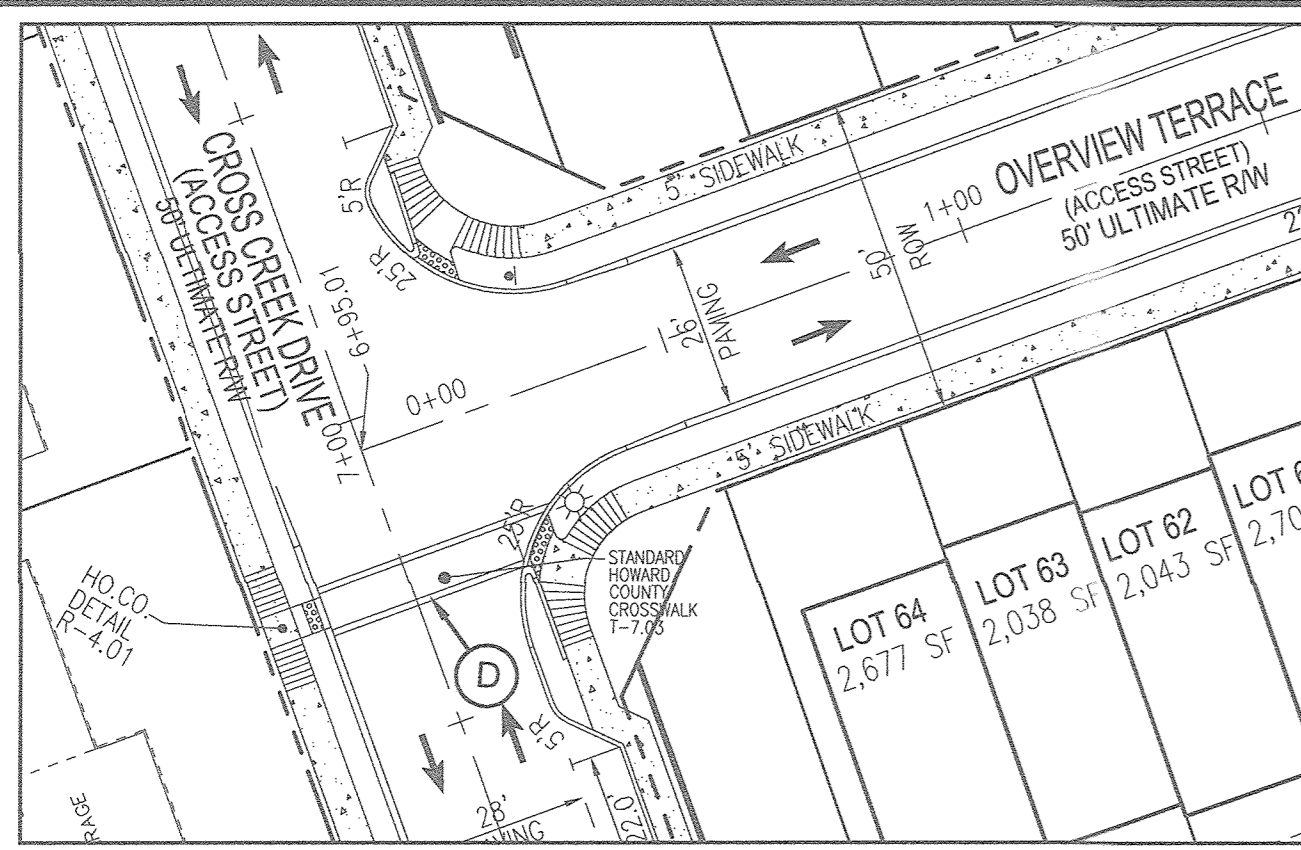
ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RNV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

4 SHEET OF 74



CROSSCREEK DRIVE - PEDESTRIAN WALK #2  
SCALE: 1"=30'

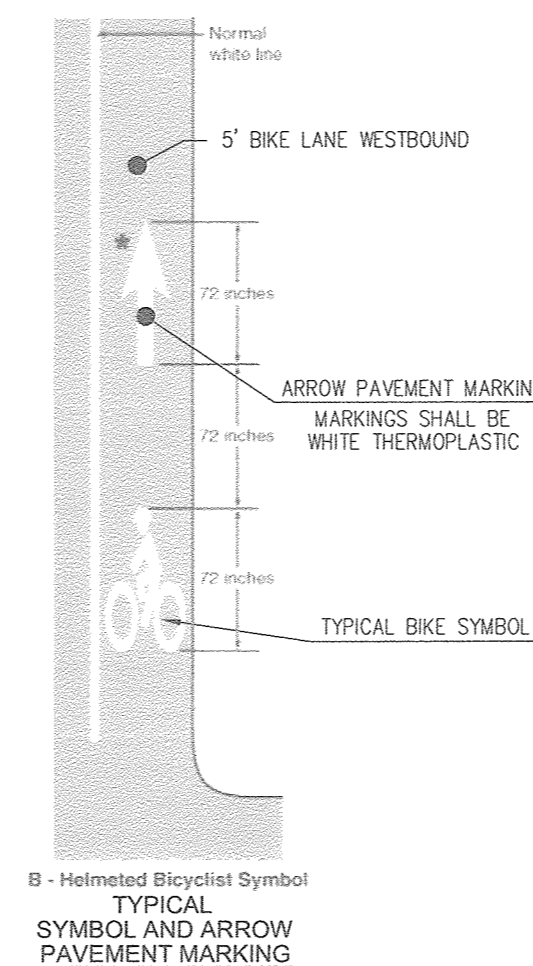
**PAVEMENT MARKING LEGEND**

- A. INSTALL 5 IN. WIDE WHITE SOLID PAVEMENT MARKING FOR LANE LINE.
- B. INSTALL 5 IN. WIDE YELLOW SOLID PAVEMENT MARKING FOR LANE LINE.
- B-1. INSTALL 5 IN. WIDE WHITE BROKEN PAVEMENT MARKING (10 FT. SEGMENT - 30 FT. GAP) FOR LANE LINE.
- C. INSTALL 5 IN. WIDE DOUBLE YELLOW PAVEMENT MARKING - FOR CENTER LINE.
- D. INSTALL CROSSWALK PAVEMENT MARKINGS HOWARD COUNTY T-7.03.
- D\*. INSTALL CROSSWALK PAVEMENT MARKINGS IN ACCORDANCE WITH HOWARD COUNTY T-7.03.
- E. INSTALL 24 IN. WIDE WHITE SOLID PAVEMENT MARKING FOR STOP LINE.
- F. INSTALL 5 IN.\* WIDE WHITE SOLID PAVEMENT MARKING FOR BIKE LANE DELINEATION.
- G. REMOVE EXISTING PAVEMENT MARKINGS BY GRINDING.
- H. TIE TO EXISTING MARKINGS.
- I. INSTALL 5 IN. WIDE WHITE BROKEN PAVEMENT MARKING (TYPE 1 - 3-9-3)
- J. INSTALL 12" x 3'-0" WHITE THERMOPLASTIC PAVEMENT MARKING.
- K. INSTALL 12" WHITE THERMOPLASTIC PAVEMENT MARKING LINE.
- L. INSTALL SHARK TEETH WHITE THERMOPLASTIC (2'X3') TOTAL NUMBER OF SHARKS TEETH NEEDED WILL BE DETERMINED IN THE FIELD.

\* WIDER LINES MAY BE INSTALLED AT THE DISCRETION OF THE TRAFFIC ENGINEERING DIVISION.

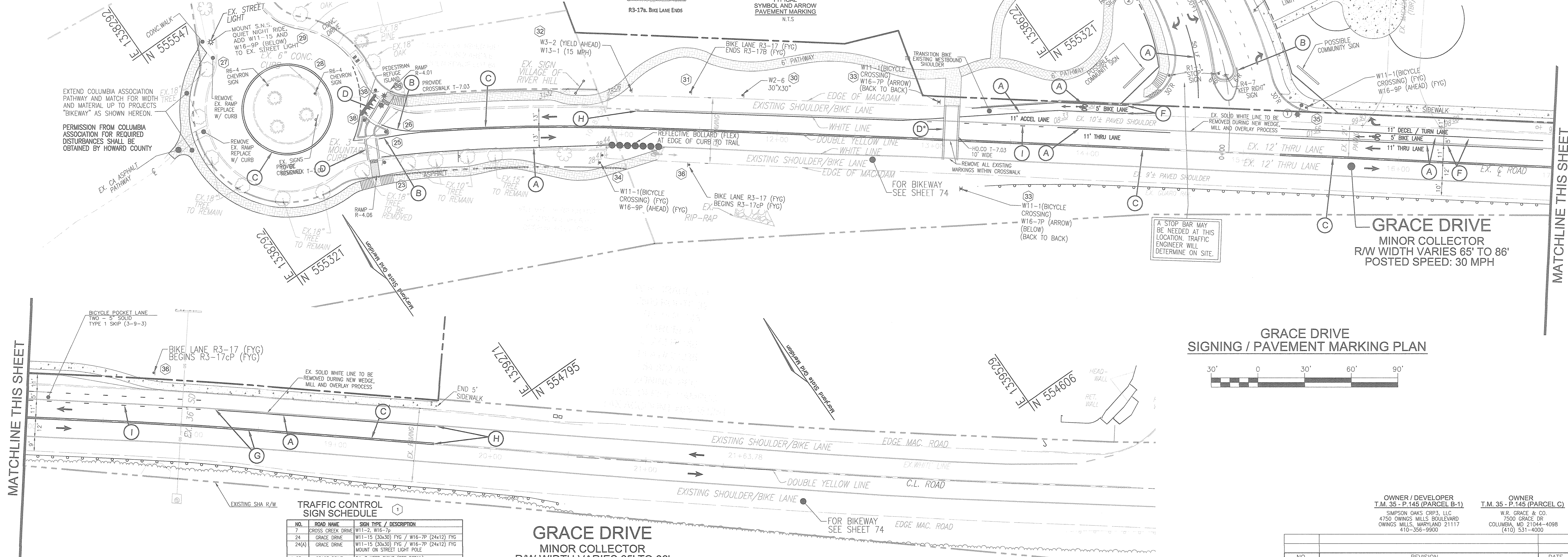


Figure 9C-3. Word, Symbol, and Arrow Pavement Markings for Bicycle Lanes

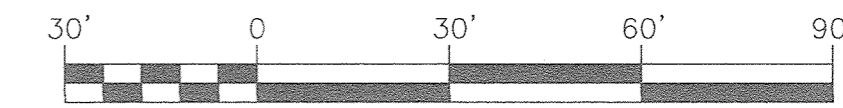


BIKE LANE SIGN LOCATION CHART *				
NO.	STREET NAME	STATION	OFFSET	SIGN
36	GRACE DRIVE	11+4.3	22' RT.	BIKE LANE R3-17 (24X18) R3-17cP, BEGINS (24X8)
	GRACE DRIVE	17+80	32' LT.	
31	GRACE DRIVE	11+4.3	24' LT.	BIKE LANE R3-17 (24X18) R3-17b, ENDS (24X8)

NOTE:  
1. STOP BAR MAY BE REQUIRED AT THE GRACE DRIVE / CROSS CREEK DRIVE INTERSECTION TO BE DETERMINED INFIELD BY THE TRAFFIC ENGINEER.  
2. ALL PAVEMENT MARKINGS SHALL BE LAID OUT BY HOWARD COUNTY TRAFFIC ENGINEERING, CALL 410-313-5752.



**GRACE DRIVE SIGNING / PAVEMENT MARKING PLAN**



**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
7	CROSS CREEK DRIVE	W11-2, W16-7P
24	GRACE DRIVE	W11-15 (30x30) FPG / W16-7P (24x12) FPG
24(A)	GRACE DRIVE	W11-15 (30x30) FPG / W16-7P (24x12) FPG MOUNT ON STREET LIGHT POLE
* 25	GRACE DRIVE	R4-7 KEEP RIGHT (SEE DETAIL)
* 26	GRACE DRIVE	(2) YELLOW D.M. (OM1-3) BACK TO BACK
27	GRACE DRIVE	R6-4 CHEVRON
28	GRACE DRIVE	Q18-15 (30x30) FPG / W16-7P (24x12) FPG
29	GRACE DRIVE	Q18-15 (30x30) FPG / W16-7P (24x12) FPG
30	GRACE DRIVE	W2-6 'ROUNDAHEAD AHEAD' 30'X30'
31	GRACE DRIVE	R3-17 BIKE LANE R3-17b ENDS
32	GRACE DRIVE	W3-2, W13-1 (15 MPH)
33	GRACE DRIVE	W11-1 BICYCLE CROSSING FPG W16-7P ARROW BELOW
34	GRACE DRIVE	W11-1 BICYCLE CROSSING FPG W16-9 AHEAD BELOW
35	GRACE DRIVE	W11-1 BICYCLE CROSSING FPG W16-9 AHEAD BELOW
36	GRACE DRIVE	R3-17 BIKE LANE R3-17cP BEGINS
* 38	GRACE DRIVE	R1-2 YIELD

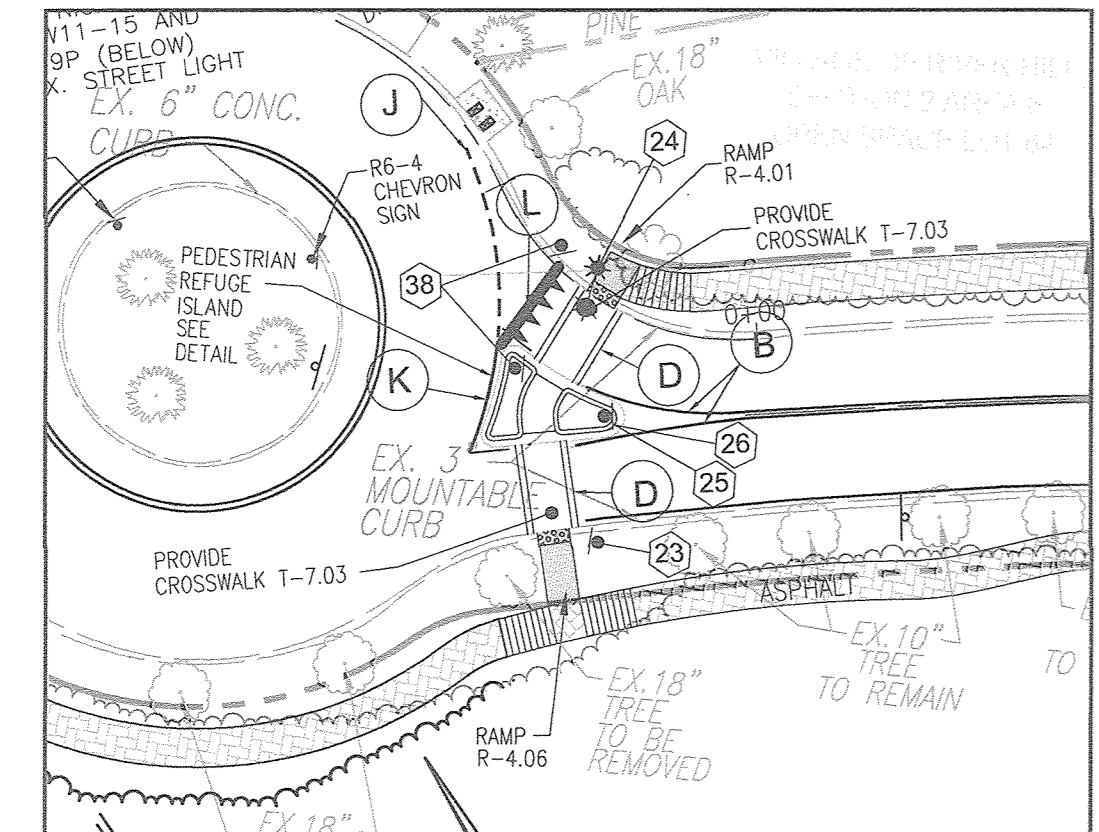
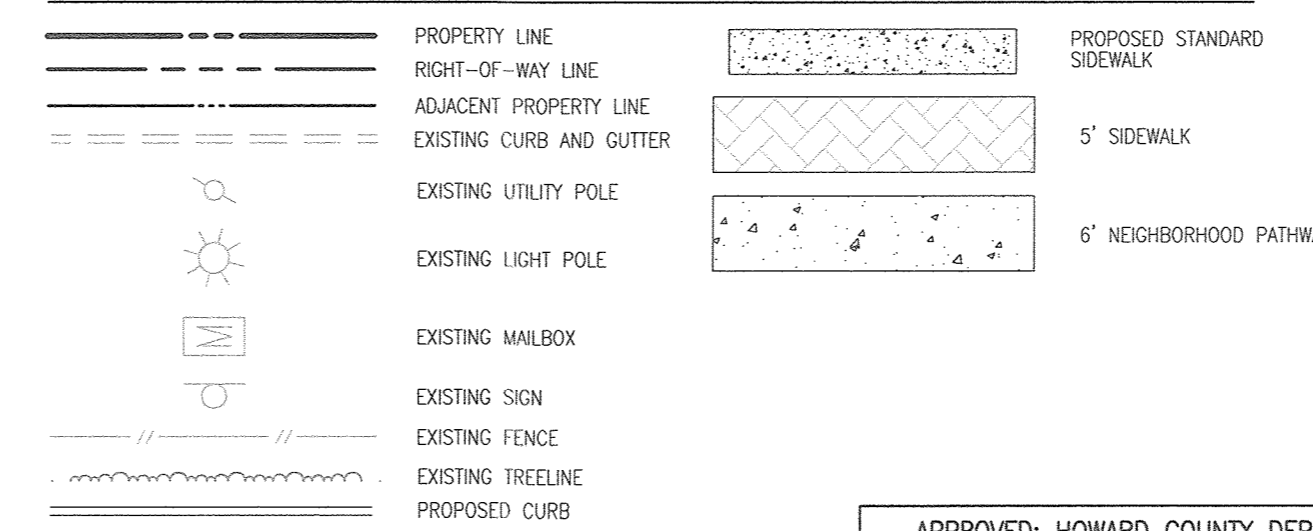
\* A 6" CORE MUST BE DRILLED IN THE ASPHALT FOR THE SIGN POSTS.

**GRACE DRIVE MINOR COLLECTOR**  
RW WIDTH VARIES 65' TO 86'  
POSTED SPEED: 30 MPH

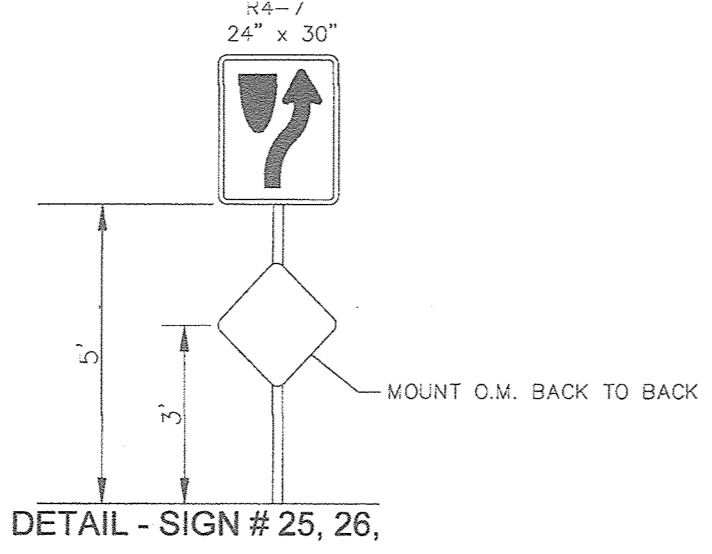
**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	1	CROSS CREEK DRIVE	LED-250 COBRA FIXTURE MOUNTED ON A 30' BRONZE FIBERGLASS POLE WITH A 12 FT ARM.
☀	2	CROSS CREEK DRIVE	LED-150 WAIT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE.
☀	3	CROSS CREEK DRIVE	LED-100 WAIT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE.

**LEGEND:**



GRACE DRIVE PEDESTRIAN REFUGE ISLAND  
SCALE: 1"=30'



DETAIL - SIGN # 25, 26

TRAFFIC CONTROL DEVICES:  
1. THE TRAFFIC CONTROL DEVICE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND MUST BE FIELD APPROVED BY HOWARD COUNTY TRAFFIC DIVISION (410-313-2450) PRIOR TO THE INSTALLATION OF ANY OF THE TRAFFIC CONTROL DEVICES.  
2. ALL TRAFFIC CONTROL DEVICES AND THEIR LOCATIONS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE 'MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES' (MDMUTCD).  
3. ALL SIGN POSTS USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL PERFORATED 'QUICK PUNCH' SQUARE TUBE POST (14 GAUGE INSERTED INTO A 2-1/2" GALVANIZED STEEL PERFORATED SQUARE TUBE SLEEVE (12 GAUGE - 3' LONG). THE ANCHOR SHALL NOT EXTEND MORE THAN TWO 'QUICK PUNCH' HOLES ABOVE GROUND LEVEL.  
4. GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON THE TOP OF EACH POST.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]* 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]* 6/12/19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**GRACE DRIVE**  
**PAVEMENT MARKING AND SIGNING PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS 'B-1' & 'C'  
 PLATS 23334-23337

TAX MAP 35 GRD 21  
5TH ELECTION DISTRICT  
EPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

9/0 PARCEL 145  
HOWARD COUNTY, MARYLAND

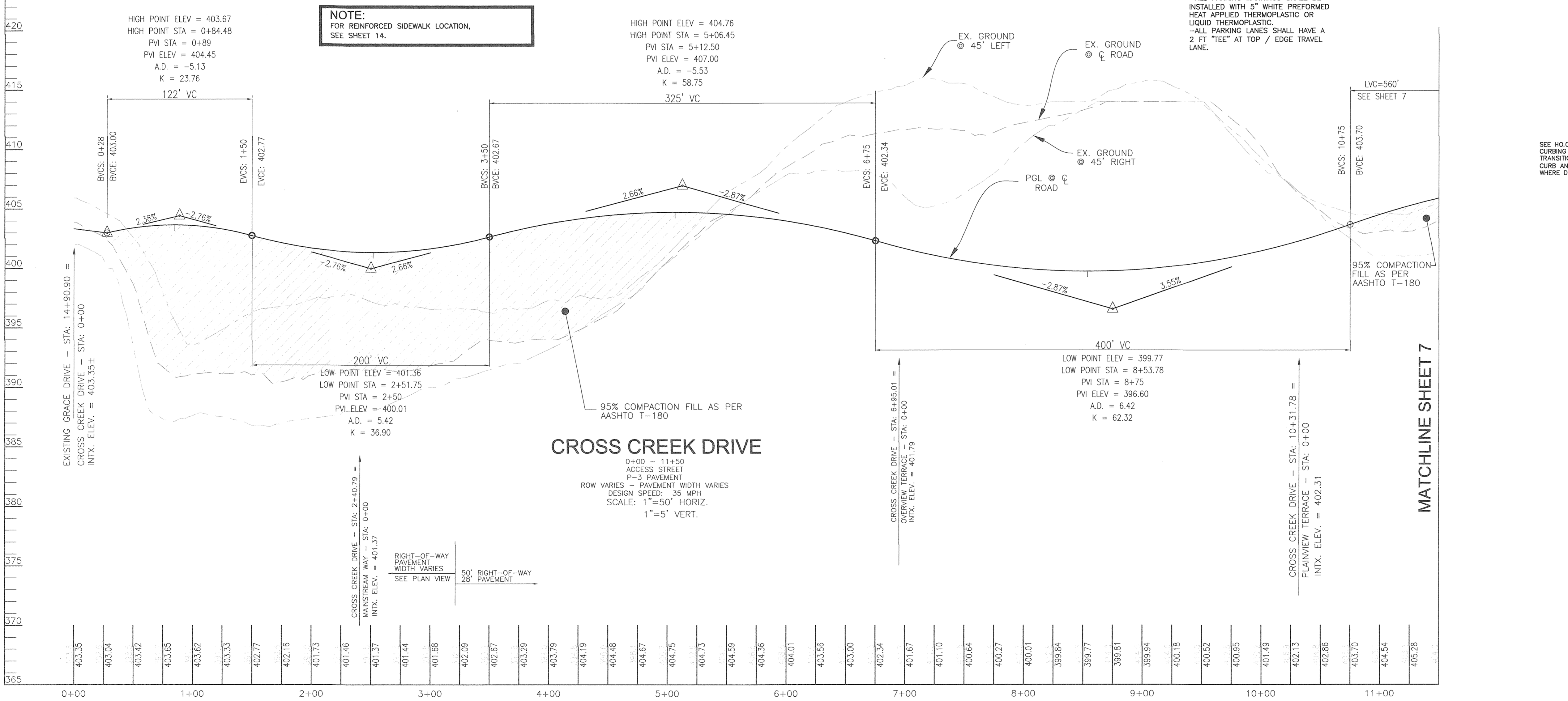
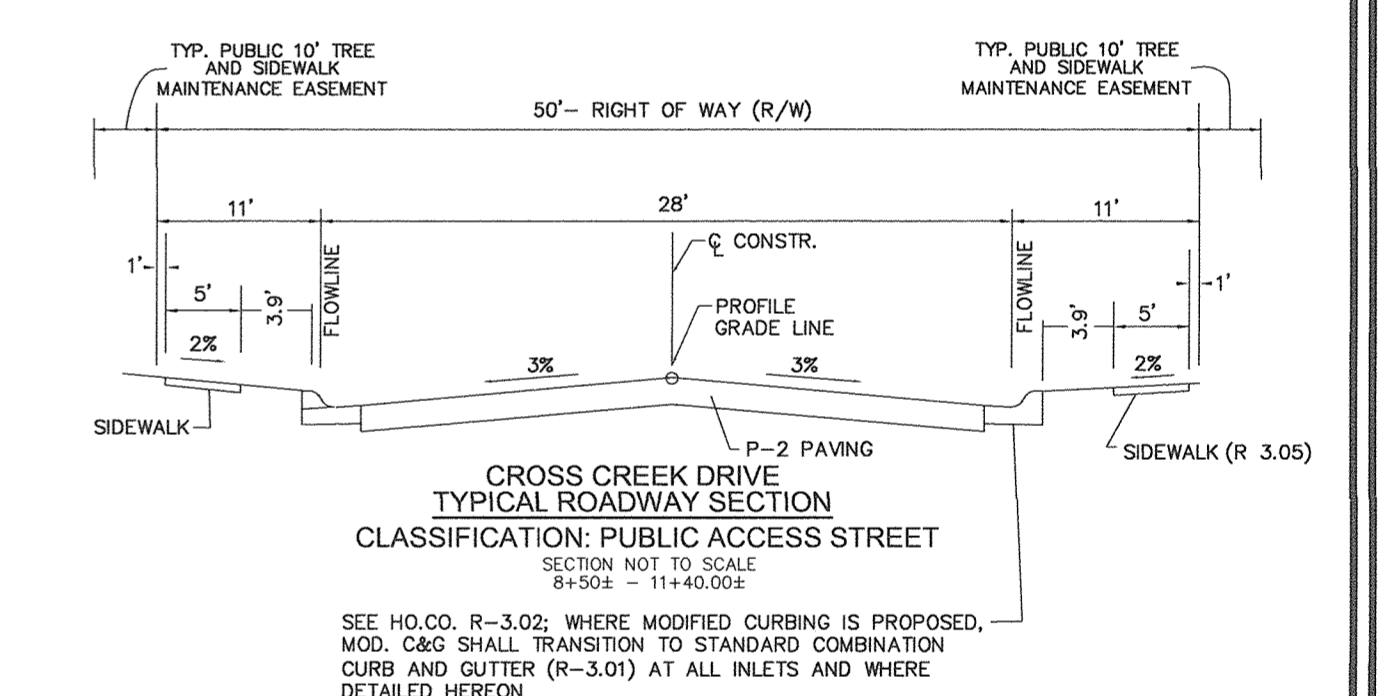
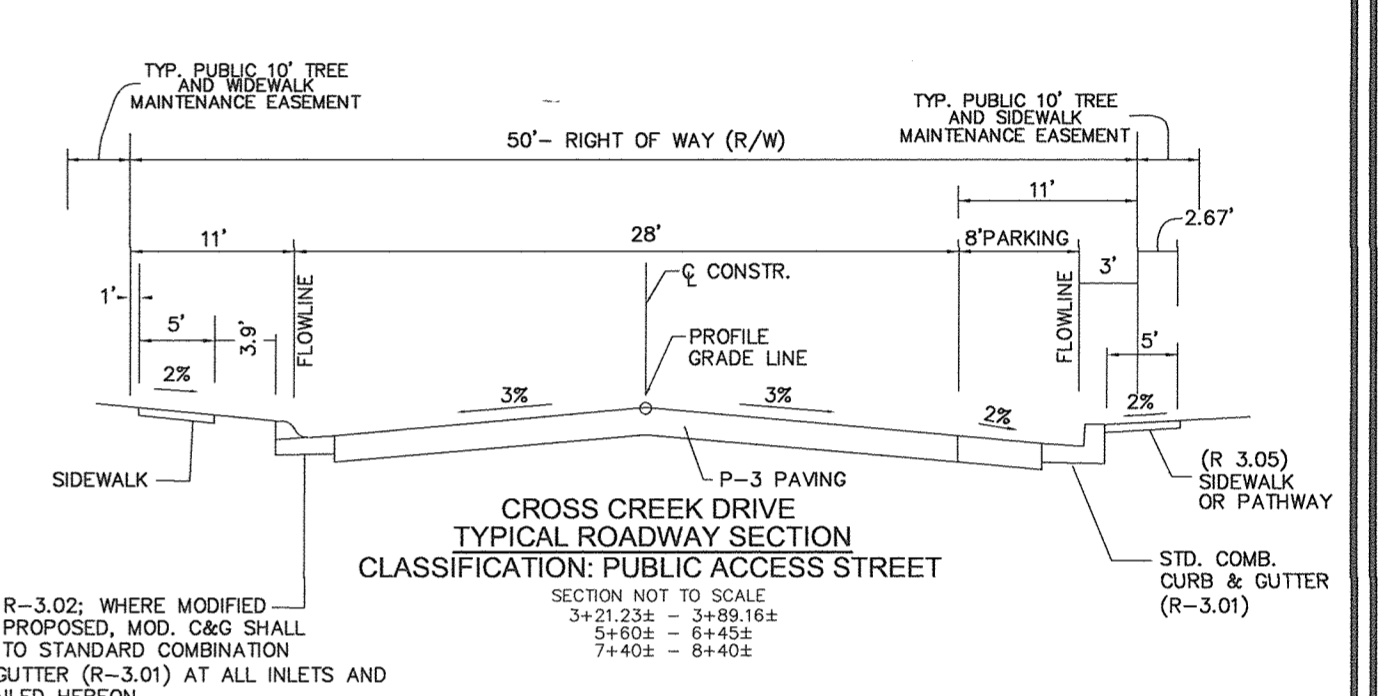
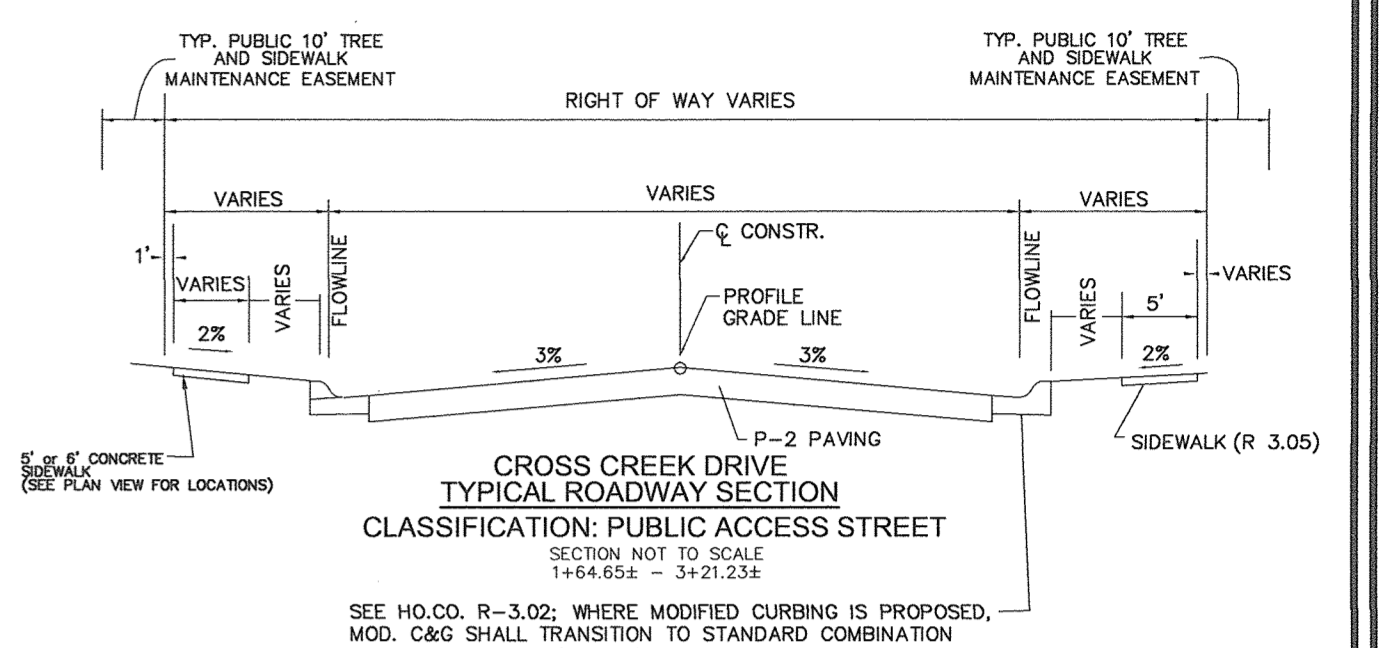
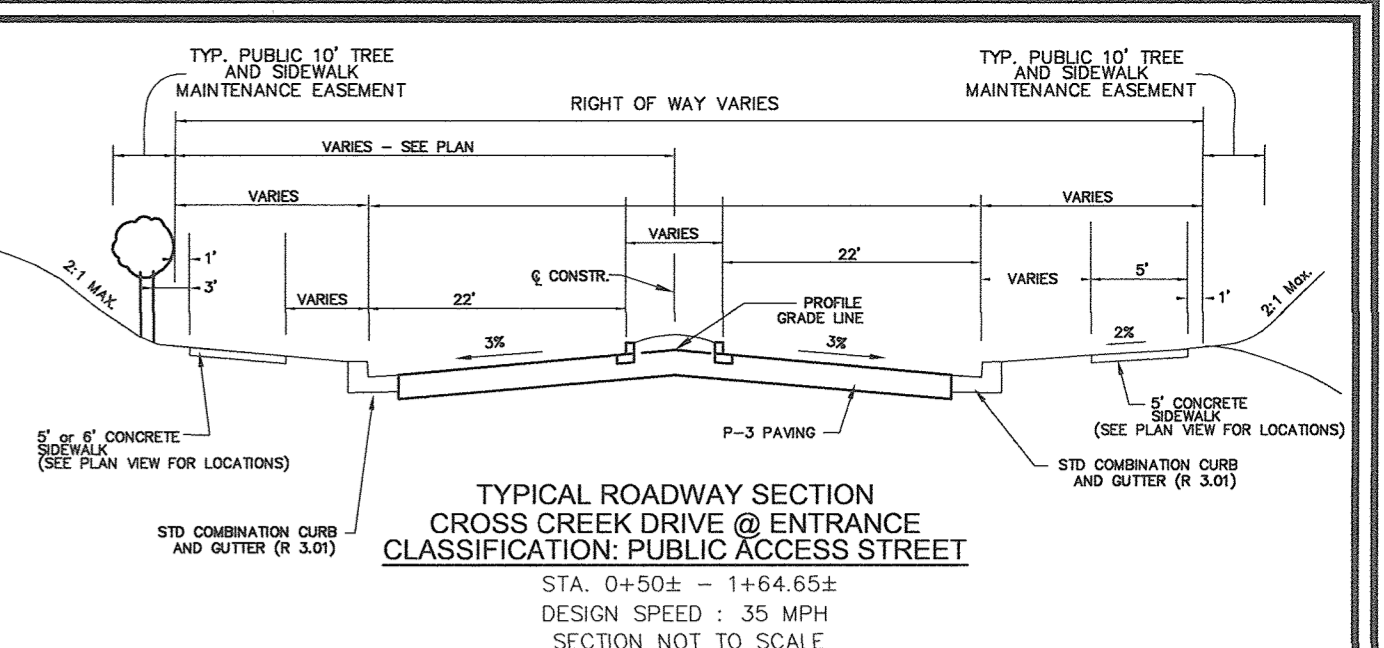
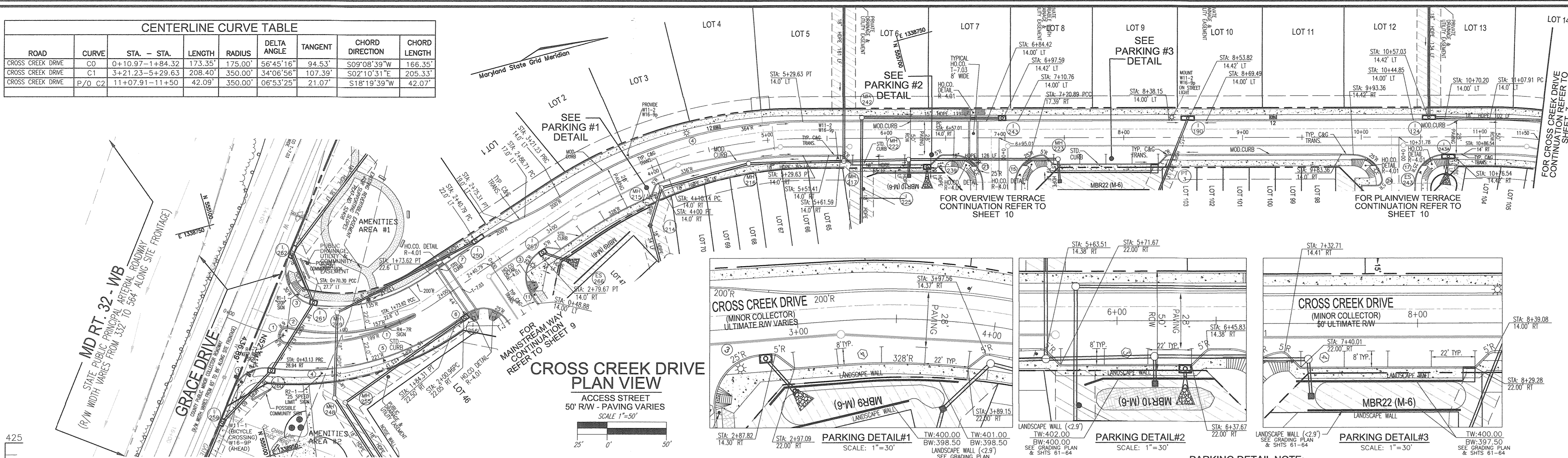
**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

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: 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 19-55

5 SHEET OF 74

CENTERLINE CURVE TABLE								
ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
CROSS CREEK DRIVE	C0	0+10.97-1+84.32	173.35'	175.00'	56°45'16"	94.53'	S09°08'39"W	166.35'
CROSS CREEK DRIVE	C1	3+21.23-5+29.63	208.40'	350.00'	34°06'56"	107.39'	S02°10'31"E	205.33'
CROSS CREEK DRIVE	P/O C2	11+07.91-11+50	42.09'	350.00'	06°53'25"	21.07'	S18°19'39"W	42.07'



STATION	ELEVATION	STATION	ELEVATION	STATION	ELEVATION	STATION	ELEVATION	STATION	ELEVATION
0+00	403.35	1+00	403.04	2+00	403.42	3+00	403.65	4+00	403.82
5+00	404.33	6+00	402.77	7+00	402.16	8+00	401.73	9+00	401.46
10+00	401.37	11+00	401.44	12+00	401.68	13+00	402.09	14+00	402.67
15+00	403.29	16+00	403.79	17+00	404.19	18+00	404.48	19+00	404.67
20+00	404.75	21+00	404.73	22+00	404.59	23+00	404.36	24+00	404.01
25+00	403.56	26+00	403.00	27+00	402.34	28+00	401.67	29+00	401.10
30+00	400.64	31+00	400.27	32+00	400.07	33+00	399.84	34+00	399.77
35+00	399.61	36+00	399.94	37+00	400.18	38+00	400.32	39+00	400.95
40+00	401.49	41+00	402.13	42+00	402.86	43+00	403.70	44+00	404.54
45+00	405.28								

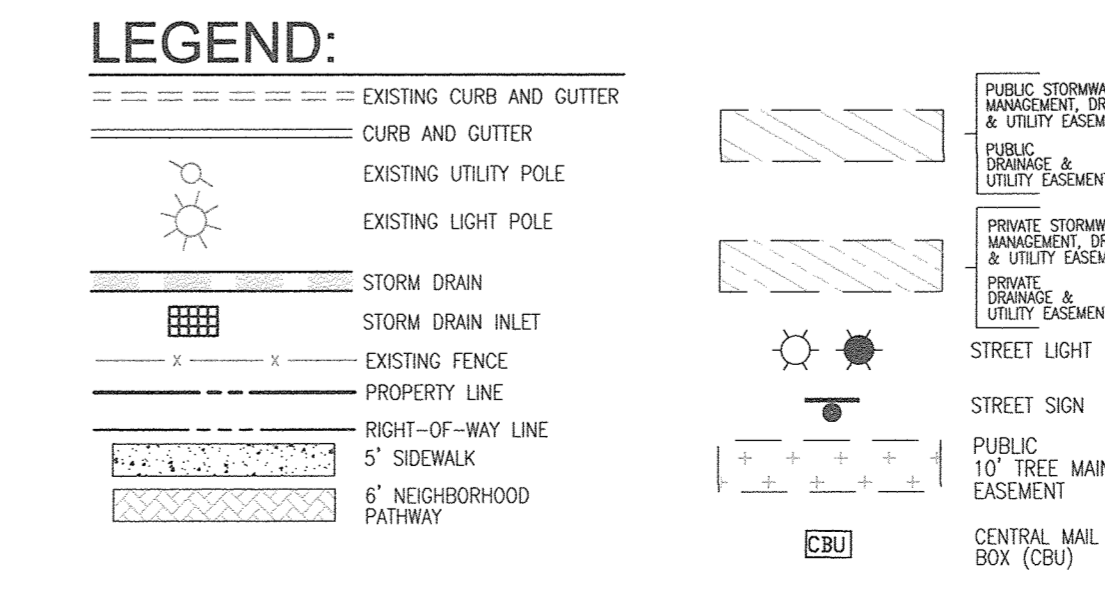
- NOTES:**
- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
  - REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
  - FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
  - ALL STREET TREES AND/OR SIGN SHALL BE LOCATED 5' MIN. FROM PROPOSED DRAINAGE, UTILITY STRUCTURE.
  - THERE SHOULD BE A MINIMUM OF 20' BETWEEN STREET LIGHTS AND STREET TREES.
  - IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN, THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
  - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - REFER TO SHEET 11 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CBU) LOCATIONS. FINAL LOCATION SHALL BE AS DIRECTED BY THE US POSTAL SERVICE.
  - HANDICAP RAMP ARE STANDARD R-4.01.

**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
1	CROSS CREEK DRIVE	KEEP RIGHT
2	CROSS CREEK DRIVE	R1-1 STOP SIGN
3	CROSS CREEK DRIVE	R1-1 STOP SIGN
4	CROSS CREEK DRIVE	R2-1 SPEED LIMIT "25"
5	CROSS CREEK DRIVE	W11-2 W16-9p
6	CROSS CREEK DRIVE	W11-2 W16-7p
7	CROSS CREEK DRIVE	W11-2 W16-7p
11	MAINSTREAM WAY	R1-1 STOP SIGN
15	OVERVIEW TERRACE	R1-1 STOP SIGN
17	PLAINVIEW TERRACE	R1-1 STOP SIGN

**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	1	CROSS CREEK DRIVE	LED-250 COBRA FIXTURE MOUNTED ON A 12' FT ARM.
☀	2	CROSS CREEK DRIVE	LED-150 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	3	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	4	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	5	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	21	OVERVIEW TERRACE	
☀	24	PLAINVIEW TERRACE	



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 CROSS CREEK DRIVE - 0+00 - 11+50 - PLAN & PROFILE

# CEDAR CREEK - PHASE 1

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF PARCELS B-1 & C  
 PLATS 23334-23337

TAX MAP 35, GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

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. MY LICENSE NO. IS 1985. EXPIRATION DATE: 09-27-2020

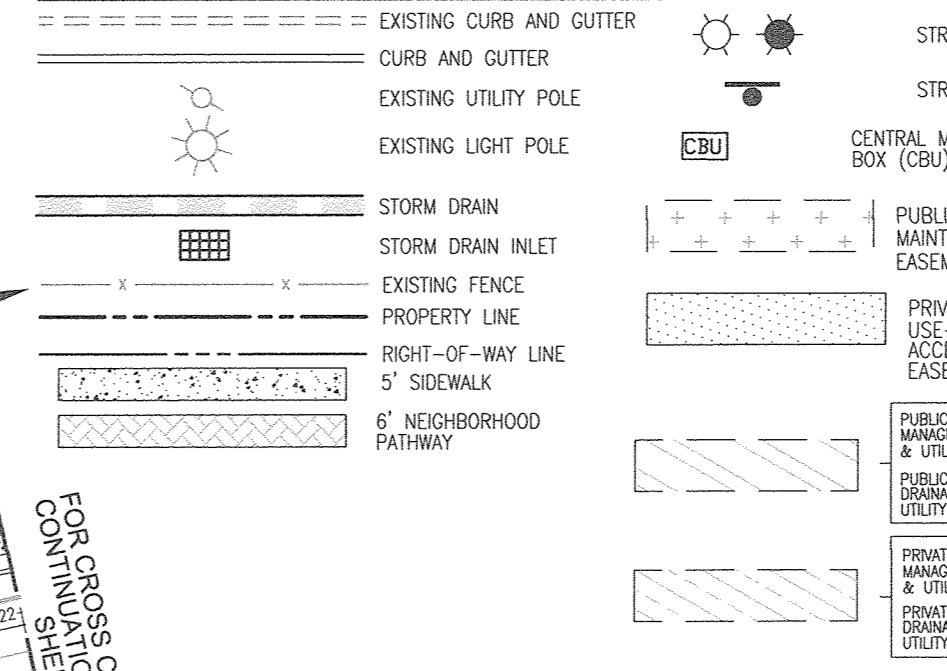
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHW  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

6 SHEET OF 74

ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
CROSS CREEK DRIVE	P/D C2	11+50-19+45.73	395.73'	350.00'	64°46'56"	222.04'	S54°09'49"W	374.99'
CROSS CREEK DRIVE	C3	16+34.31-19+13.92	279.61'	550.00'	29°07'42"	142.90'	S71°59'26"W	276.61'

**NOTE:**  
FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION, SEE SHEET 13.  
FOR REINFORCED SIDEWALK LOCATION, SEE SHEET 14.

**LEGEND:**



**NOTES:**

- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
- REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
- FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
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  - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
  - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
- REFER TO SHEET 11 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CMB) LOCATIONS. FINAL LOCATION SHALL BE AS DIRECTED BY THE US POSTAL SERVICE.
- HANDICAP RAMPS ARE STANDARD R-4.01.

**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
8	CROSS CREEK DRIVE	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE
9	CROSS CREEK DRIVE	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE
10	CROSS CREEK DRIVE	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE
19	LAWDALE CIRCLE	R1-1 STOP SIGN
21	SANBORN WAY	R1-1 STOP SIGN

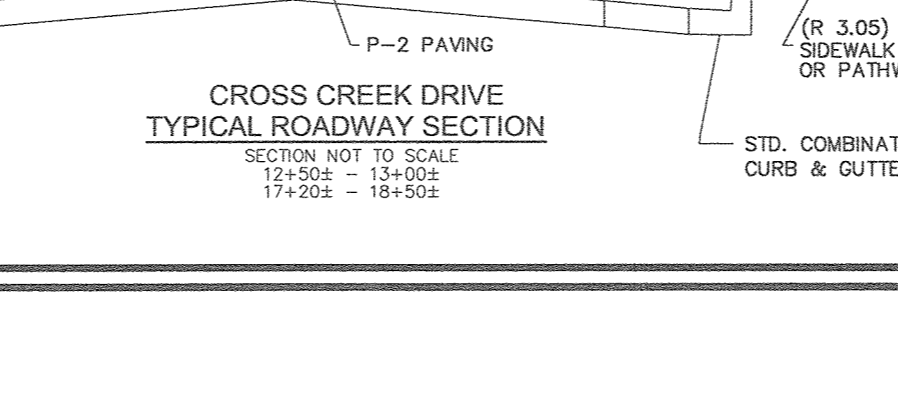
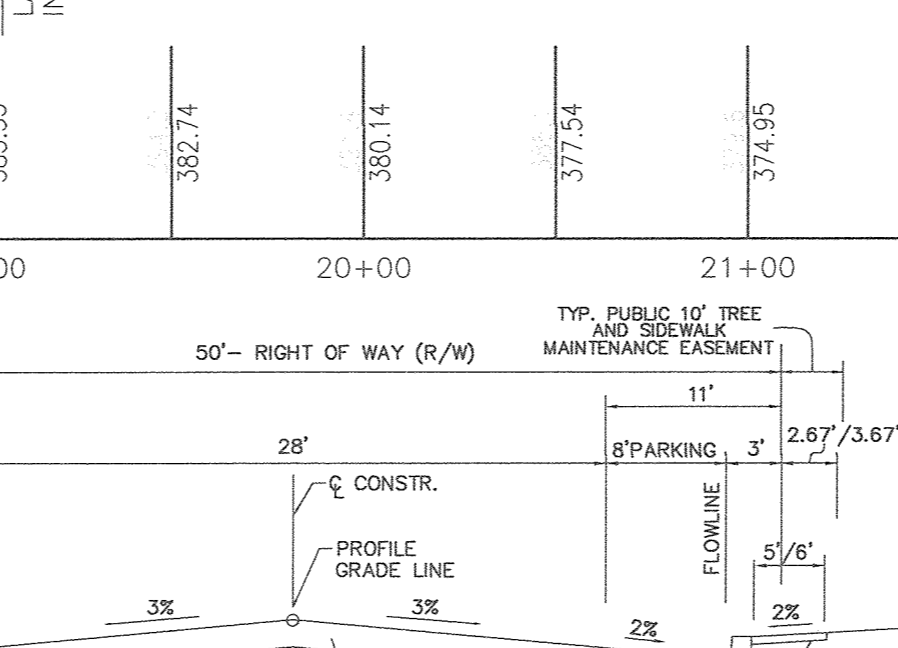
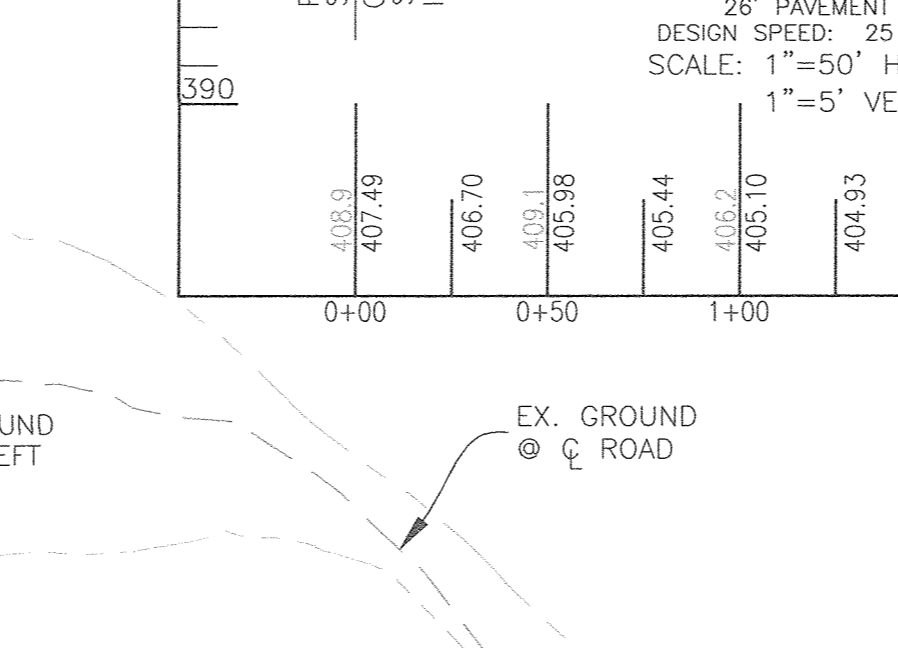
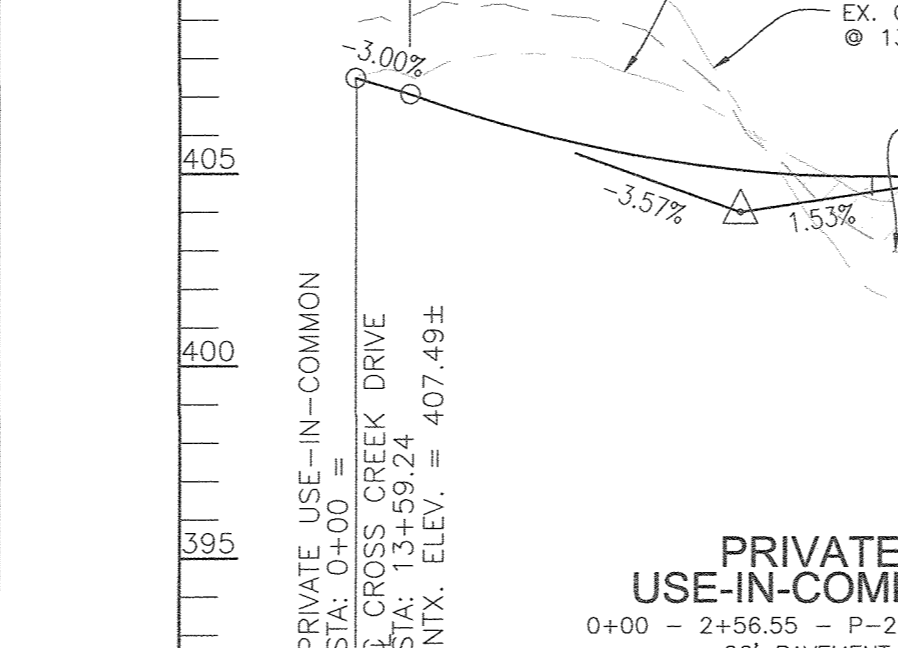
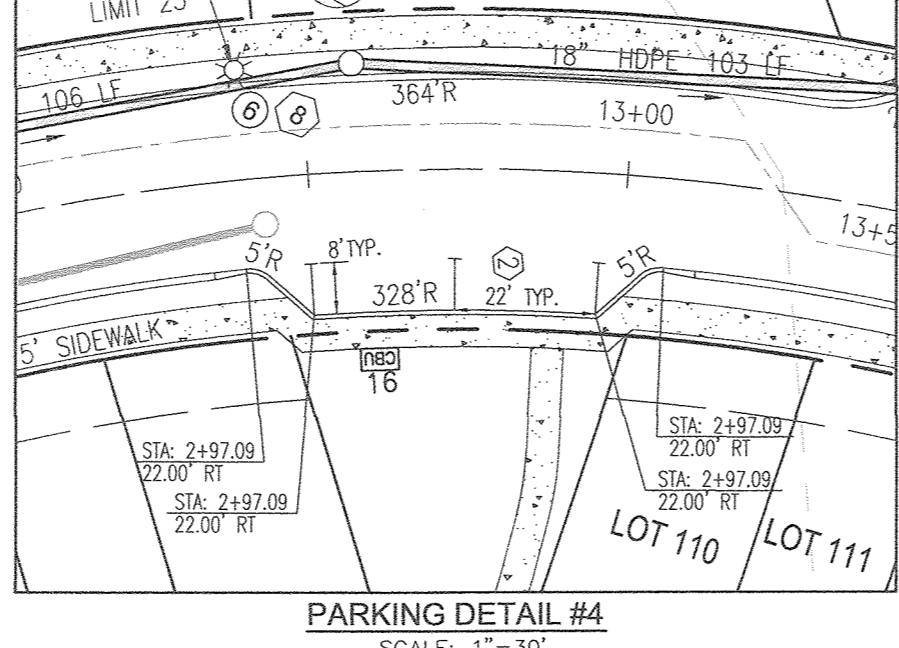
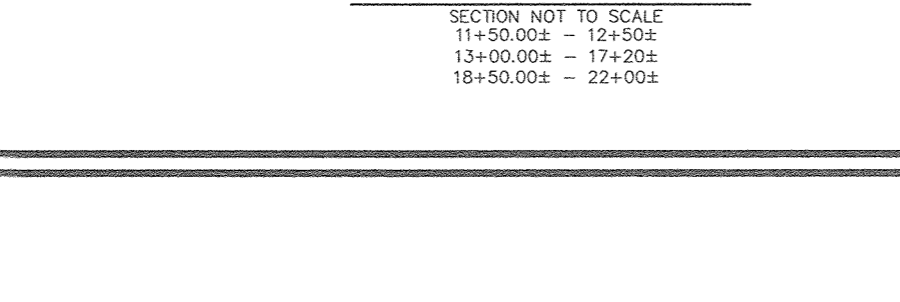
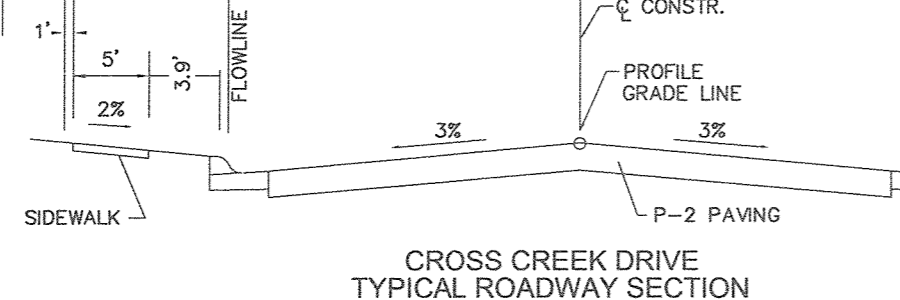
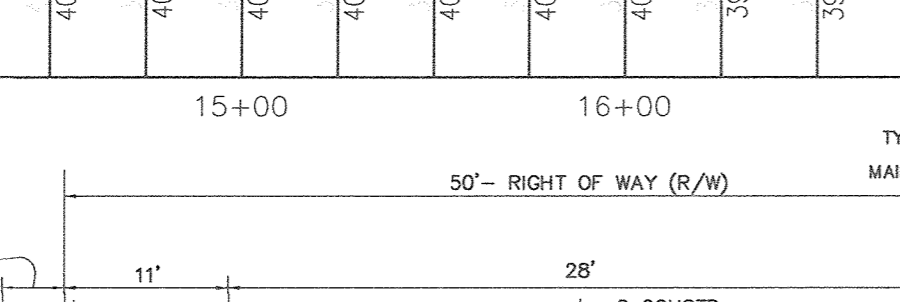
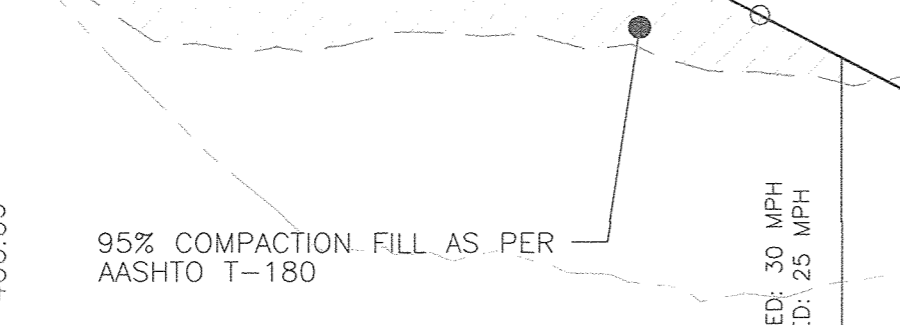
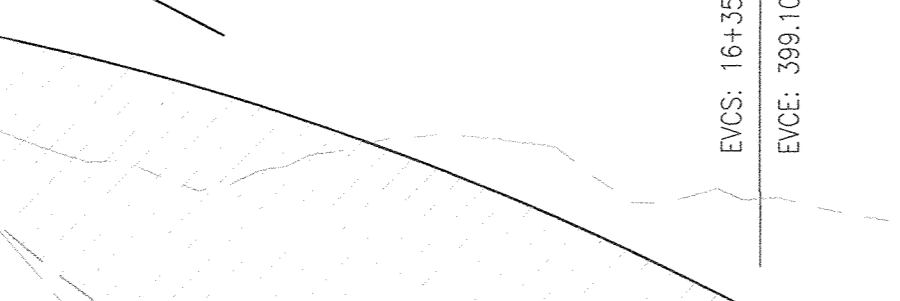
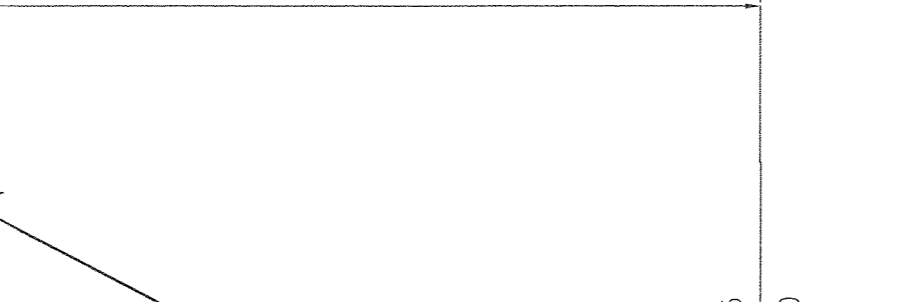
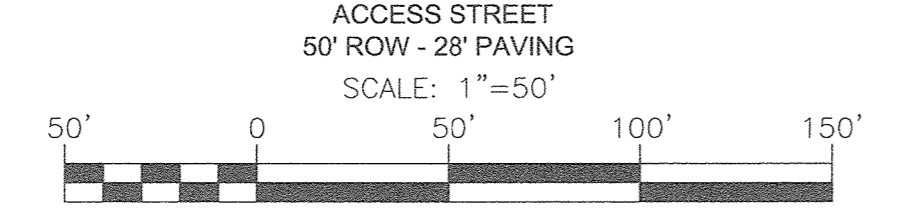
**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	6	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	7	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	8	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	9	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	10	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	11	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	12	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE

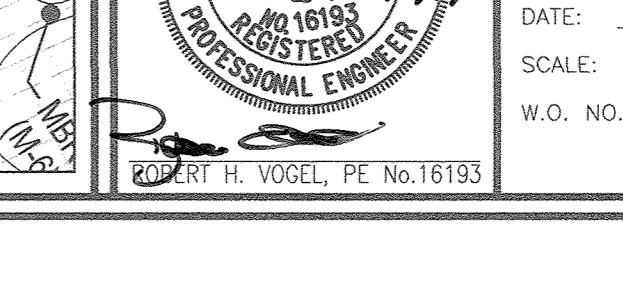
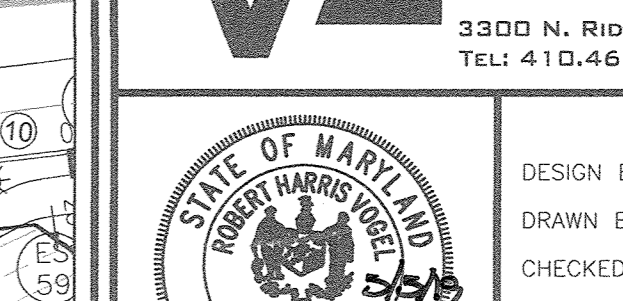
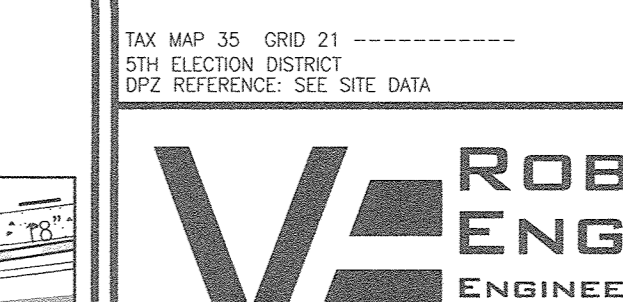
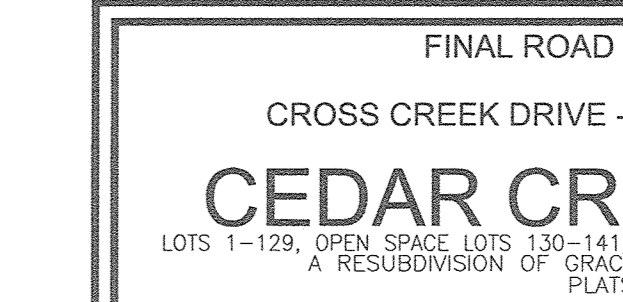
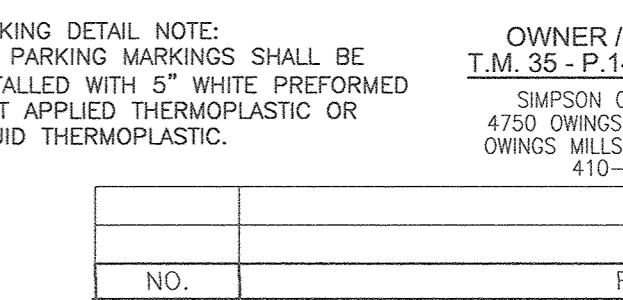
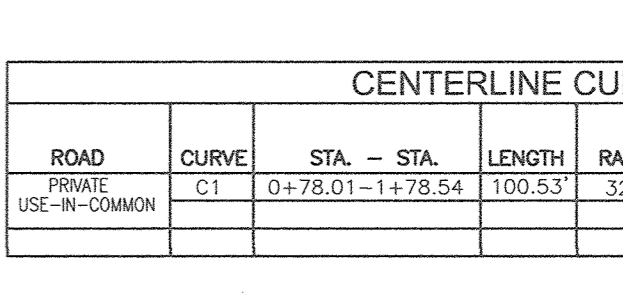
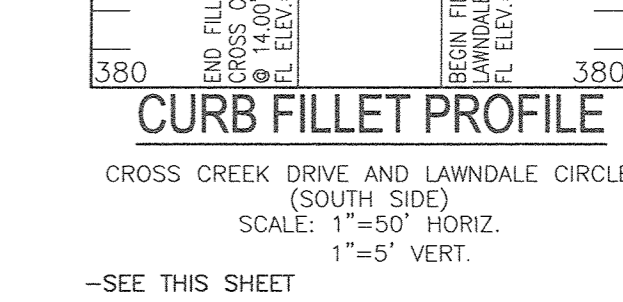
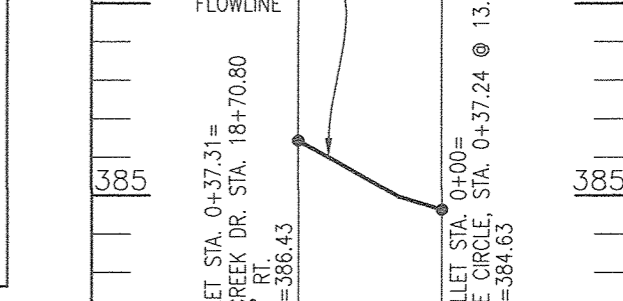
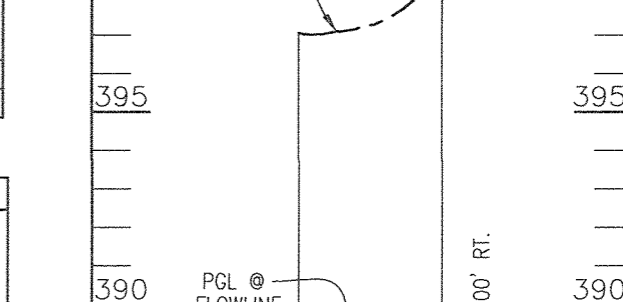
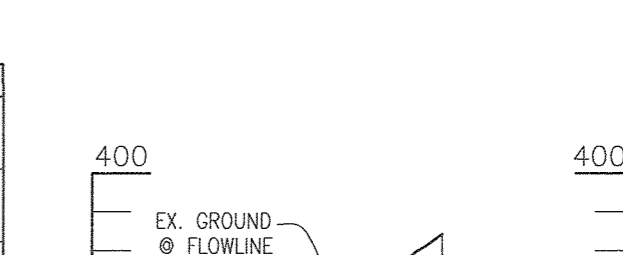
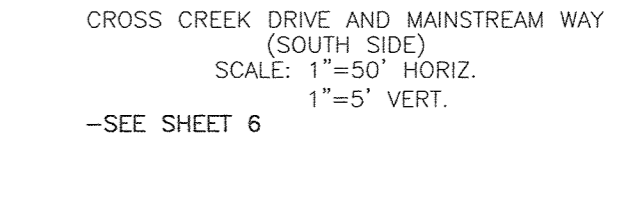
**PARKING DETAIL NOTE:**

- ALL PARKING MARKINGS SHALL BE INSTALLED WITH 5" WHITE PREFORMED HEAT APPLIED THERMOPLASTIC OR LIQUID THERMOPLASTIC.
- ALL PARKING LANES SHALL HAVE A 2 FT "TEE" AT TOP / EDGE TRAVEL LANE.

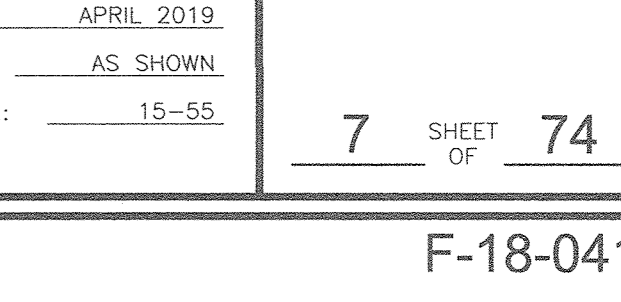
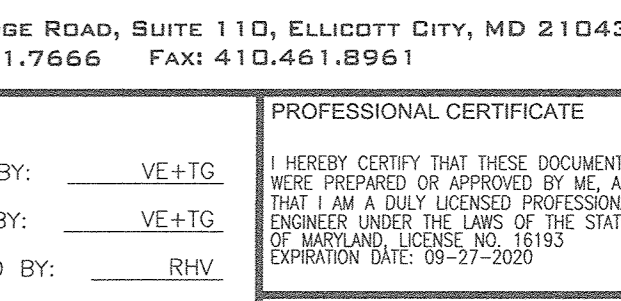
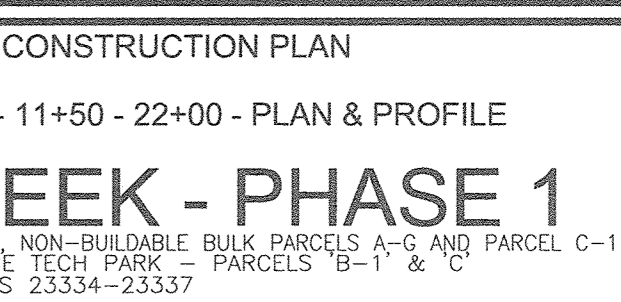
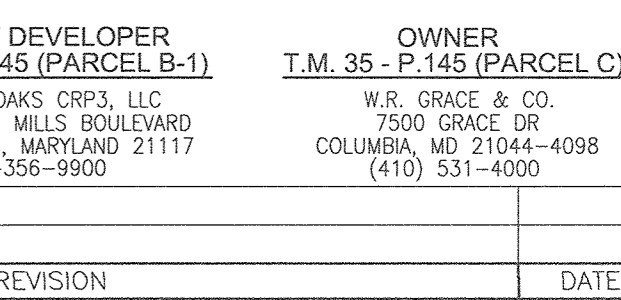
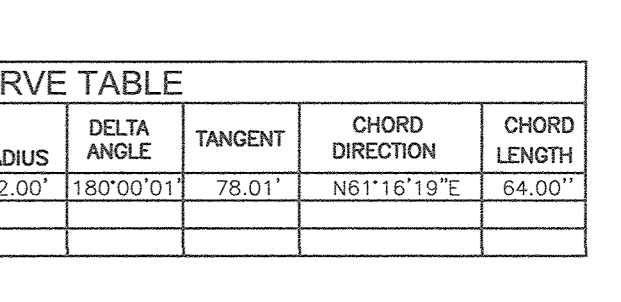
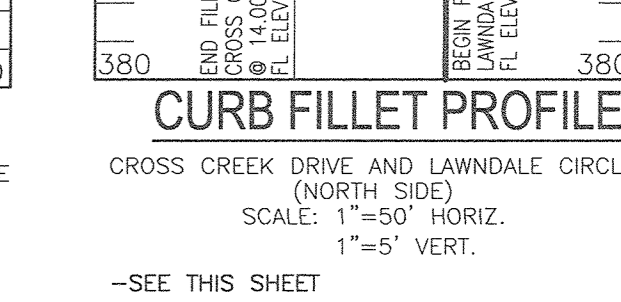
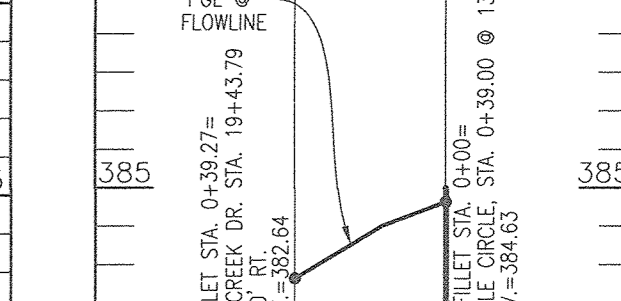
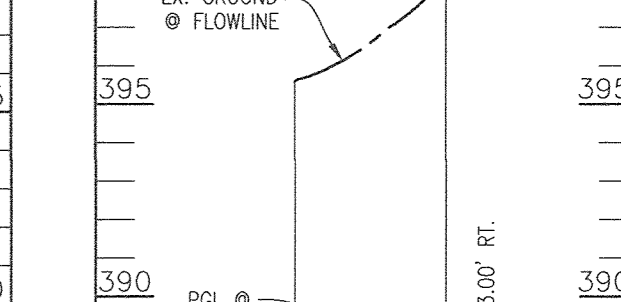
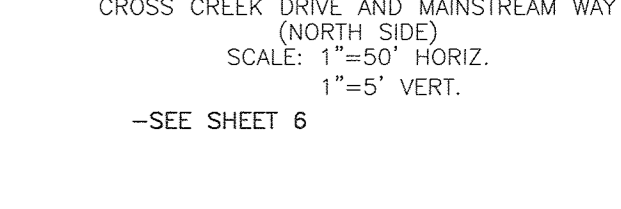
**CROSS CREEK DRIVE PLAN VIEW**



**CURB FILLET PROFILE**



**CURB FILLET PROFILE**



ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
PRIVATE USE-IN-COMMON	C1	0+78.01-14+78.54	100.53'	32.00'	180°00'01"	78.01'	N61°16'19"E	64.00'

**PARKING DETAIL NOTE:** ALL PARKING MARKINGS SHALL BE INSTALLED WITH 5" WHITE PREFORMED HEAT APPLIED THERMOPLASTIC OR LIQUID THERMOPLASTIC.

**OWNER / DEVELOPER**  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 CRICE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**

**CROSS CREEK DRIVE - 11+50 - 22+00 - PLAN & PROFILE**

**CEDAR CREEK - PHASE 1**

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRD 21 5TH ELECTION DISTRICT DPZ REFERENCE: SEE SITE DATA ZONED: CEF-R P/O PARCEL 145 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**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 AND LICENSED 18193 EXPIRATION DATE: 09-27-2020

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

7 SHEET OF 74

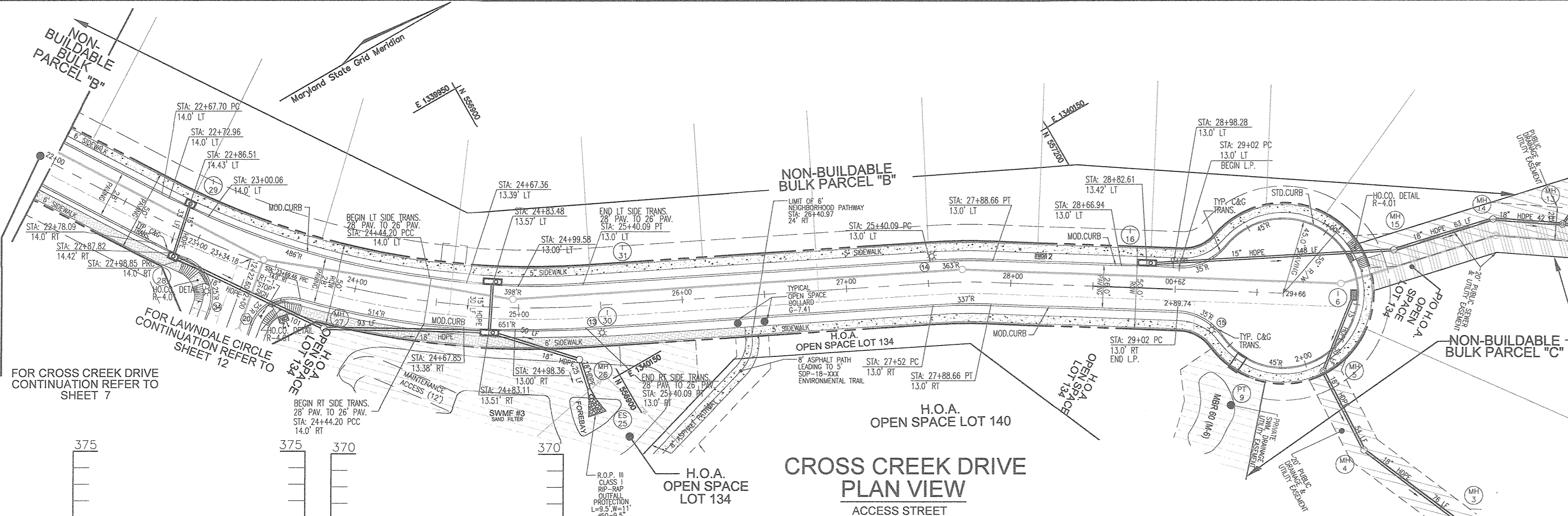
MATCHLINE SHEET 6

MATCHLINE SHEET 8

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.28.19



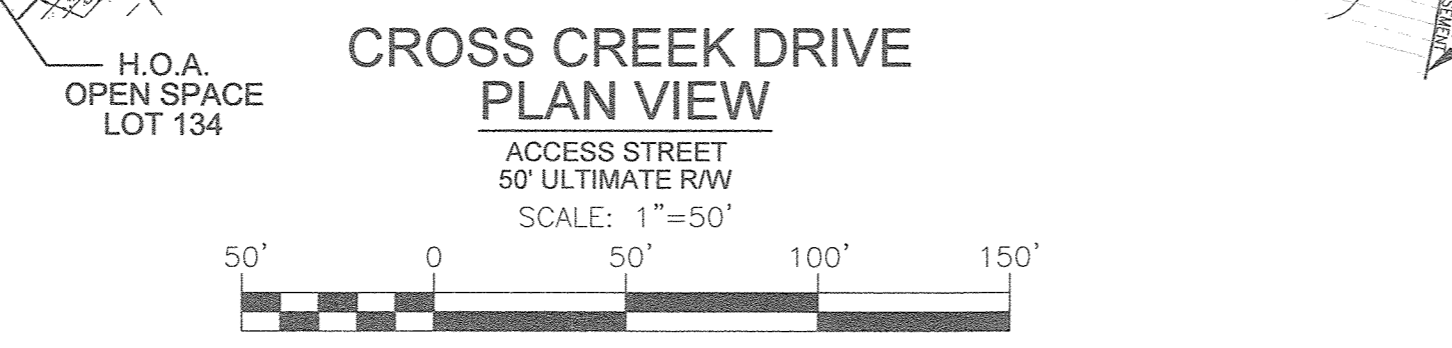
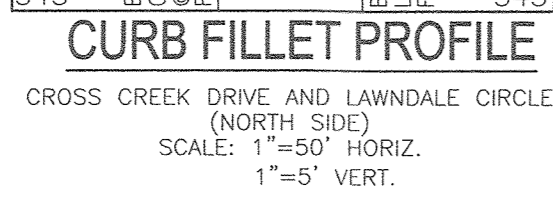
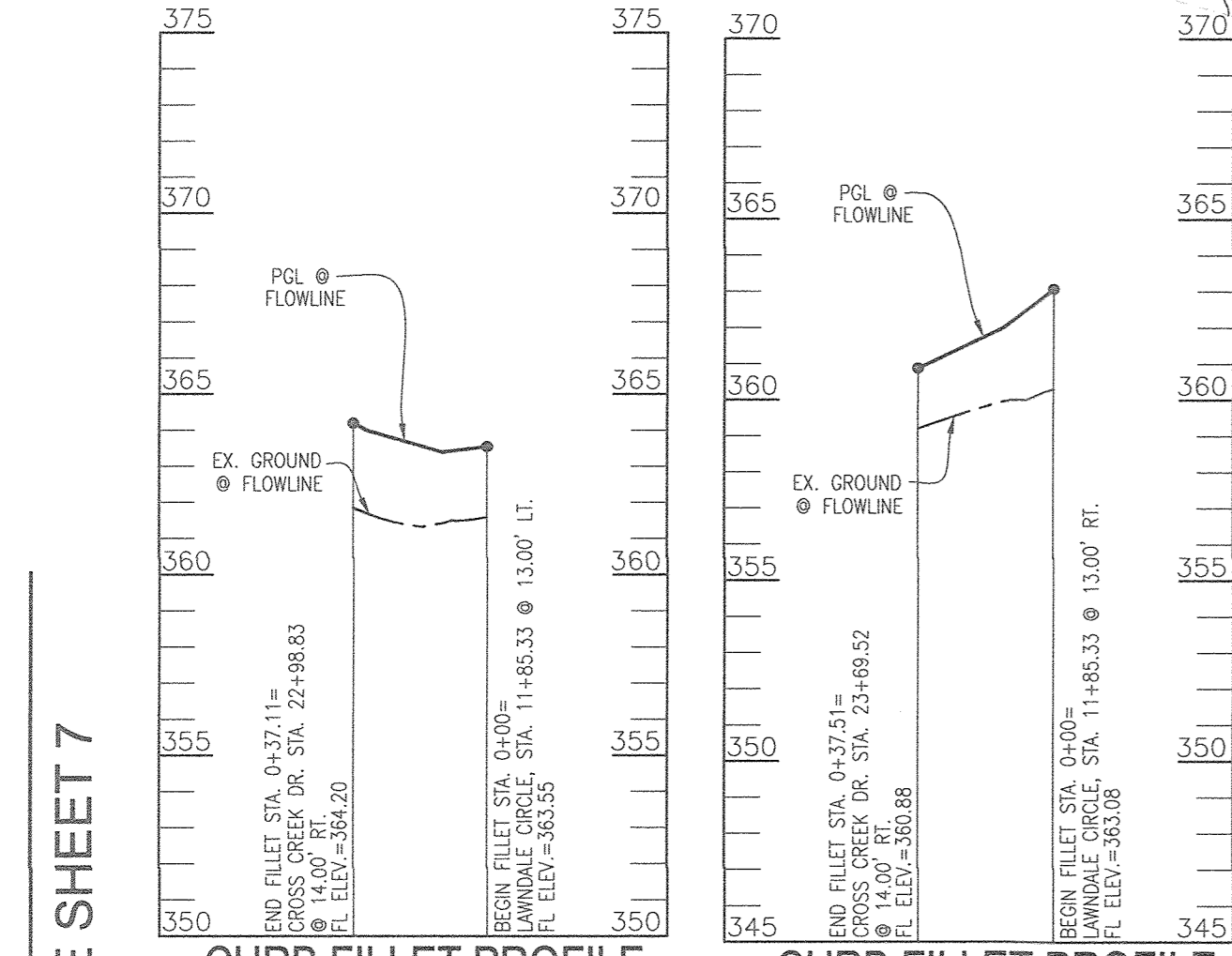
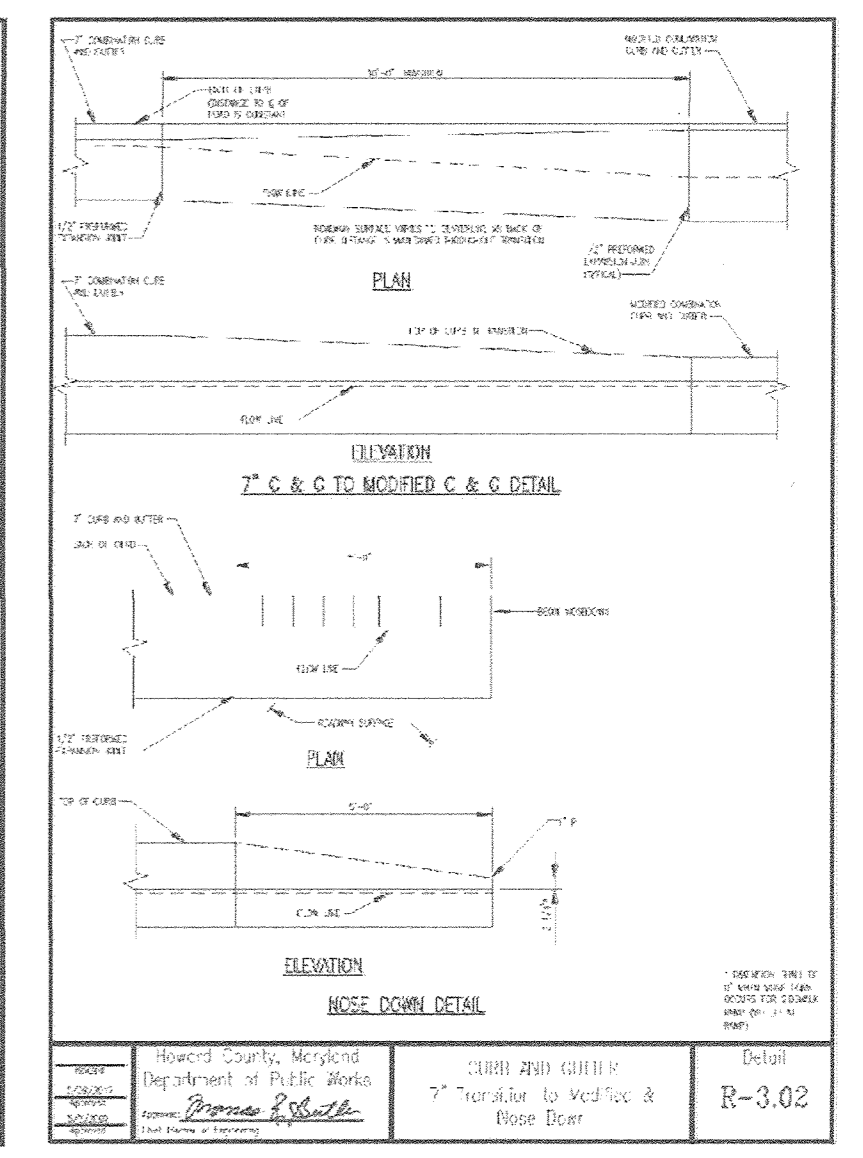
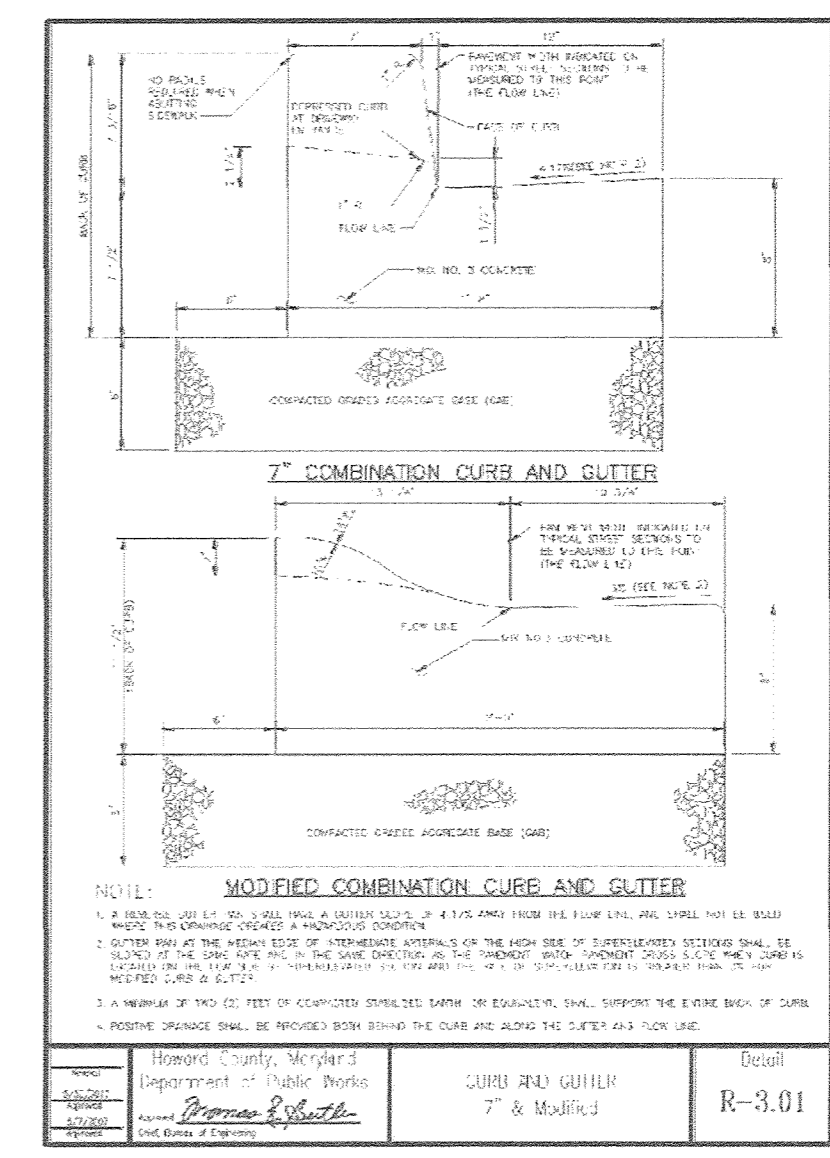
NOTE:  
FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION,  
SEE SHEET 13.  
FOR REINFORCED SIDEWALK LOCATION,  
SEE SHEET 14.

**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	13	CROSS CREEK DRIVE	LED-100 BATT COLUMNAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	14	CROSS CREEK DRIVE	
	15	CROSS CREEK DRIVE	
	34	LAWDALE CIRCLE	

**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
20	LAWDALE CIRCLE	R-1-1 STOP SIGN

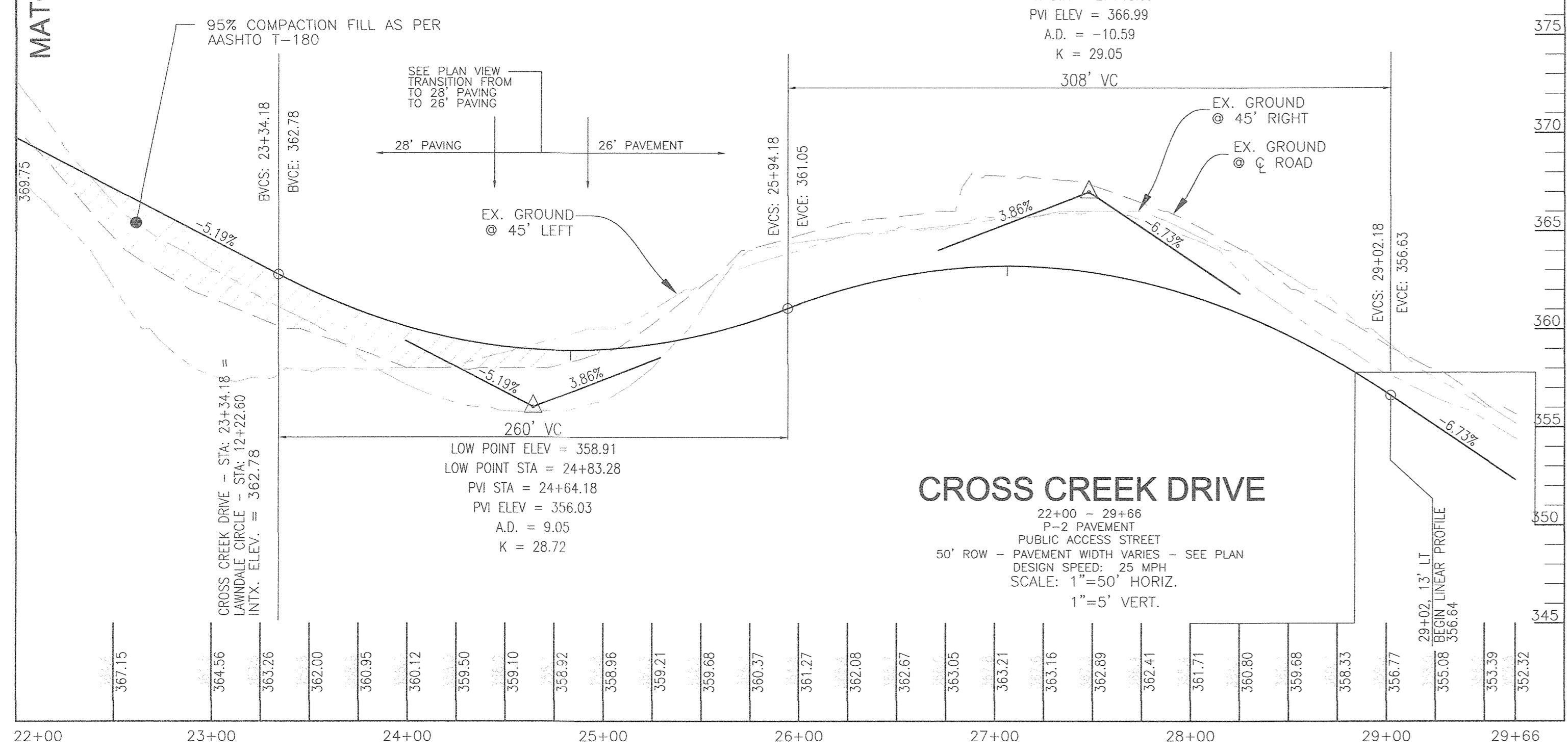


**CENTERLINE CURVE TABLE**

ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
CROSS CREEK DRIVE	C4	22+67.70-29+40.09	272.40	500.00'	31°12'51"	139.67'	S41°49'10"W	269.04'
CROSS CREEK DRIVE	C5	27+52.00-27+88.66	36.66	350.00'	6°00'02"	18.34'	S29°12'46"W	36.64'

**CURB FILLET PROFILE**  
CROSS CREEK DRIVE AND LAWDALE CIRCLE (SOUTH SIDE)  
SCALE: 1"=50' HORIZ.  
1"=5' VERT.

**CURB FILLET PROFILE**  
CROSS CREEK DRIVE AND LAWDALE CIRCLE (NORTH SIDE)  
SCALE: 1"=50' HORIZ.  
1"=5' VERT.



**CROSS CREEK DRIVE**  
22+00 = 29+66  
P-2 PAVEMENT  
PUBLIC ACCESS STREET  
50' ROW - PAVEMENT WIDTH VARIES - SEE PLAN  
DESIGN SPEED: 25 MPH  
SCALE: 1"=50' HORIZ.  
1"=5' VERT.

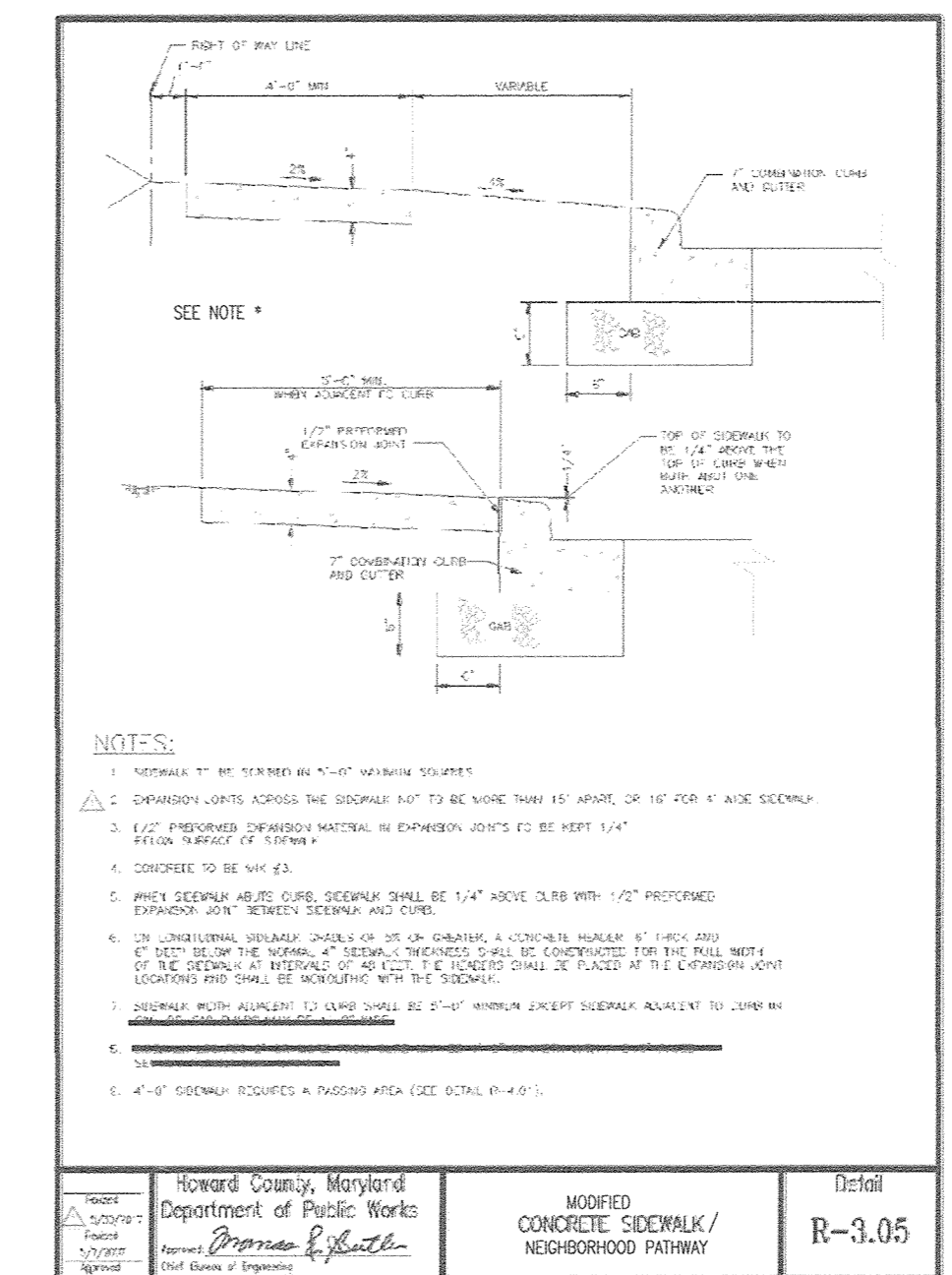
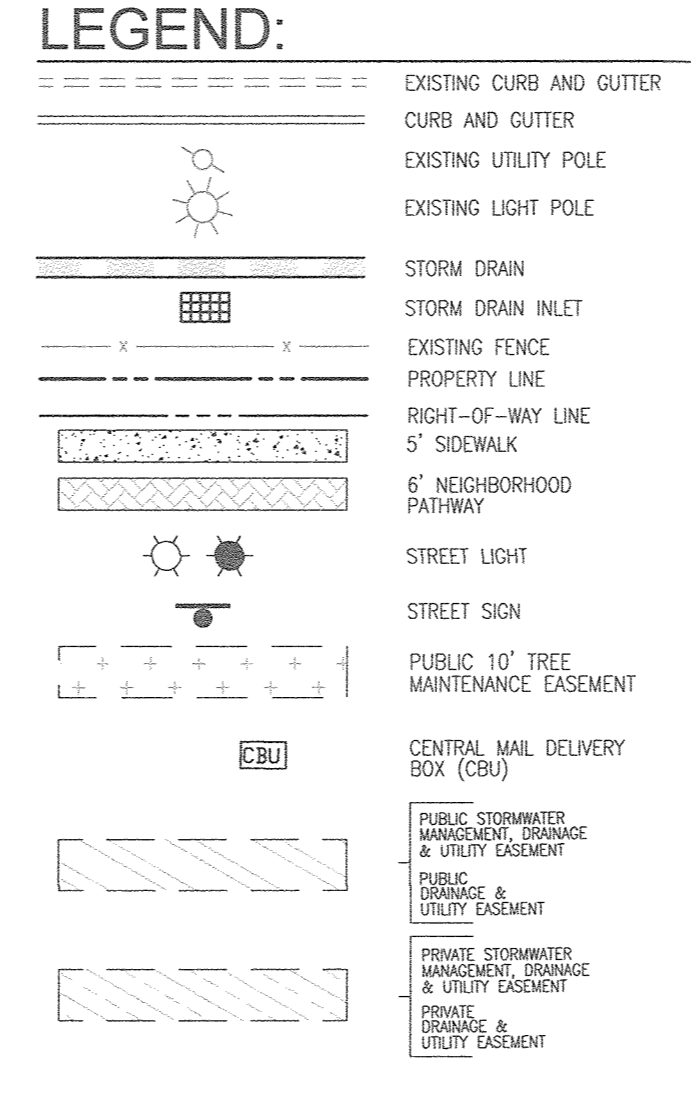
**NOTES:**

- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
- REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
- FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
- ALL STREET TREES AND/OR SIGN SHALL BE LOCATED 5' MIN. FROM PROPOSED DRAINAGE, UTILITY STRUCTURE.
- THERE SHOULD BE A MINIMUM OF 20' BETWEEN STREET LIGHTS AND STREET TREES.
- IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:
  - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
  - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
- REFER TO SHEET 11 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CBU) LOCATIONS. FINAL LOCATION SHALL BE AS DIRECTED BY THE US POSTAL SERVICE.
- HANDICAP RAMPS ARE STANDARD R-4.01.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

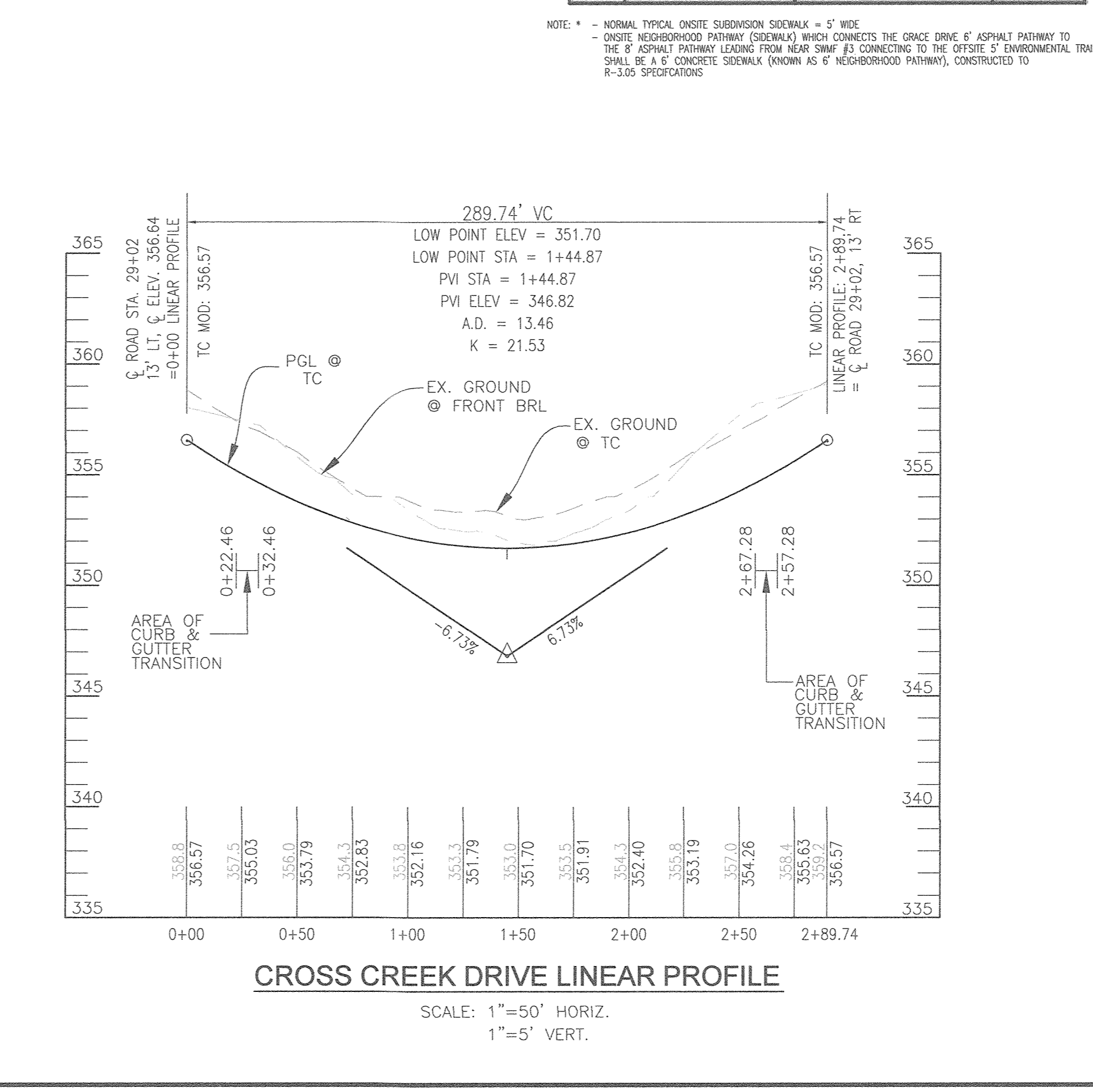
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6-26-19



**NOTES:**

1. SIDEWALK SHALL BE REINFORCED WITH 4" X 4" REINFORCING STEEL.
2. CURB AND GUTTER JOINTS SHALL BE REINFORCED WITH 4" X 4" REINFORCING STEEL.
3. EXISTING SIDEWALK SHALL BE REINFORCED WITH 4" X 4" REINFORCING STEEL.
4. EXISTING SIDEWALK SHALL BE REINFORCED WITH 4" X 4" REINFORCING STEEL.
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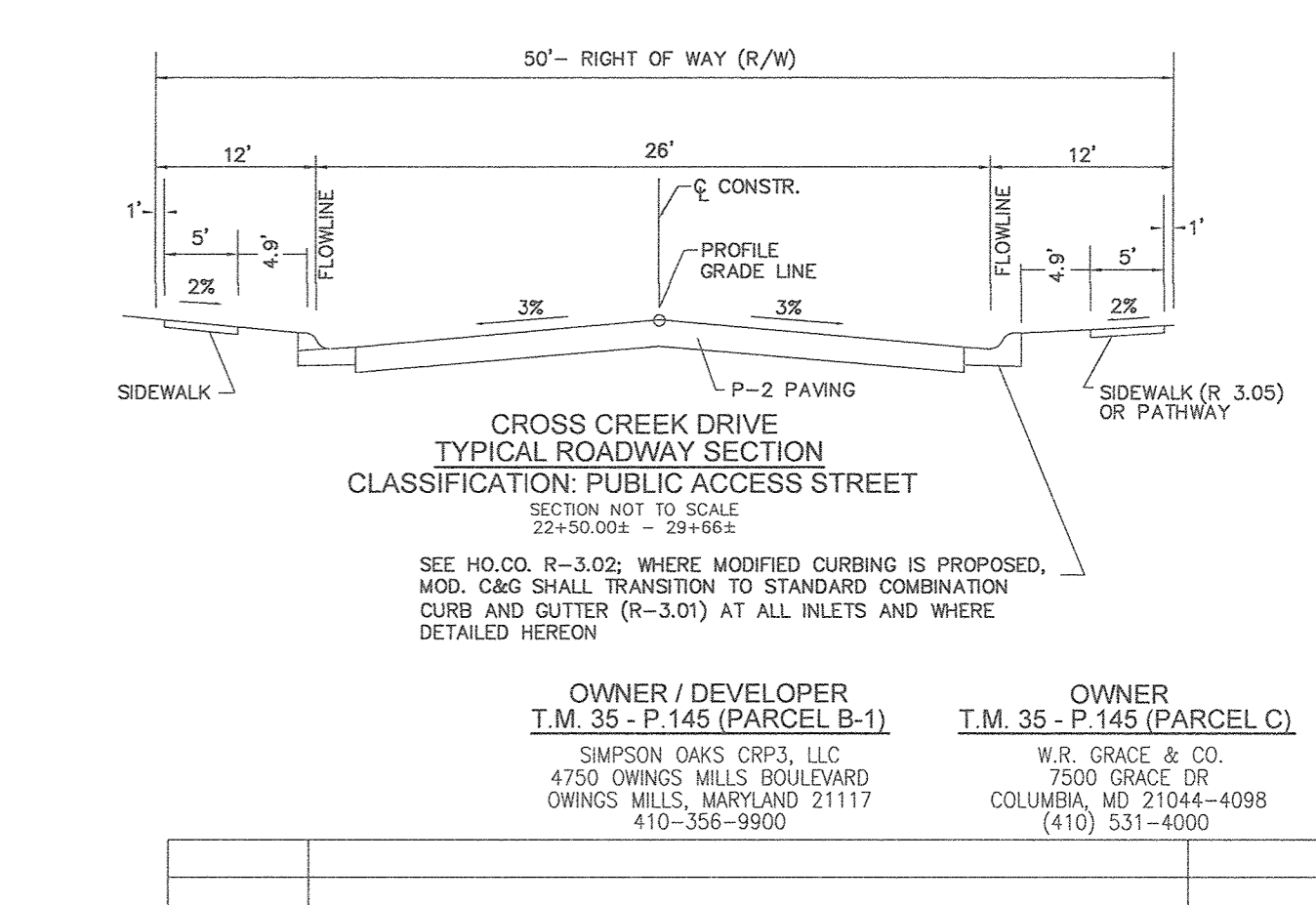


**CROSS CREEK DRIVE LINEAR PROFILE**  
SCALE: 1"=50' HORIZ.  
1"=5' VERT.

**PAVING SECTIONS**

SECTION	PAVING	THICKNESS (INCHES)	SPREAD	SPREAD	SPREAD	SPREAD	SPREAD	SPREAD	SPREAD
P-1	PAVING	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P-2	PAVING	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P-3	PAVING	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
P-4	PAVING	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Howard County, Maryland  
Department of Public Works  
Chief, Bureau of Highways  
Date: 6/11/2019



**CROSS CREEK DRIVE TYPICAL ROADWAY SECTION**  
CLASSIFICATION: PUBLIC ACCESS STREET  
SECTION NOT TO SCALE  
22+00.00E - 29+66.00E

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OWNS CRPS, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

**FINAL ROAD CONSTRUCTION PLAN**  
CROSS CREEK DRIVE - 22+00 - 29+66 - PLAN & PROFILE  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARTS PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

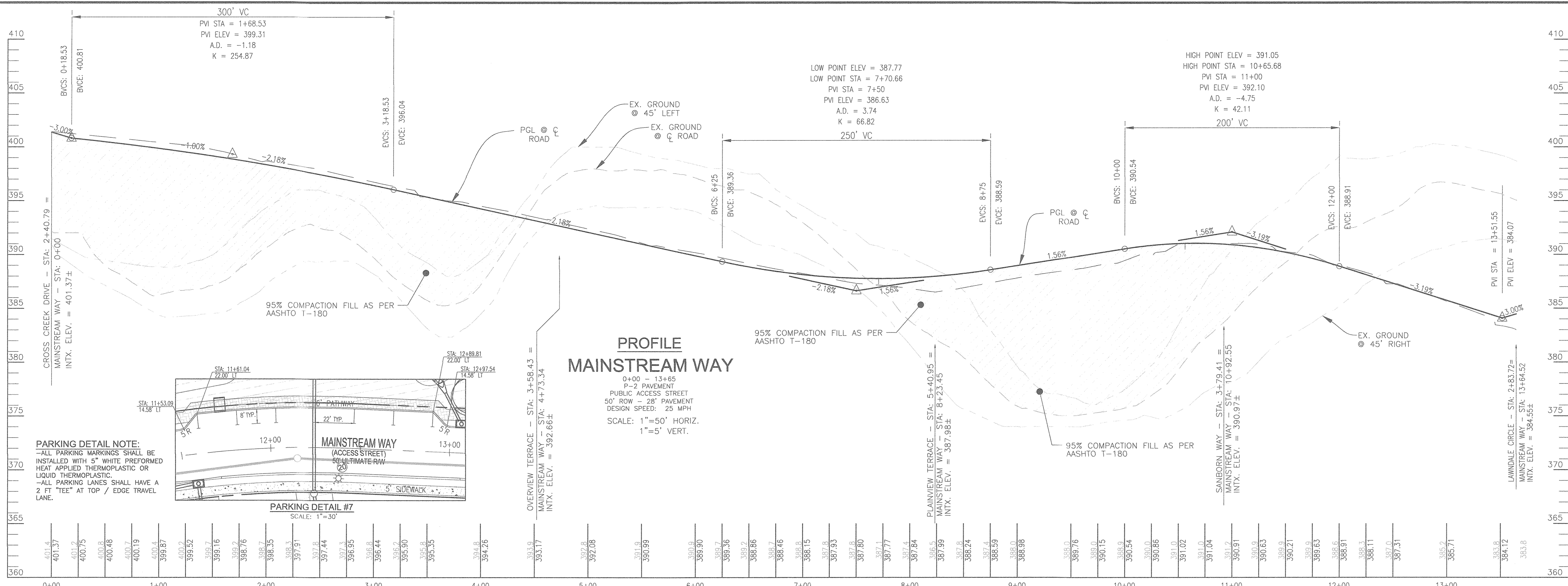
**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**  
DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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. 10193, EXPIRATION DATE: 09-27-2020

8 SHEET OF 74

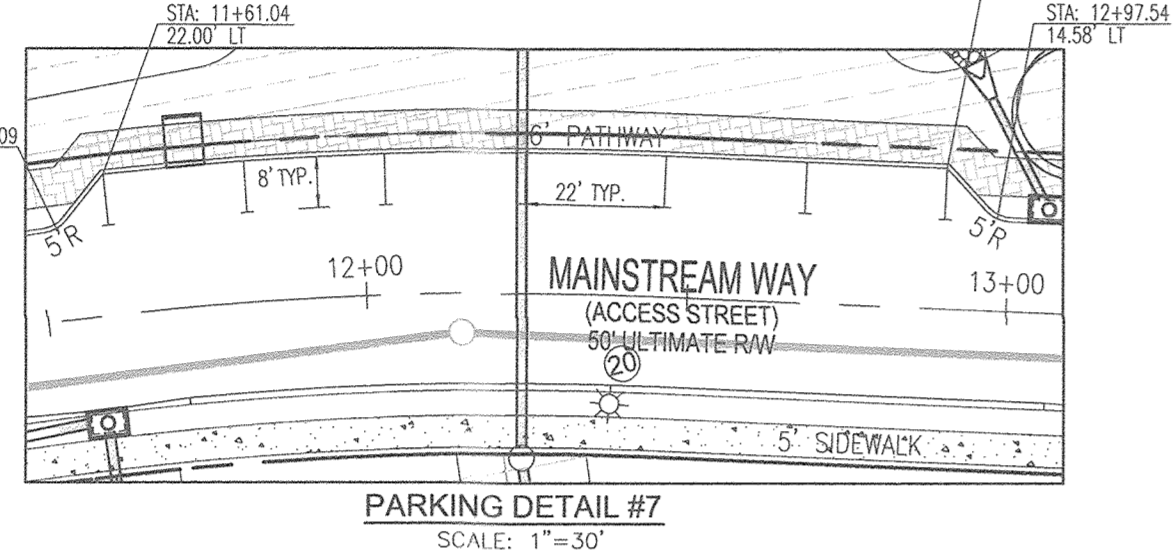




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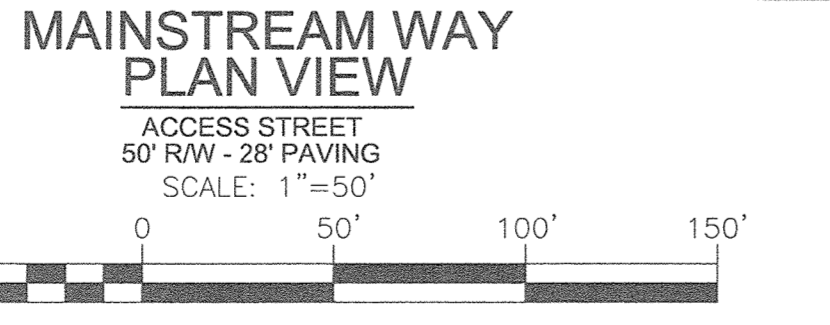
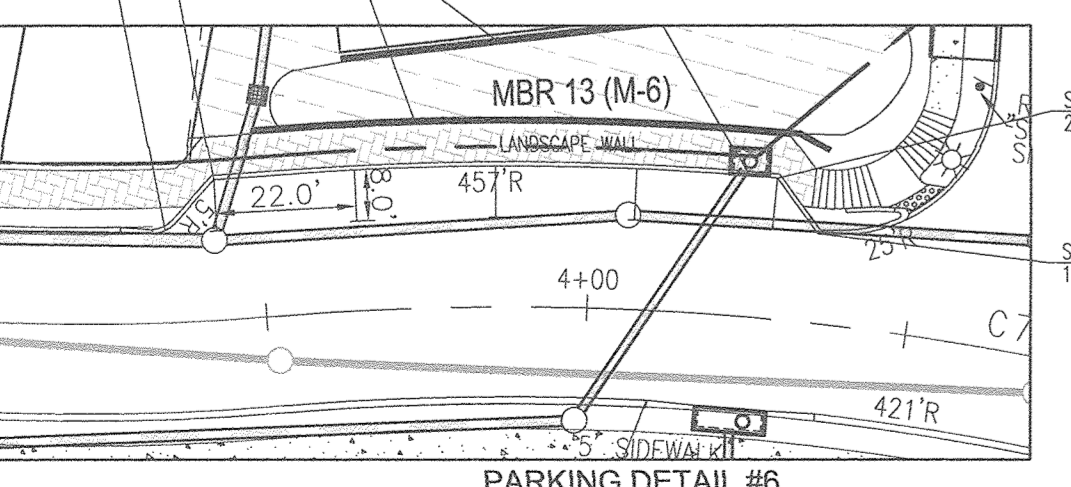
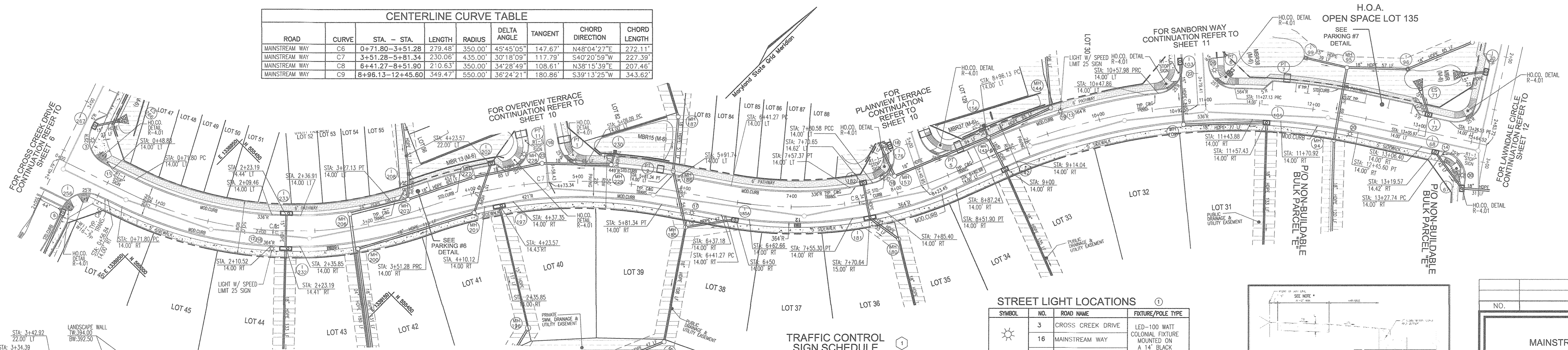
- EXISTING CURB AND GUTTER
- CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- STORM DRAIN
- STORM DRAIN INLET
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- 5' SIDEWALK
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- PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PUBLIC DRAINAGE & UTILITY EASEMENT
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- PRIVATE DRAINAGE & UTILITY EASEMENT
- STREET LIGHT
- STREET SIGN
- PUBLIC 10' TREE MAINTENANCE EASEMENT
- CENTRAL MAIL DELIVERY BOX (CBU)

- NOTES:**
- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
  - REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
  - FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
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  - SEE SHEET 8 FOR PAVING SECTION DETAILS.
  - REFER TO SHEET 11 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CBU) LOCATIONS. FINAL LOCATION SHALL BE AS DIRECTED BY THE U.S. POSTAL SERVICE.
  - HANDICAP RAMPS PER STANDARD DETAIL R-4.01.



**CENTERLINE CURVE TABLE**

ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
MAINSTREAM WAY	C6	D+71.80 - 3+51.28	279.48'	350.00'	45°45'05"	147.67'	N48°04'27"E	272.11'
MAINSTREAM WAY	C7	3+51.28 - 5+81.34	230.06'	435.00'	30°18'09"	117.79'	S40°20'59"W	227.39'
MAINSTREAM WAY	C8	6+41.27 - 8+51.90	210.63'	350.00'	34°28'49"	108.61'	N38°15'39"E	207.46'
MAINSTREAM WAY	C9	8+96.13 - 12+45.60	349.47'	550.00'	36°24'21"	180.86'	S39°13'25"W	343.62'

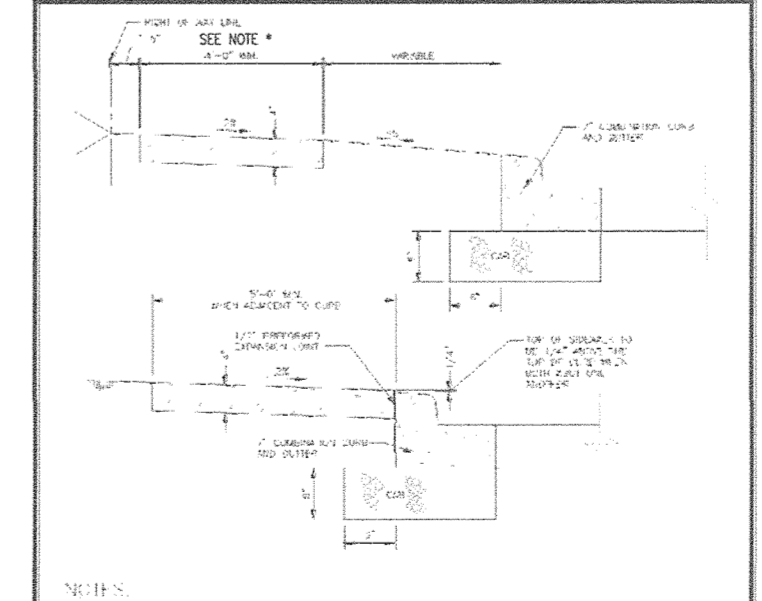


**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
6	CROSS CREEK DRIVE	W11-2 W16-7p
11	MAINSTREAM WAY	R1-1 STOP SIGN
12	MAINSTREAM WAY	R2-1 SPEED LIMIT 25" MOUNTED TO STREET LIGHT POLE
13	MAINSTREAM WAY	R2-2 SPEED LIMIT 25" MOUNTED TO STREET LIGHT POLE
14	MAINSTREAM WAY	R1-1 STOP SIGN
16	OVERVIEW TERRACE	R1-1 STOP SIGN
18	PLAINVIEW TERRACE	R1-1 STOP SIGN

**STREET LIGHT LOCATIONS**

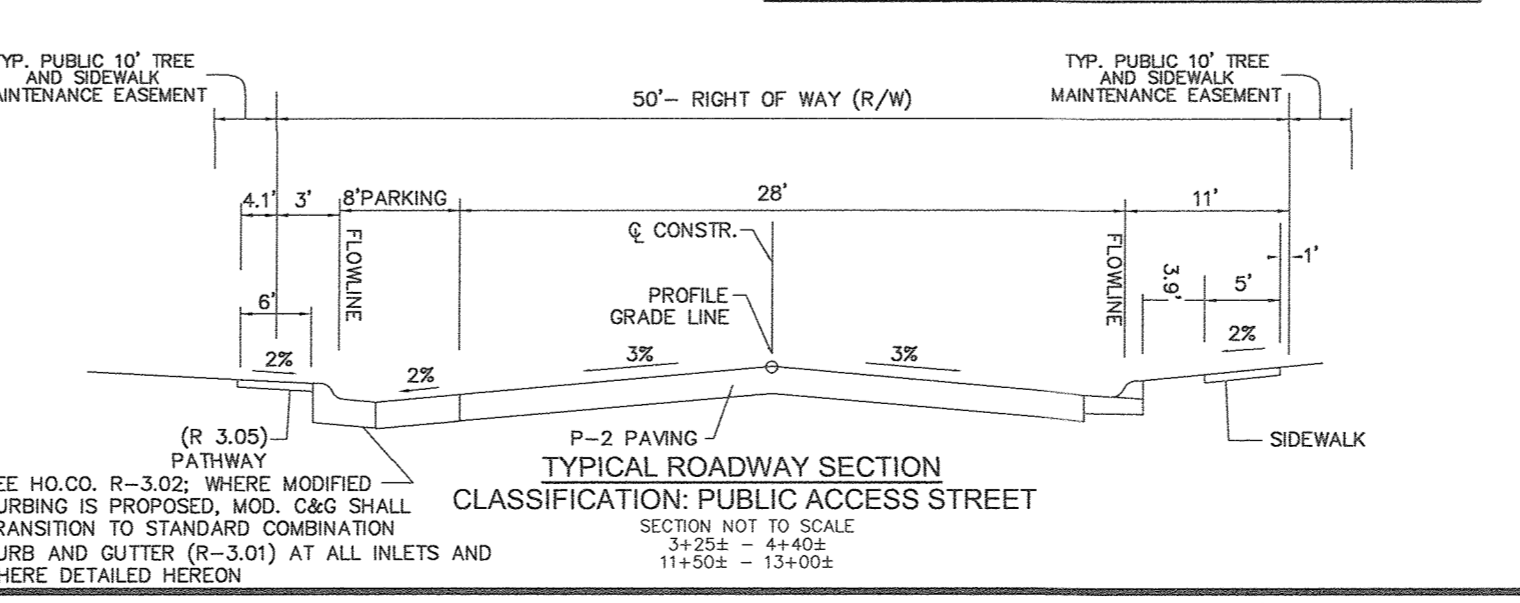
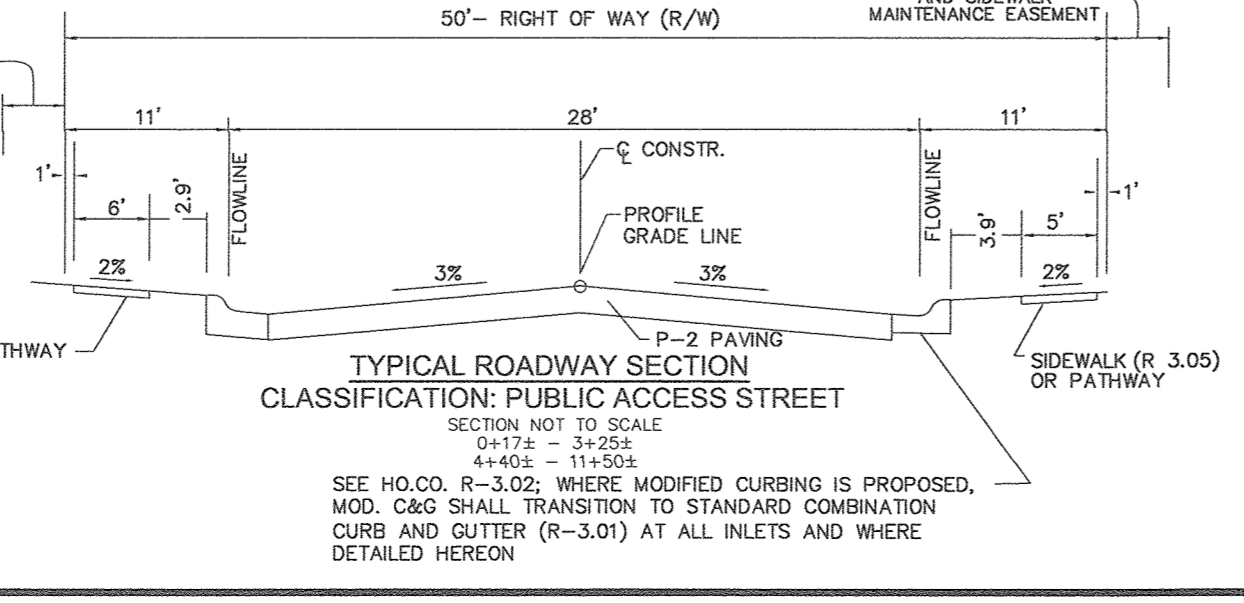
SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	3	CROSS CREEK DRIVE	LED-100 WAIT COLONIAL FIXTURE MOUNTED ON A 14" BLACK FIBERGLASS POLE
	16	MAINSTREAM WAY	
	17	MAINSTREAM WAY	
	18	MAINSTREAM WAY	
	19	MAINSTREAM WAY	
	20	MAINSTREAM WAY	
	23	OVERVIEW TERRACE	
	28	SANBORN WAY	
	30	LAWNDALE CIRCLE	



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.24.19



**NOTE:**  
 FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION, SEE SHEET 13.  
 FOR REINFORCED SIDEWALK LOCATION, SEE SHEET 14.

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CORP., LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 CRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 MAINSTREAM WAY - 0+00 - 13+64.55 - PLAN & PROFILE

**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRD 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

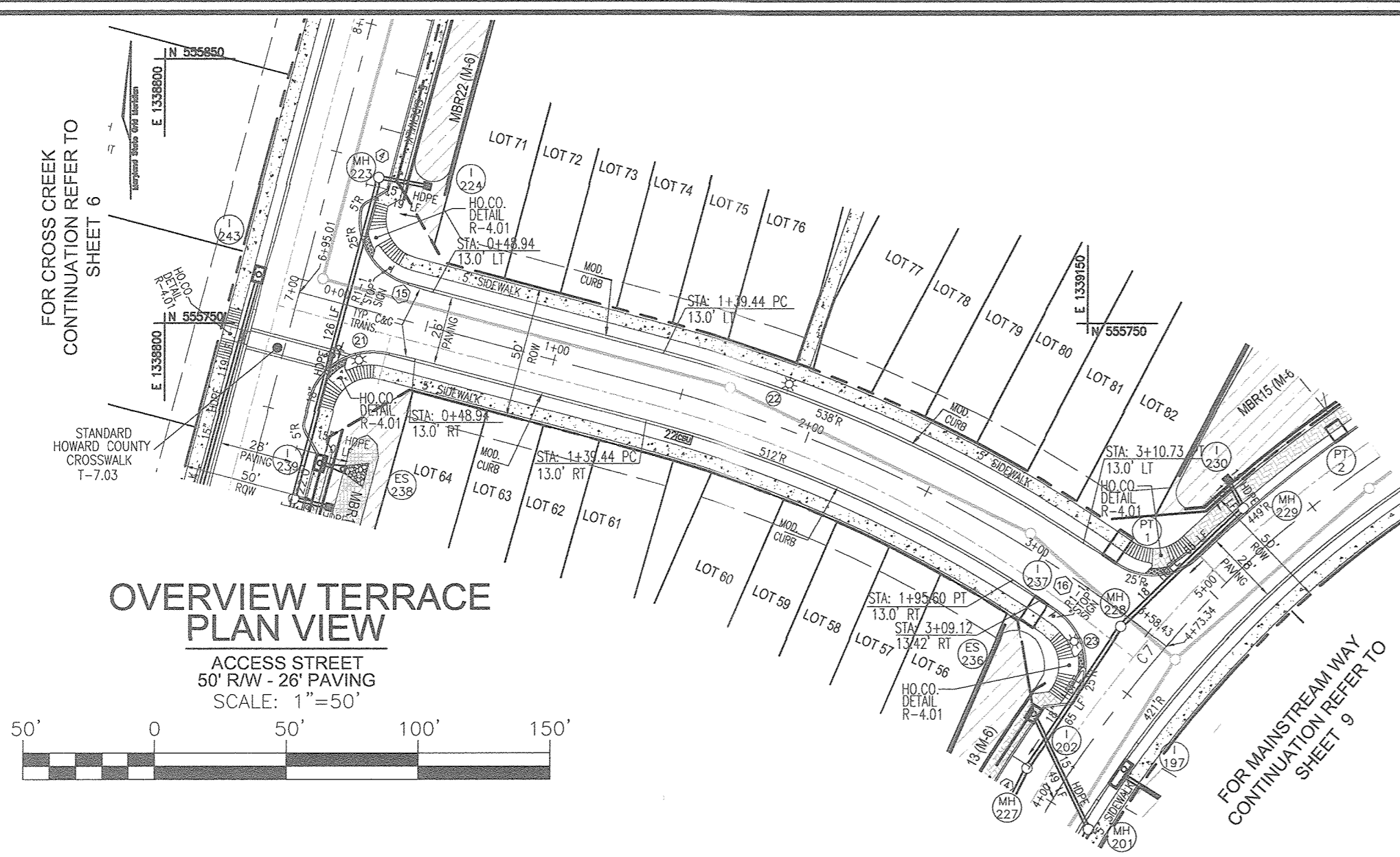
ZONED: CEF-R P/O PARCEL 145  
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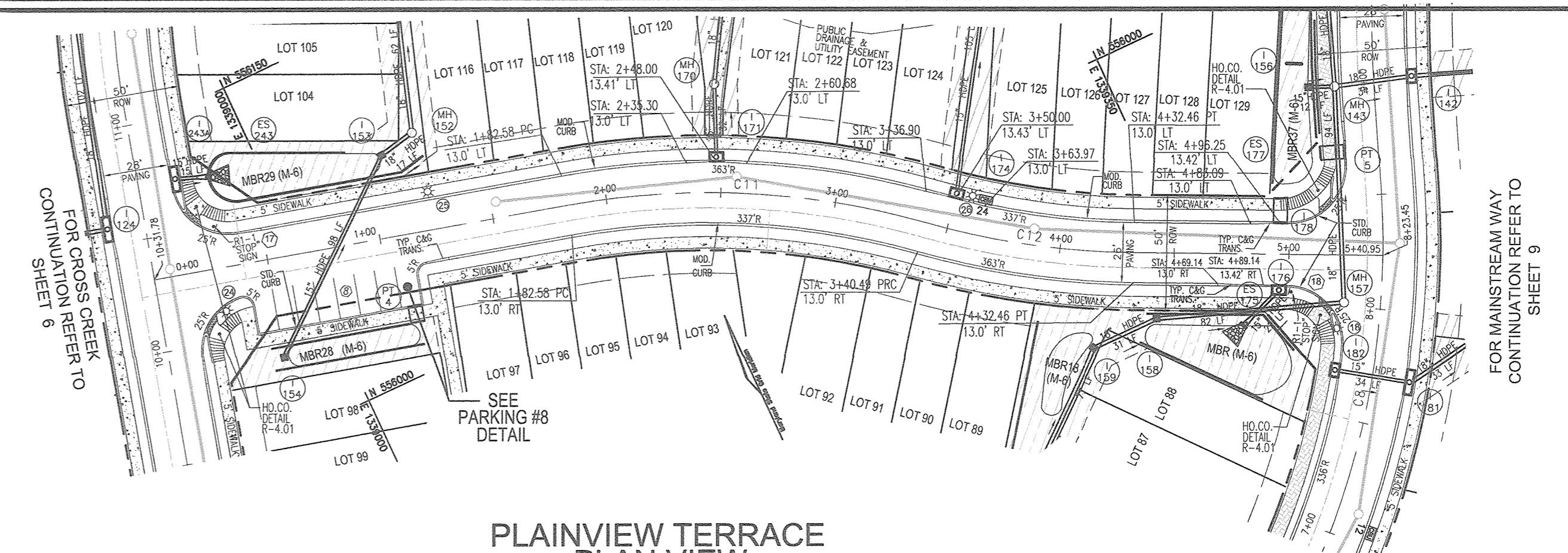
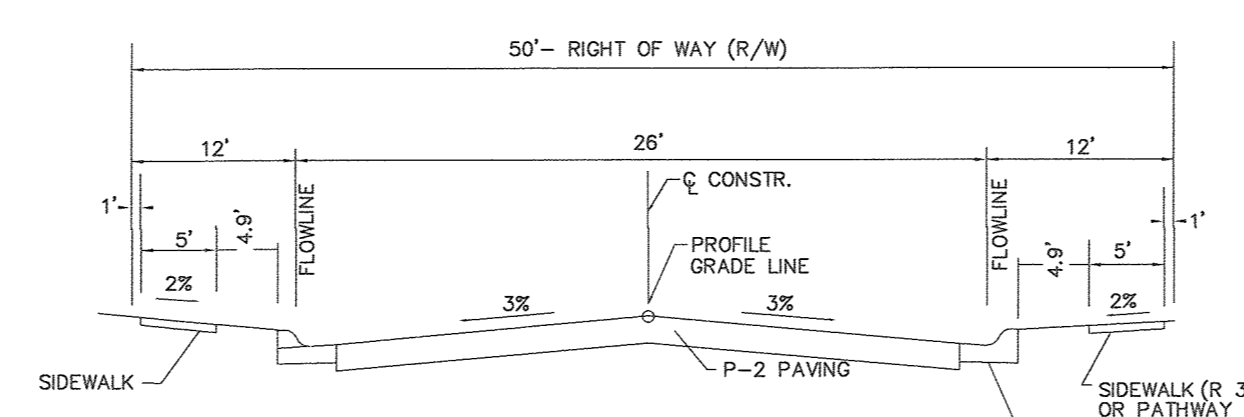
PROFESSIONAL CERTIFICATE  
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DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

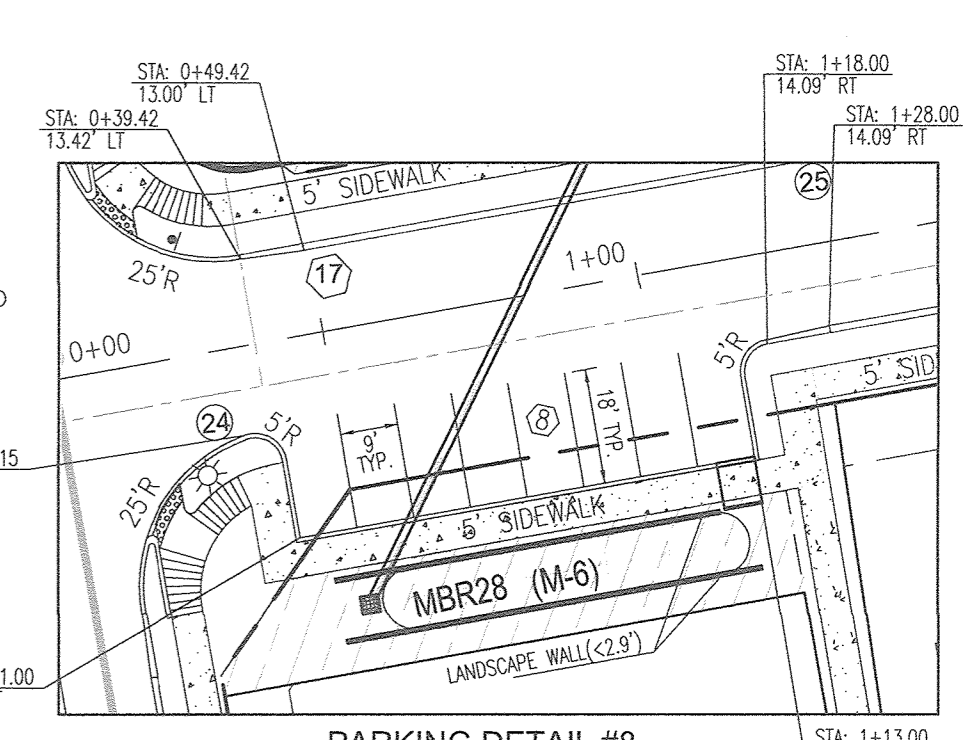
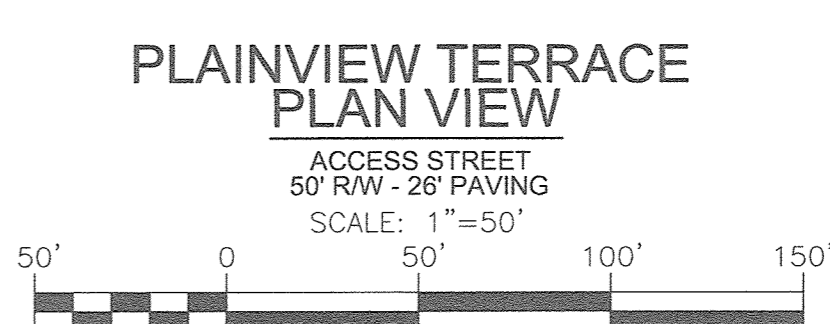
9 SHEET OF 74



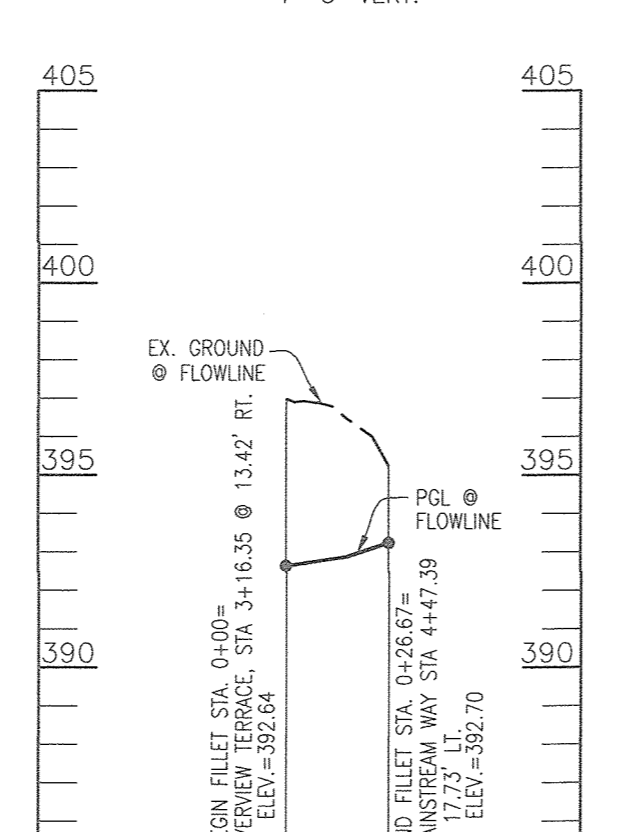
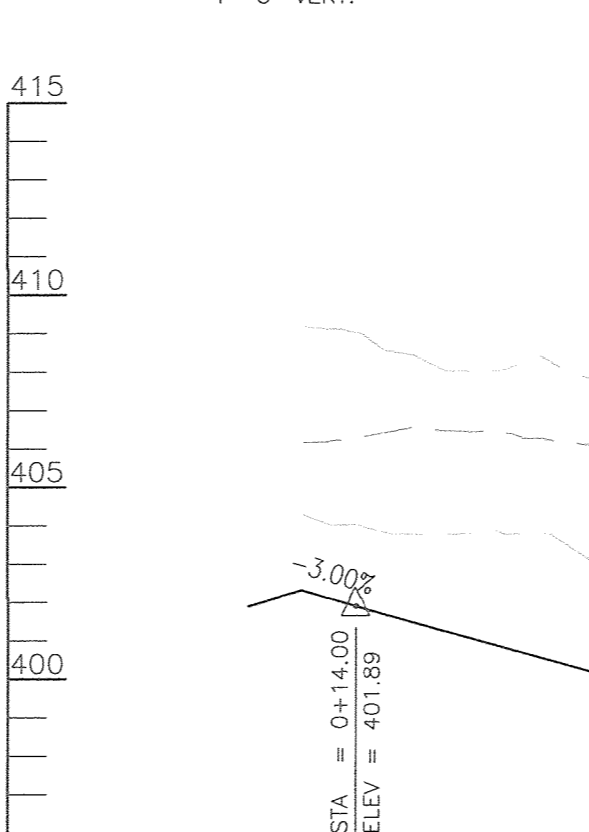
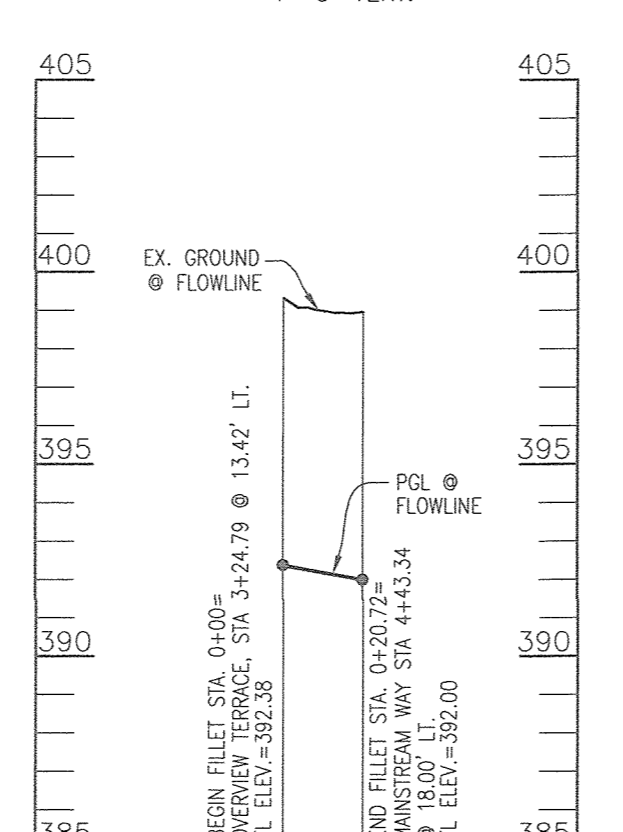
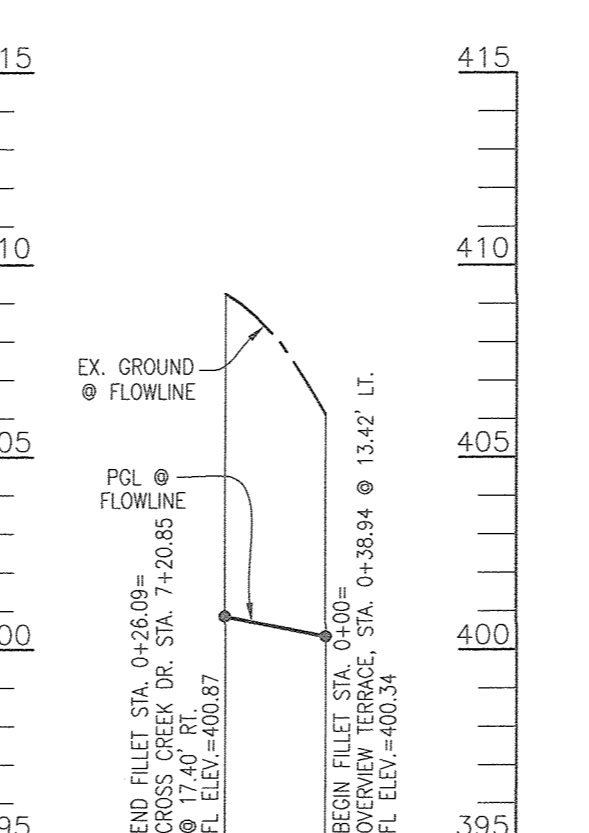
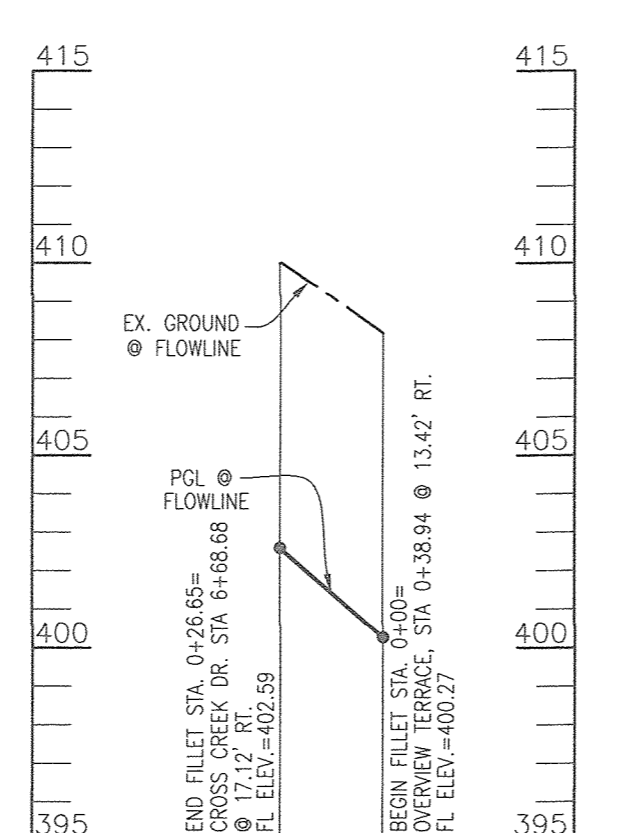
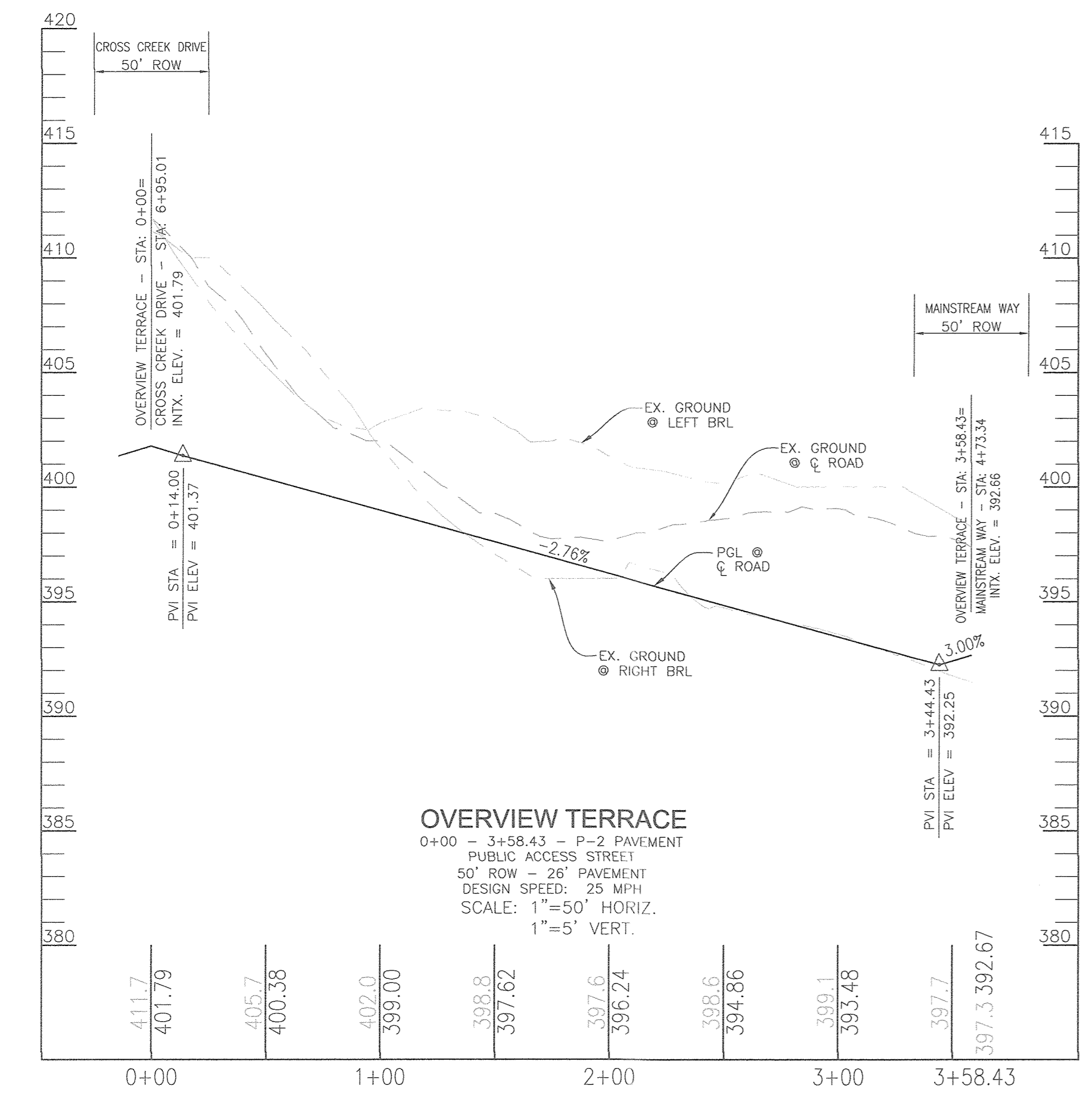
CENTERLINE CURVE TABLE							
ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	CHORD DIRECTION	CHORD LENGTH
OVERVIEW TERRACE		1+39.44 - 3+58.43	218.99'	525.00'	23°53'59"	S63°10'04"E	217.41'
PLAINVIEW TERRACE	C11	1+82.58 - 3+40.49	157.91'	350.00'	25°51'03"	N62°11'32"W	156.58'
PLAINVIEW TERRACE	C12	3+40.49 - 4+32.46	91.97'	350.00'	15°03'19"	S56°47'40"E	91.70'



TRAFFIC CONTROL SIGN SCHEDULE		
NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
15	OVERVIEW TERRACE	R1-1 STOP SIGN
16	OVERVIEW TERRACE	R1-1 STOP SIGN
17	PLAINVIEW TERRACE	R1-1 STOP SIGN
18	PLAINVIEW TERRACE	R1-1 STOP SIGN

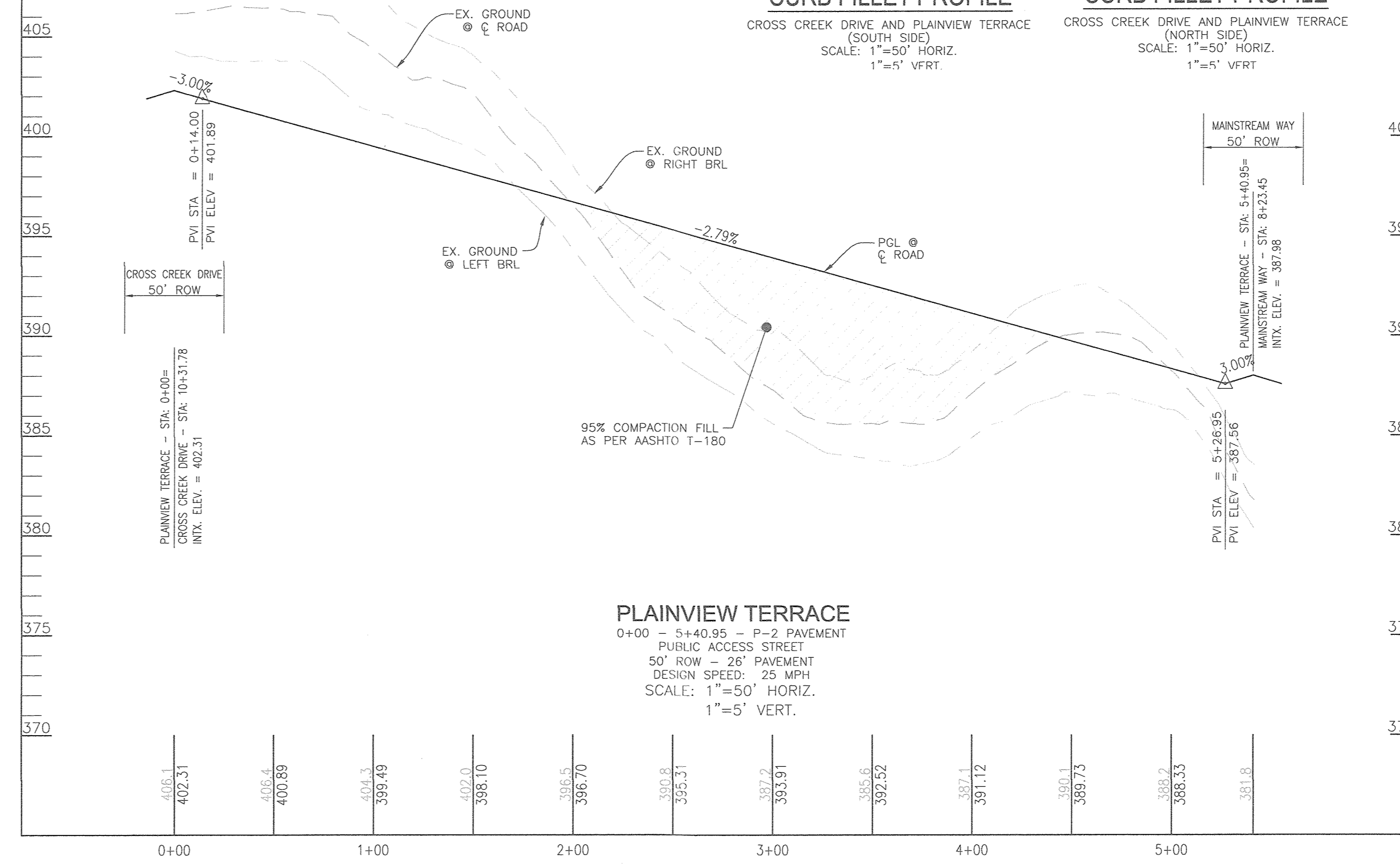
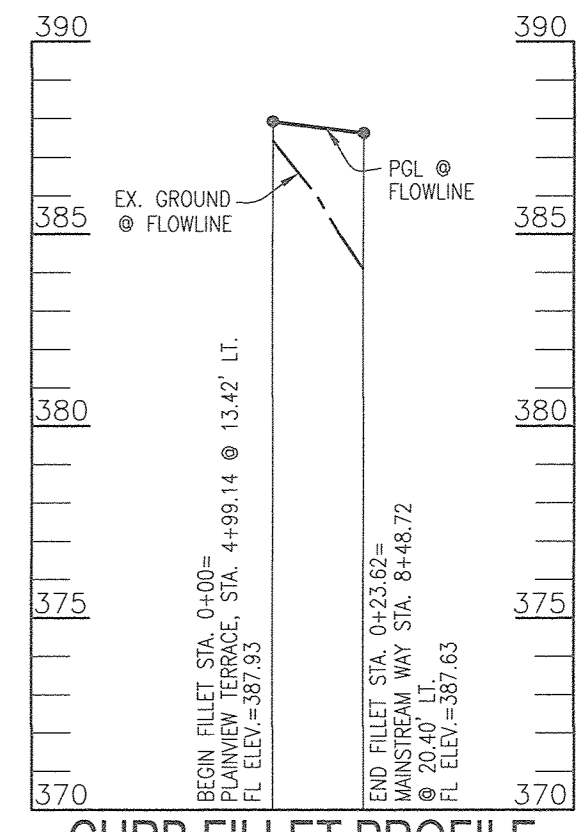
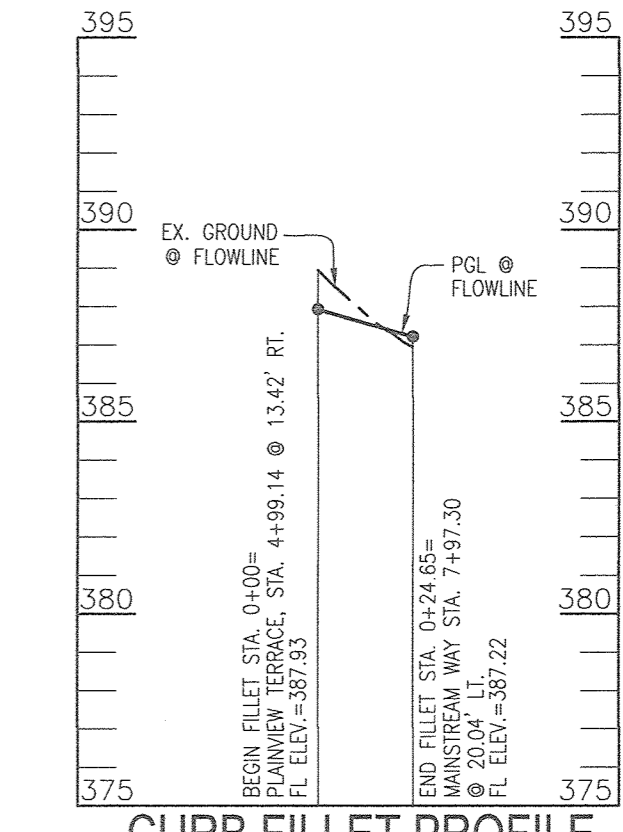
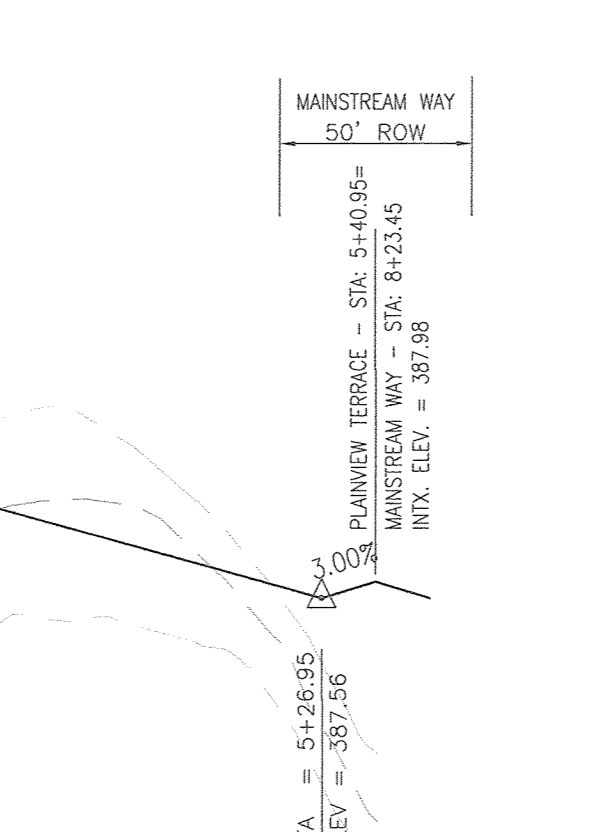
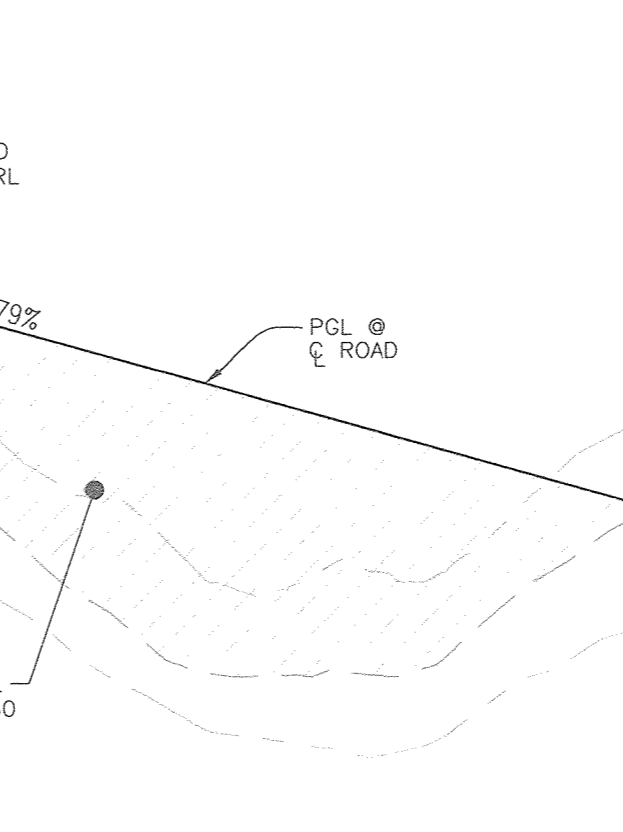
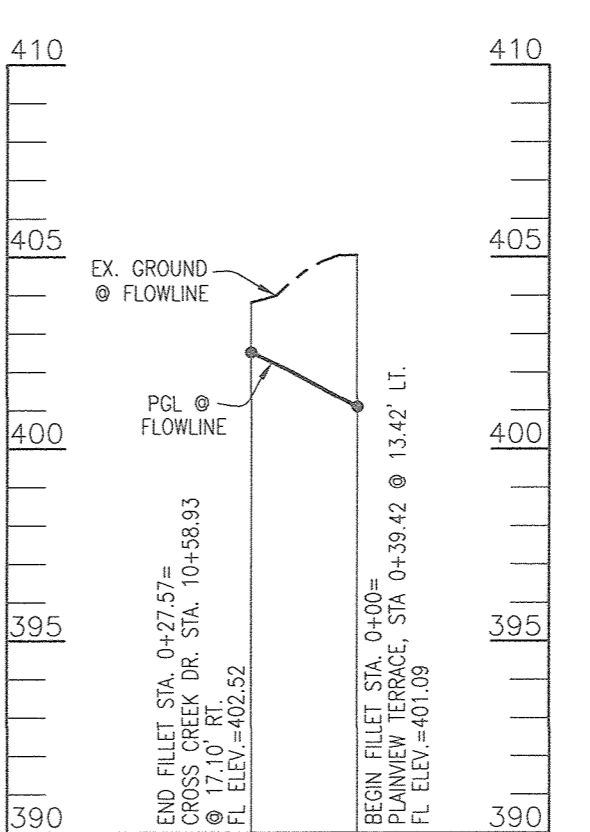
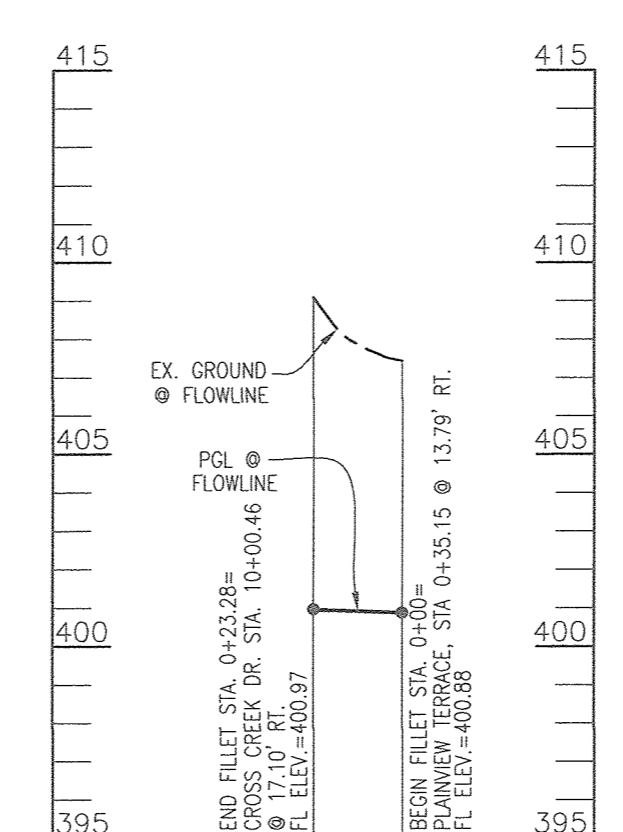


**NOTE:**  
FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION, SEE SHEET 13.



- LEGEND:**
- EXISTING CURB AND GUTTER
  - EXISTING UTILITY POLE
  - EXISTING LIGHT POLE
  - STORM DRAIN
  - STORM DRAIN INLET
  - EXISTING FENCE
  - PROPERTY LINE
  - RIGHT-OF-WAY LINE
  - 5' SIDEWALK
  - 6' NEIGHBORHOOD PATHWAY
  - PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
  - PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
  - STREET LIGHT
  - STREET SIGN
  - PUBLIC 10' TREE MAINTENANCE EASEMENT
  - CENTRAL MAIL DELIVERY BOX (CMB)

STREET LIGHT LOCATIONS			
SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	18	MAINSTREAM WAY	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	21	OVERVIEW TERRACE	
☀	22	OVERVIEW TERRACE	
☀	26	OVERVIEW TERRACE	
☀	24	PLAINVIEW TERRACE	
☀	25	PLAINVIEW TERRACE	
☀	26	PLAINVIEW TERRACE	



- NOTES:**
- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
  - REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
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APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
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OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
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 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

**FINAL ROAD CONSTRUCTION PLAN**  
 OVERVIEW TERRACE - 0+00 - 3+58.43 - PLAN & PROFILE  
 PLAINVIEW TERRACE - 0+00 - 5+40.95 - PLAN & PROFILE  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
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 PLATS 23334-4-23337

TAX MAP 35 GRID 21  
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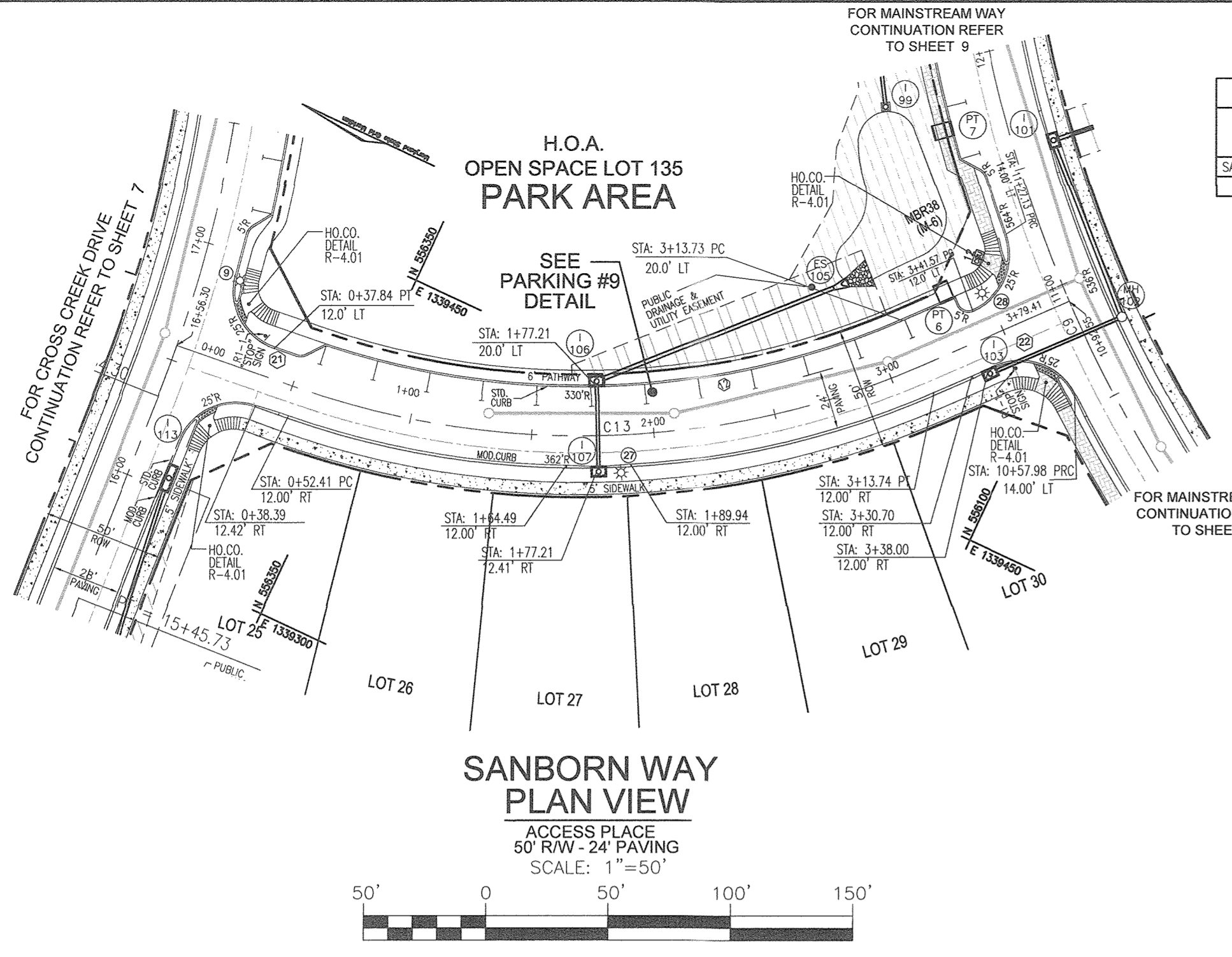
**ROBERT H. VOGEL ENGINEERING, INC.**  
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DESIGN BY: VE+TG  
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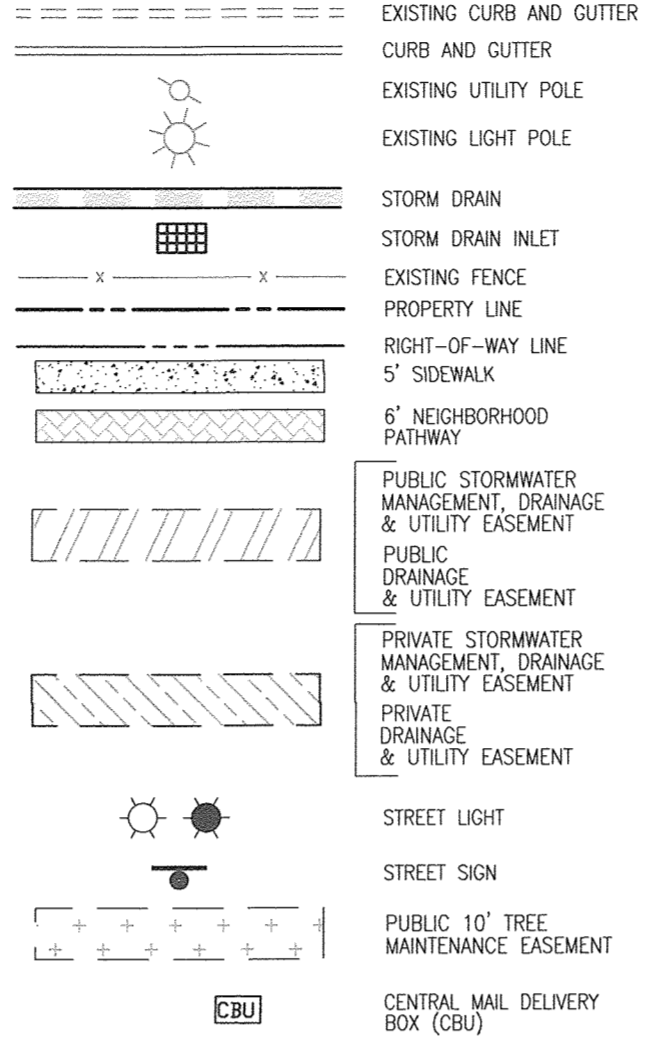
ROBERT H. VOGEL, PE No. 16193

10 SHEET OF 74

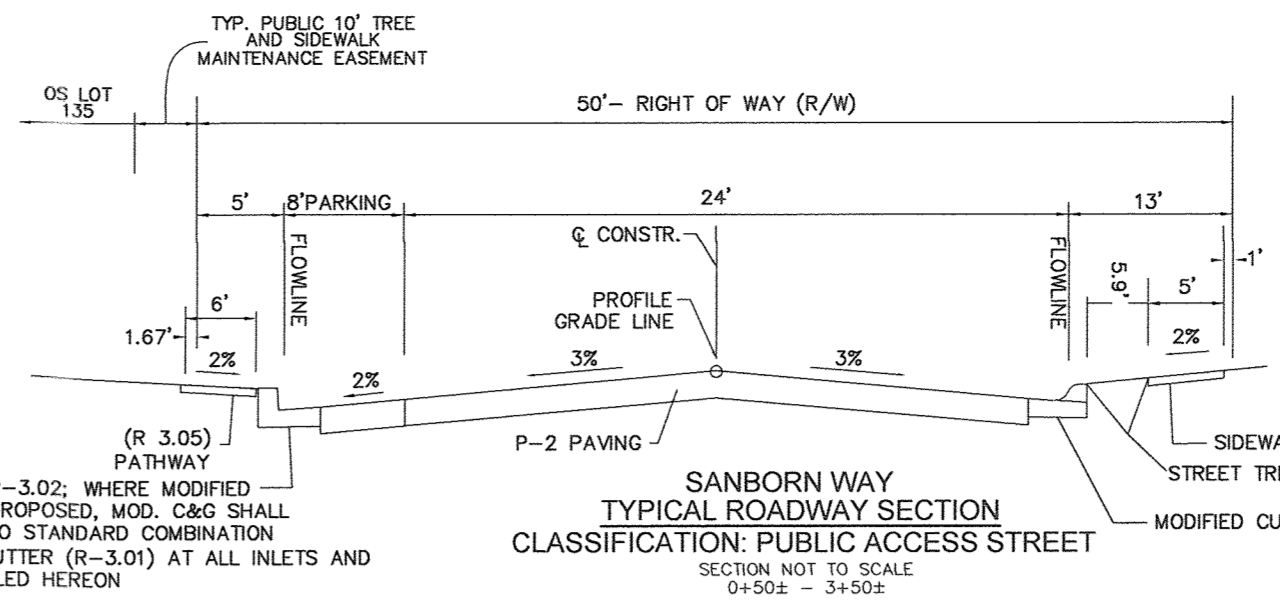


CENTERLINE CURVE TABLE								
ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
SANBORN WAY	C13	0+52.41-3+13.74	261.33'	350.00'	42°46'49"	137.09'	S27°07'36"E	255.30'

**LEGEND:**



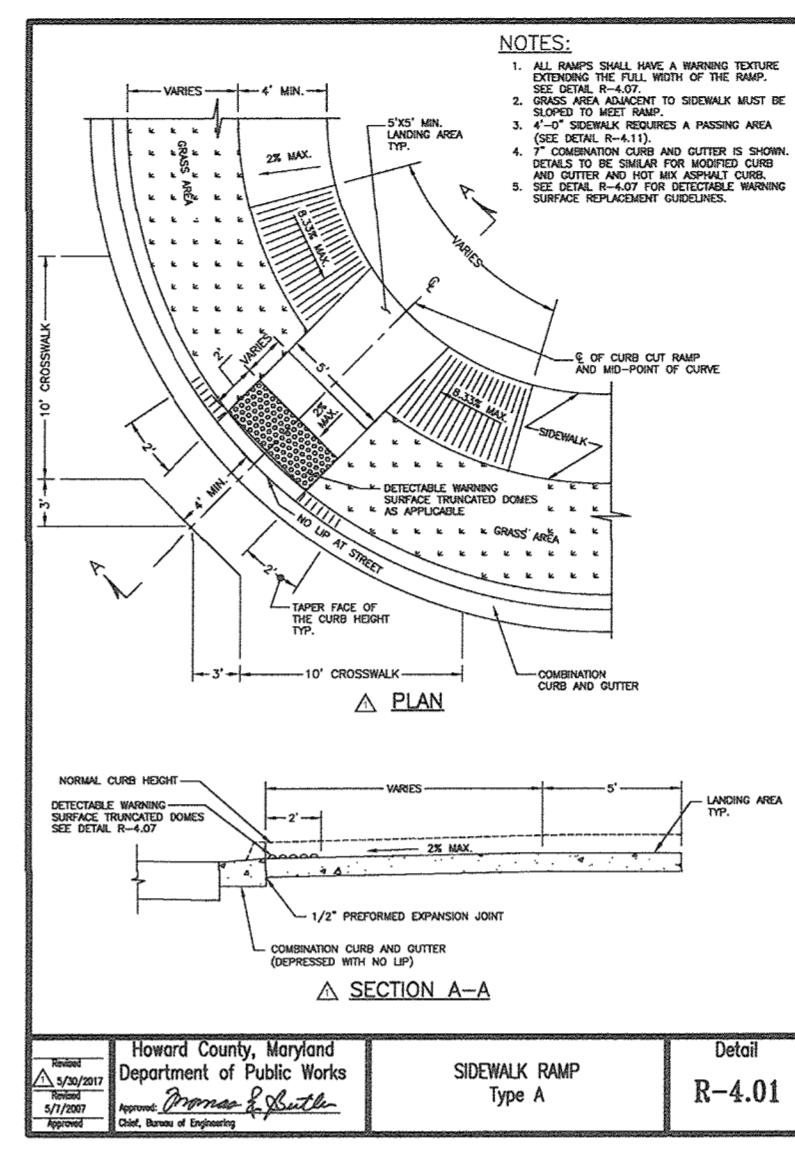
**NOTE:**  
FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION, SEE SHEET 13.  
FOR REINFORCED SIDEWALK LOCATION, SEE SHEET 14.



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SALSBUURY INDUSTRIES MANUFACTURES CBU'S THAT ARE OFFICIALLY LICENSED BY THE U.S.P.S. SALSBUURY 3300 SERIES CLUSTER BOX UNITS ARE MANUFACTURED TO U.S.P.S. "F" SPECIFICATIONS. THEY ARE AN OFFICIALLY LICENSED PRODUCT OF THE U.S. POSTAL SERVICE FOR CENTRALIZED MAIL DELIVERY. LICENSE NUMBER 10DSEQ-08-B-0026



**CBU BOX LOCATIONS:** SUBJECT TO CHANGE

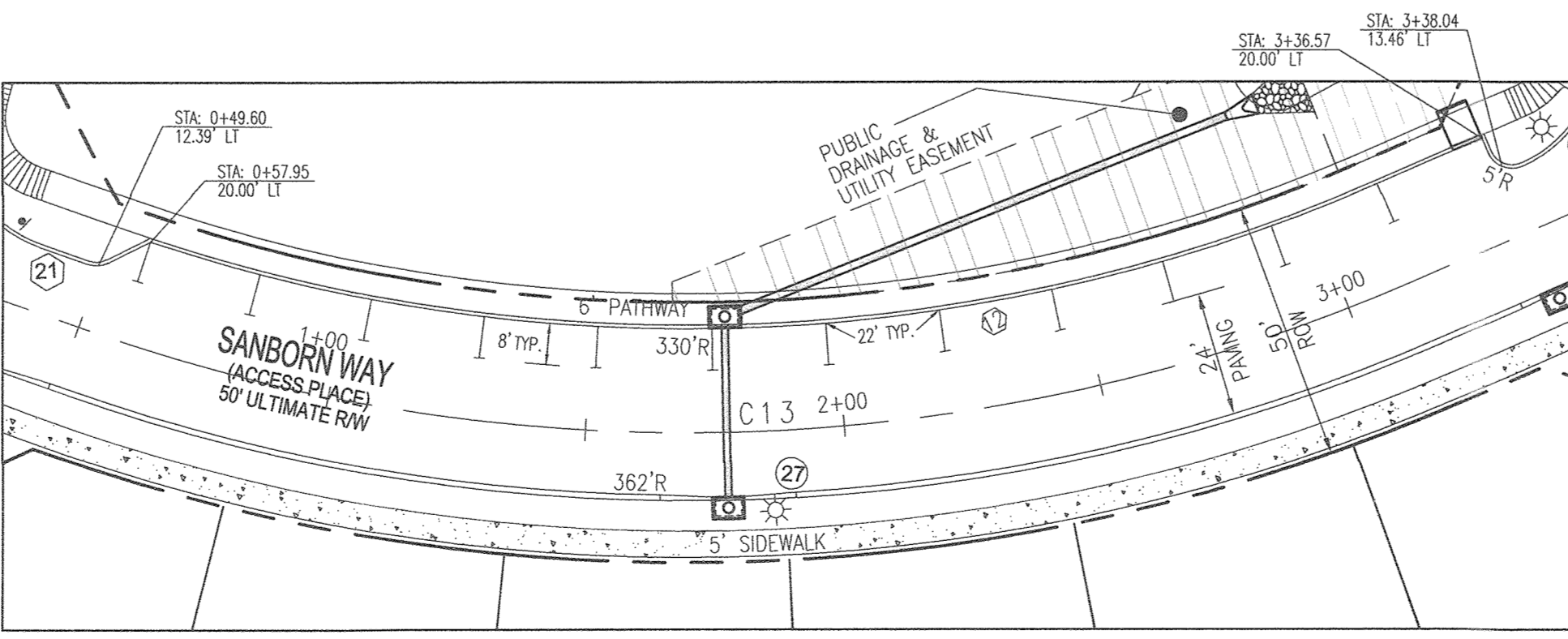
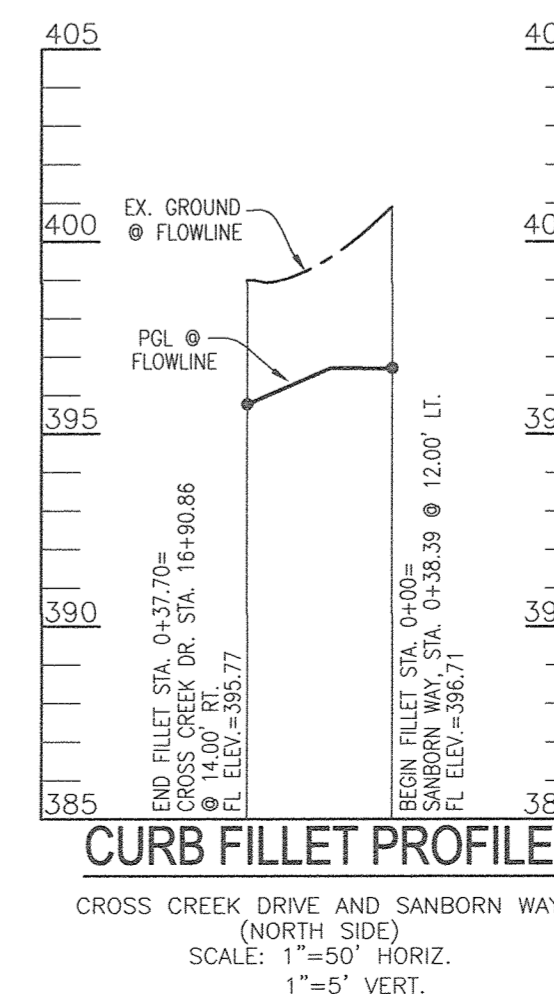
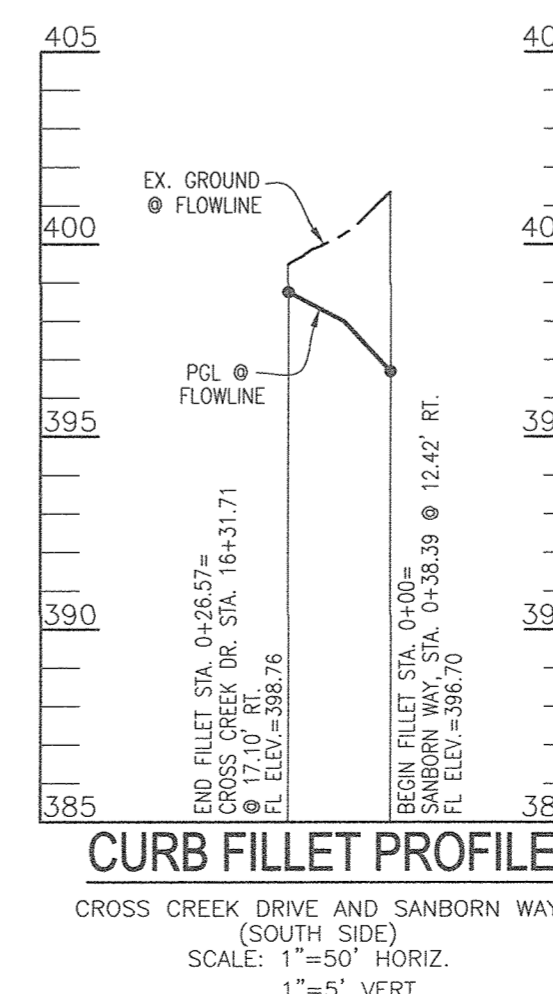
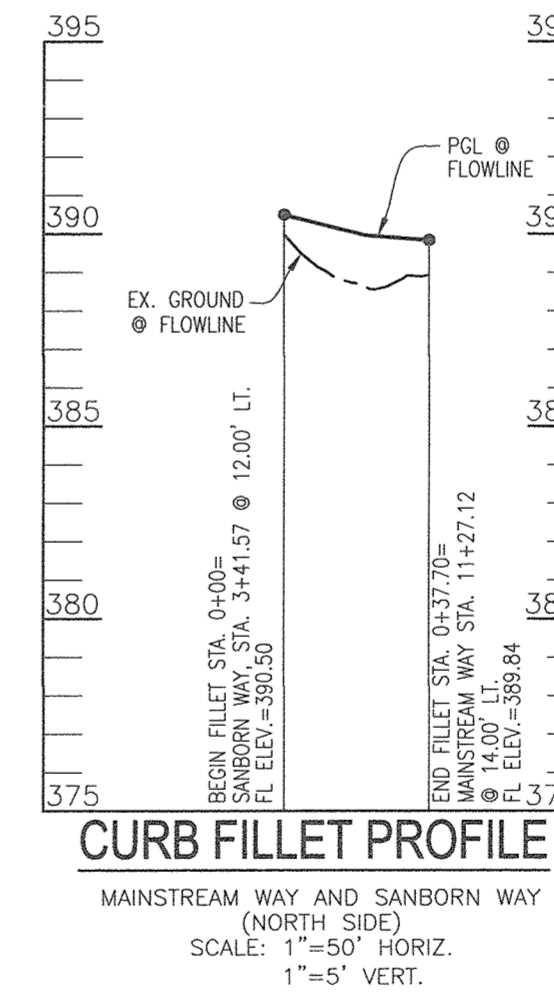
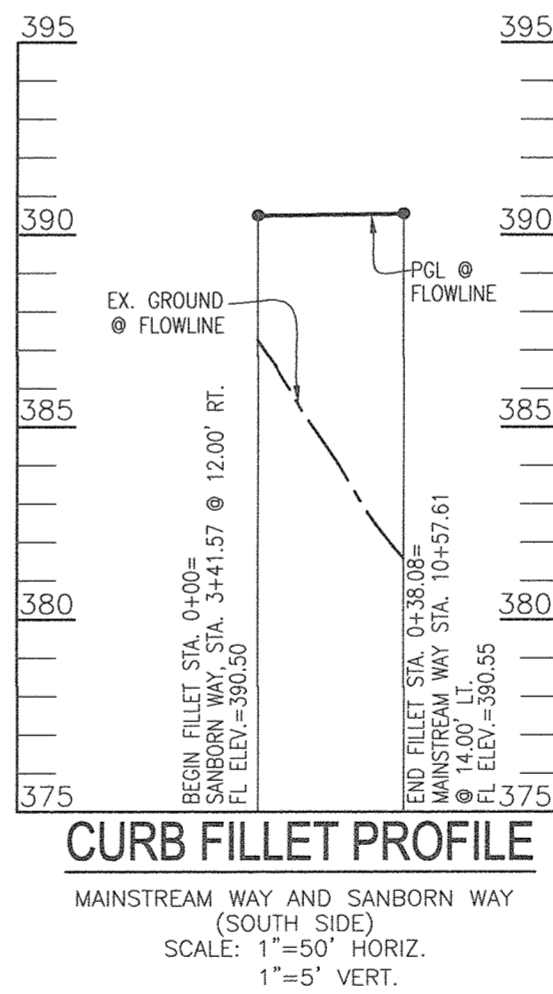
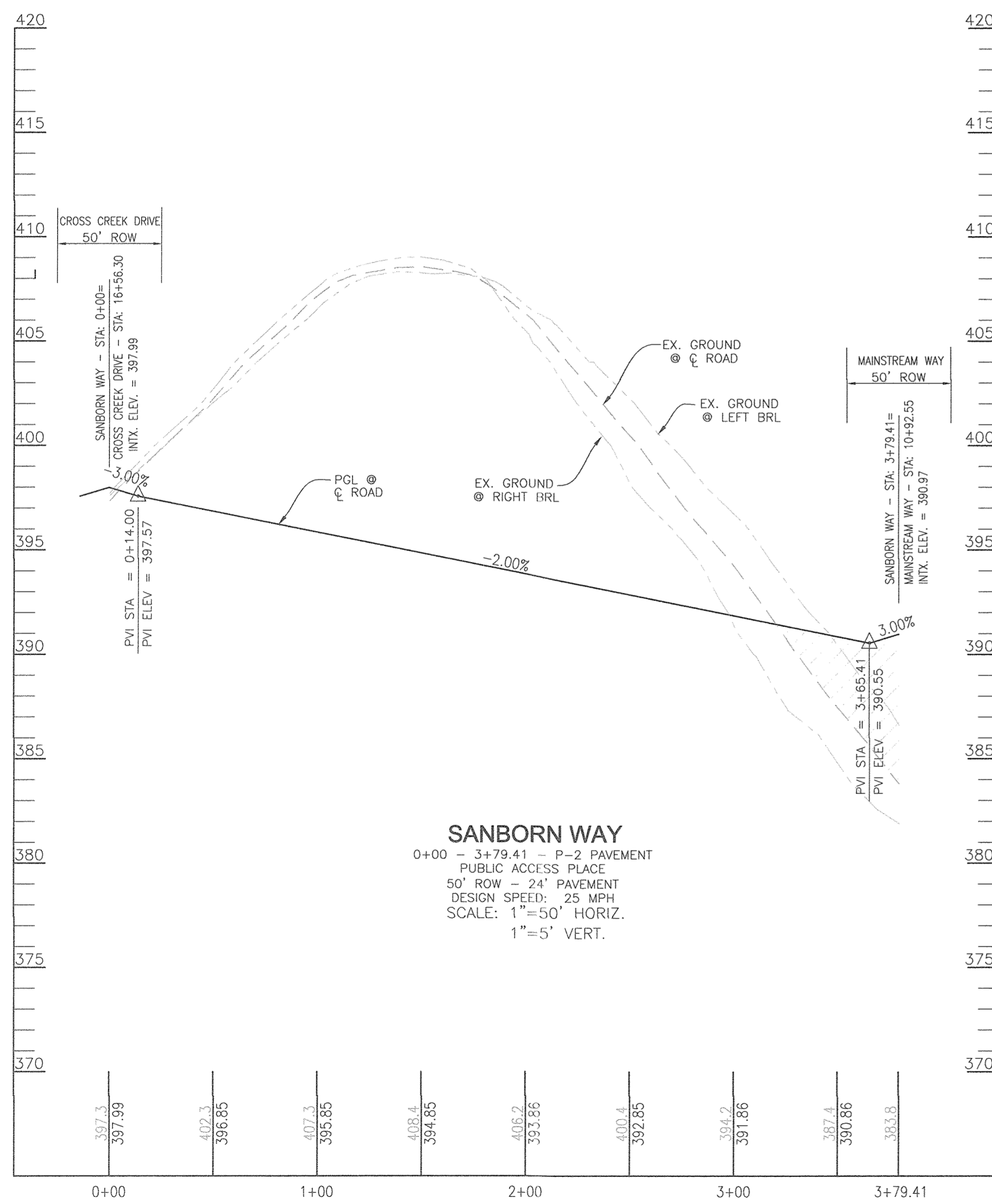
- CROSS CREEK DRIVE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR LOT 4 TO SERVE LOTS 1 - 6, 65-70.
- CROSS CREEK DRIVE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR THE SE CORNER OF OPEN SPACE LOT 135 TO SERVE LOTS 25 - 30 & 31 - 33.
- CROSS CREEK DRIVE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR LOT 22 TO SERVE LOTS 17 - 24.
- CROSS CREEK DRIVE/LAWDALE CIRCLE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR THE N CORNER OF OPEN SPACE LOT 135 TO SERVE FUTURE LOTS 144 - 147 & 182 - 184 & 196.
- CROSS CREEK DRIVE/LAWDALE CIRCLE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR THE W CORNER OF OPEN SPACE LOT 134 TO SERVE FUTURE LOTS 148 - 152 & 164 - 166 193 - 195.
- CROSS CREEK DRIVE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOT 157 TO SERVE FUTURE LOTS 153 - 163.
- OVERVIEW TERRACE - ONE 22 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR LOT 60 TO SERVE LOTS 56 - 64 & 71 - 82.
- PLAINVIEW TERRACE - ONE 24 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR LOT 125 TO SERVE LOTS 89 - 97 & 116 - 129.
- MAINSTREAM WAY/SANBORN WAY - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR THE SE CORNER OF OPEN SPACE LOT 135 TO SERVE LOTS 25 - 30 & 31 - 33.
- MAINSTREAM WAY - ONE 16 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR LOT 43 TO SERVE LOTS 40 - 55.
- MAINSTREAM WAY - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR THE SE CORNER OF OPEN SPACE LOT 135 TO SERVE LOTS 34 - 39 & 83 - 88.
- LAWDALE CIRCLE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOT 187 TO SERVE FUTURE LOTS 185 - 188 & 175 - 181.
- LAWDALE CIRCLE - ONE 12 UNIT "CLUSTER BOX UNIT" HAS BEEN PLACED NEAR FUTURE LOT 190 TO SERVE FUTURE LOTS 189 - 192 & 167 - 174.

**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	9	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
☀	27	SANBORN WAY	
☀	28	SANBORN WAY	

**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
21	SANBORN WAY	R1-1 STOP SIGN
22	SANBORN WAY	R1-1 STOP SIGN



**PARKING DETAIL NOTE:**  
-ALL PARKING MARKINGS SHALL BE INSTALLED WITH 5" WHITE PREFORMED HEAT APPLIED THERMOPLASTIC OR LIQUID THERMOPLASTIC.  
-ALL PARKING LANES SHALL HAVE A 2 FT "TEE" AT TOP / EDGE TRAVEL LANE.

- NOTES:**
- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES.
  - REFER TO SHEET 43 FOR STORMDRAIN STRUCTURE SCHEDULE.
  - FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
  - ALL STREET TREES AND/OR SIGN SHALL BE LOCATED 5' MIN. FROM PROPOSED DRAINAGE, UTILITY STRUCTURE.
  - THERE SHOULD BE A MINIMUM OF 20' BETWEEN STREET LIGHTS AND STREET TREES.
  - IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN, THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
  - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - SEE SHEET 8 FOR PAVING SECTION DETAILS.
  - HANDICAP RAMPS PER STANDARD DETAIL R-4.01.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OWMS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 SANBORN WAY - 0+00 - 3+79.41 - PLAN & PROFILE  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRADE TECH PARK PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

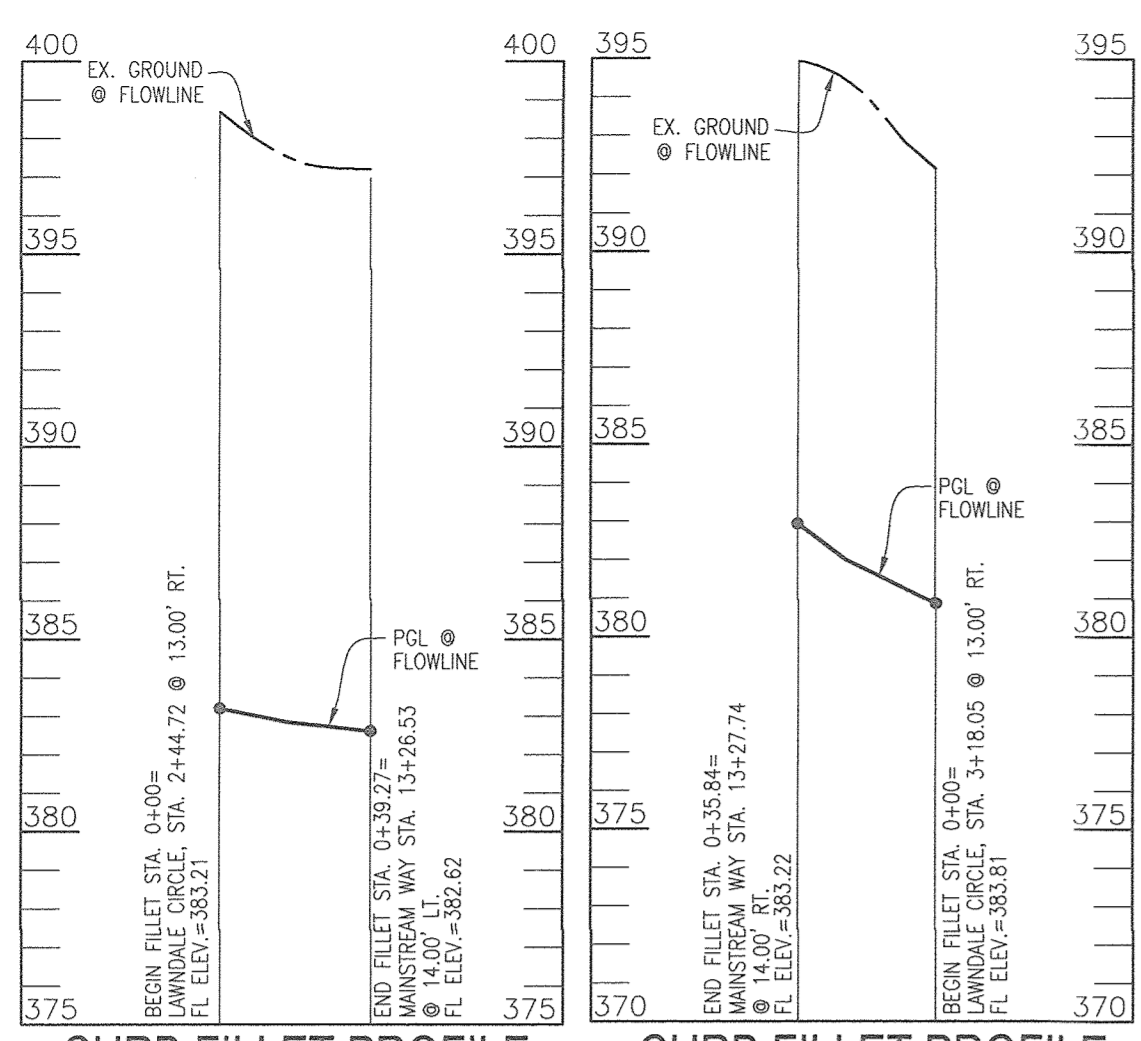
**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

PROFESSIONAL CERTIFICATE

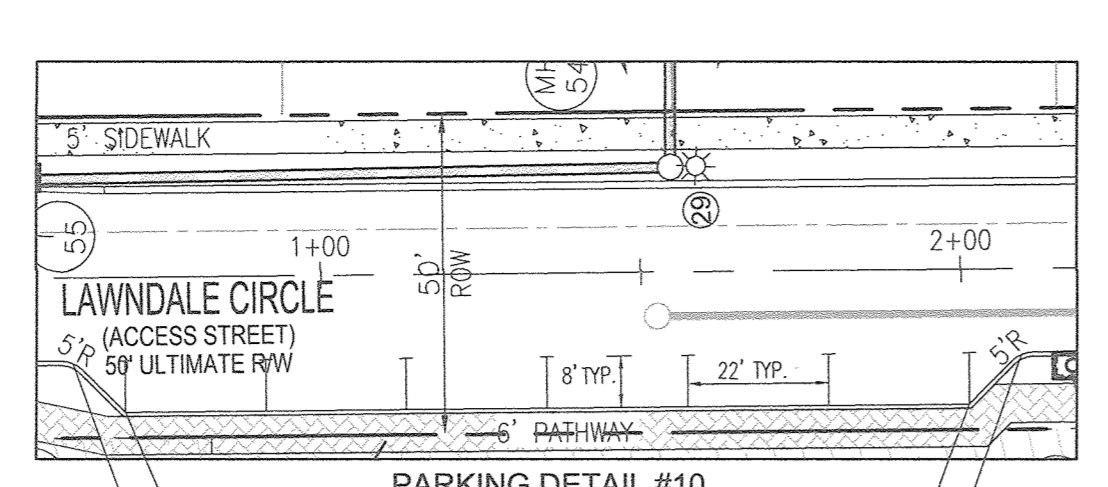
11 SHEET OF 74



**CURB FILLET PROFILE**  
MAINSTREAM WAY AND LAWNDALE CIRCLE (WEST SIDE)  
SCALE: 1"=50' HORIZ. 1"=5' VERT.

**CURB FILLET PROFILE**  
MAINSTREAM WAY AND LAWNDALE CIRCLE (EAST SIDE)  
SCALE: 1"=50' HORIZ. 1"=5' VERT.

**NOTE:**  
FOR CROSS CREEK DRIVE / LAWNDALE CIRCLE FILLET PROFILES REFER TO SHEET 7



**PARKING DETAIL #10**  
SCALE: 1"=30'

**PARKING DETAIL NOTE:**  
-ALL PARKING MARKINGS SHALL BE INSTALLED WITH 5" WHITE PREFORMED HEAT APPLIED THERMOPLASTIC OR LIQUID THERMOPLASTIC.  
-ALL PARKING LINES SHALL HAVE A 2 FT "TEE" AT TOP / EDGE TRAVEL LANE.

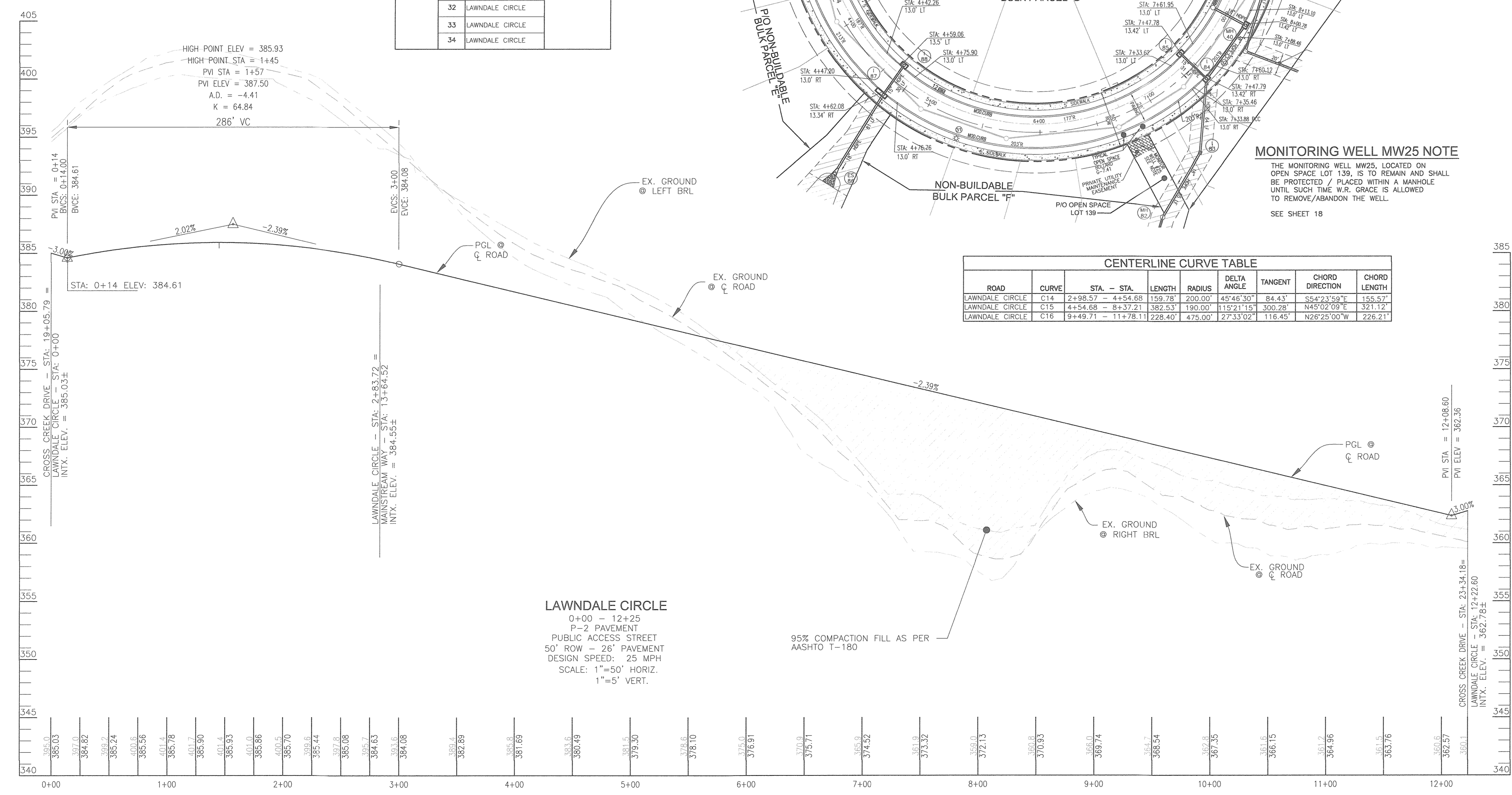
**NOTE:**  
FOR STREET LIGHT AND TRAFFIC SIGNAGE LOCATION, SEE SHEET 13.

**STREET LIGHT LOCATIONS**

SYMBOL	NO.	ROAD NAME	FIXTURE/POLE TYPE
☀	10	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	11	CROSS CREEK DRIVE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	29	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	30	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	31	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	32	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	33	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE
	34	LAWNDALE CIRCLE	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE

**TRAFFIC CONTROL SIGN SCHEDULE**

NO.	ROAD NAME	SIGN TYPE / DESCRIPTION
14	MAINSTREAM WAY	R1-1 STOP SIGN
19	LAWNDALE CIRCLE	R1-1 STOP SIGN
20	LAWNDALE CIRCLE	R1-1 STOP SIGN



**CENTERLINE CURVE TABLE**

ROAD	CURVE	STA. - STA.	LENGTH	RADIUS	DELTA ANGLE	TANGENT	CHORD DIRECTION	CHORD LENGTH
LAWNDALE CIRCLE	C14	2+98.57 - 4+54.68	159.78'	200.00'	45°46'30"	84.43'	S54°23'59"E	155.57'
LAWNDALE CIRCLE	C15	4+54.68 - 8+37.21	382.53'	190.00'	115°21'15"	300.28'	N45°02'09"E	321.12'
LAWNDALE CIRCLE	C16	9+49.71 - 11+76.11	228.40'	475.00'	27°33'02"	116.45'	N26°25'00"W	226.21'

**LAWNDALE CIRCLE**  
0+00 - 12+25  
P-2 PAVEMENT  
PUBLIC ACCESS STREET  
50' ROW - 26' PAVEMENT  
DESIGN SPEED: 25 MPH  
SCALE: 1"=50' HORIZ. 1"=5' VERT.

95% COMPACTION FILL AS PER AASHTO T-180

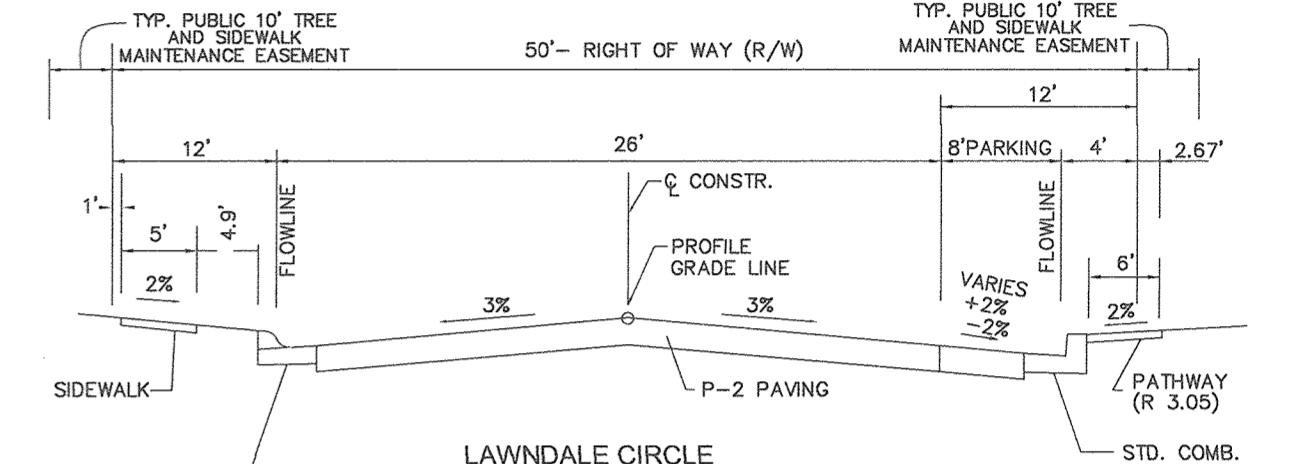
**MONITORING WELL MW25 NOTE**  
THE MONITORING WELL MW25, LOCATED ON OPEN SPACE LOT 139, IS TO REMAIN AND SHALL BE PROTECTED / PLACED WITHIN A MANHOLE UNTIL SUCH TIME W.R. GRACE IS ALLOWED TO REMOVE/ABANDON THE WELL.  
SEE SHEET 18

**LAWNDALE CIRCLE PARKING RESTRICTION:**  
PARKING RESTRICTIONS ALONG THE INSIDE CURVE ON LAWNDALE CIRCLE SHALL BE DEFINED BY THE HOWARD COUNTY TRAFFIC DIVISION (410-313-2430)

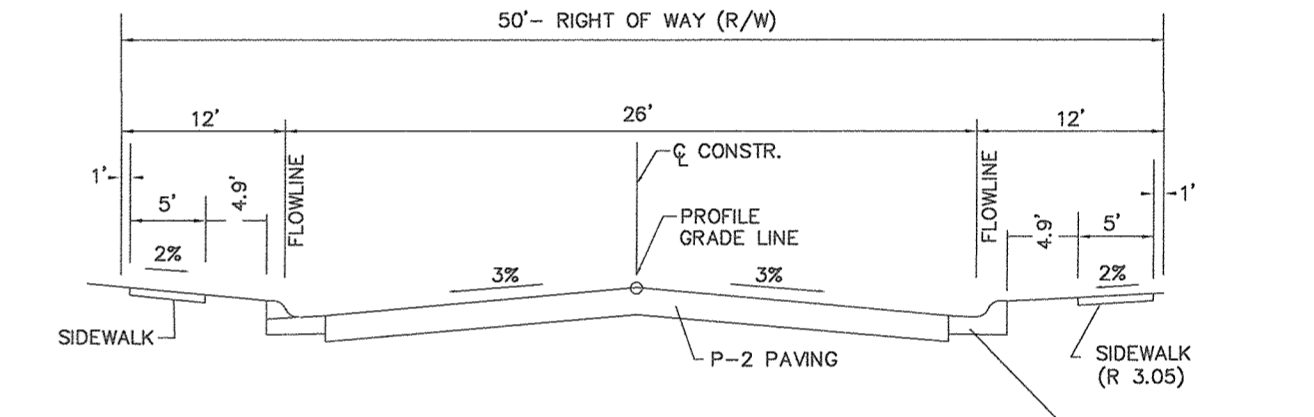
- NOTES:**
- REFER TO SHEETS 35 TO 42 FOR STORMDRAIN PROFILES. REFER TO SHEET 43 FOR STORMDRAIN SCHEDULE.
  - FOR STREET TREE LOCATIONS, REFER TO SHEETS 44-48.
  - ALL STREET TREES AND/OR SIGN SHALL BE LOCATED 5' MIN. FROM PROPOSED DRAINAGE UTILITY STRUCTURE.
  - THERE SHOULD BE A MINIMUM OF 20' BETWEEN STREET LIGHTS AND STREET TREES.
  - IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:
    - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
    - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - SEE SHEET 8 FOR PAVING SECTION DETAILS.
  - REFER TO SHEET 11 FOR PROPOSED CENTRAL MAIL DELIVERY BOX (CBU) LOCATIONS. FINAL LOCATION SHALL BE AS DIRECTED BY THE US POSTAL SERVICE.
  - HANDICAP RAMPS PER STANDARD DETAIL R-4.01.

**LEGEND:**

- EXISTING CURB AND GUTTER
- CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- STORM DRAIN
- STORM DRAIN INLET
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- 5' SIDEWALK
- 6' NEIGHBORHOOD PATHWAY
- PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PUBLIC DRAINAGE & UTILITY EASEMENT
- PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PRIVATE DRAINAGE & UTILITY EASEMENT
- STREET LIGHT
- STREET SIGN
- PUBLIC 10' TREE MAINTENANCE EASEMENT
- CENTRAL MAIL DELIVERY BOX (CBU)



**LAWNDALE CIRCLE TYPICAL ROADWAY SECTION**  
CLASSIFICATION: PUBLIC ACCESS STREET  
SECTION NOT TO SCALE  
SEE H.O.C. R-3.02; WHERE MODIFIED CURBING IS PROPOSED, MOD. C&G SHALL TRANSITION TO STANDARD COMBINATION CURB AND GUTTER (R-3.01) AT ALL INLETS AND WHERE DETAILED HEREON.



**LAWNDALE CIRCLE TYPICAL ROADWAY SECTION**  
CLASSIFICATION: PUBLIC ACCESS STREET  
SECTION NOT TO SCALE  
SEE H.O.C. R-3.02; WHERE MODIFIED CURBING IS PROPOSED, MOD. C&G SHALL TRANSITION TO STANDARD COMBINATION CURB AND GUTTER (R-3.01) AT ALL INLETS AND WHERE DETAILED HEREON.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Alphonse* 6.17.19  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*Walter* 6-26-19  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
LAWNDALE CIRCLE - 0+00 - 12+22.60 - PLAN & PROFILE  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35, GRID 21  
5TH ELECTION DISTRICT  
BPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

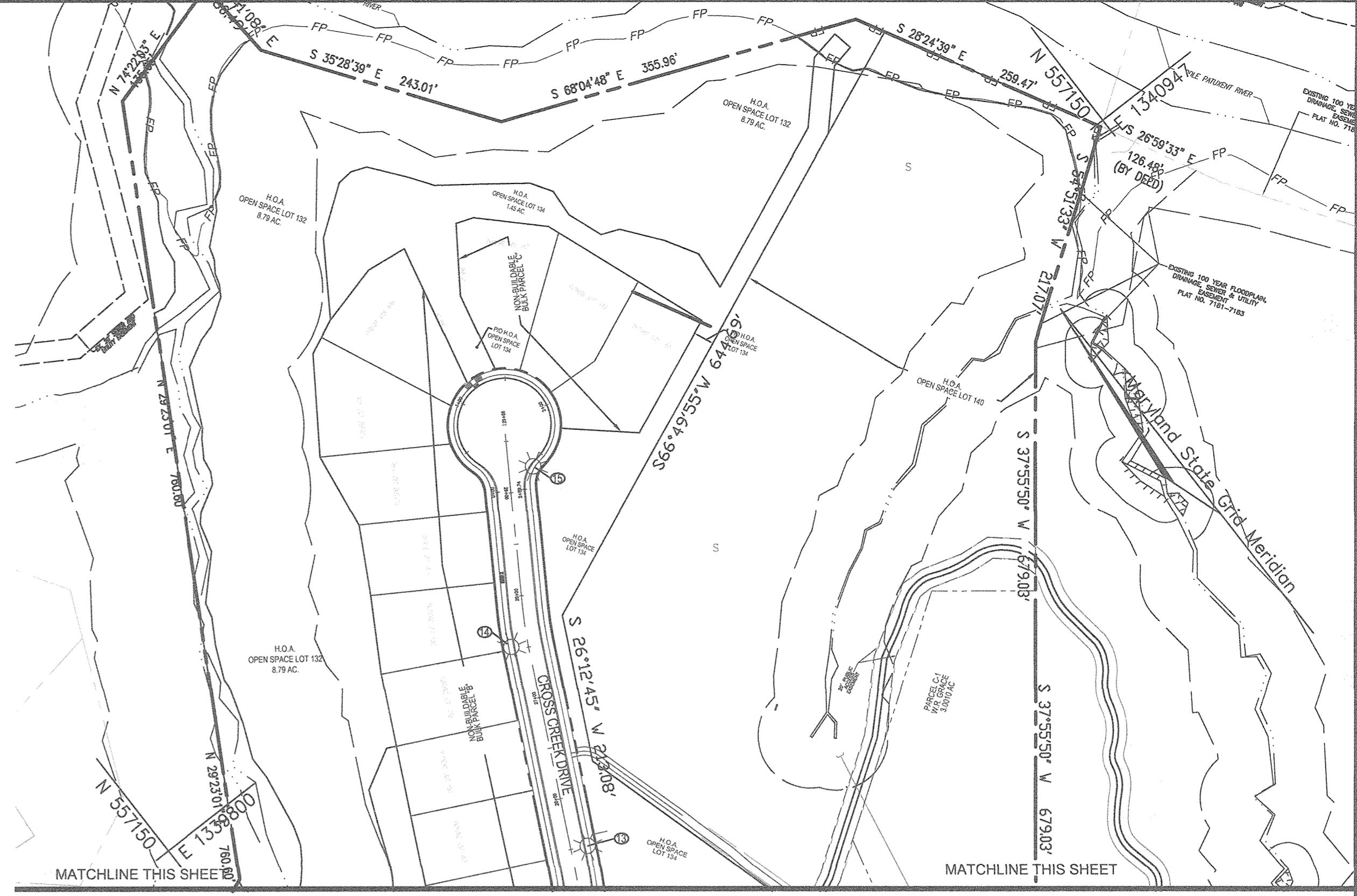
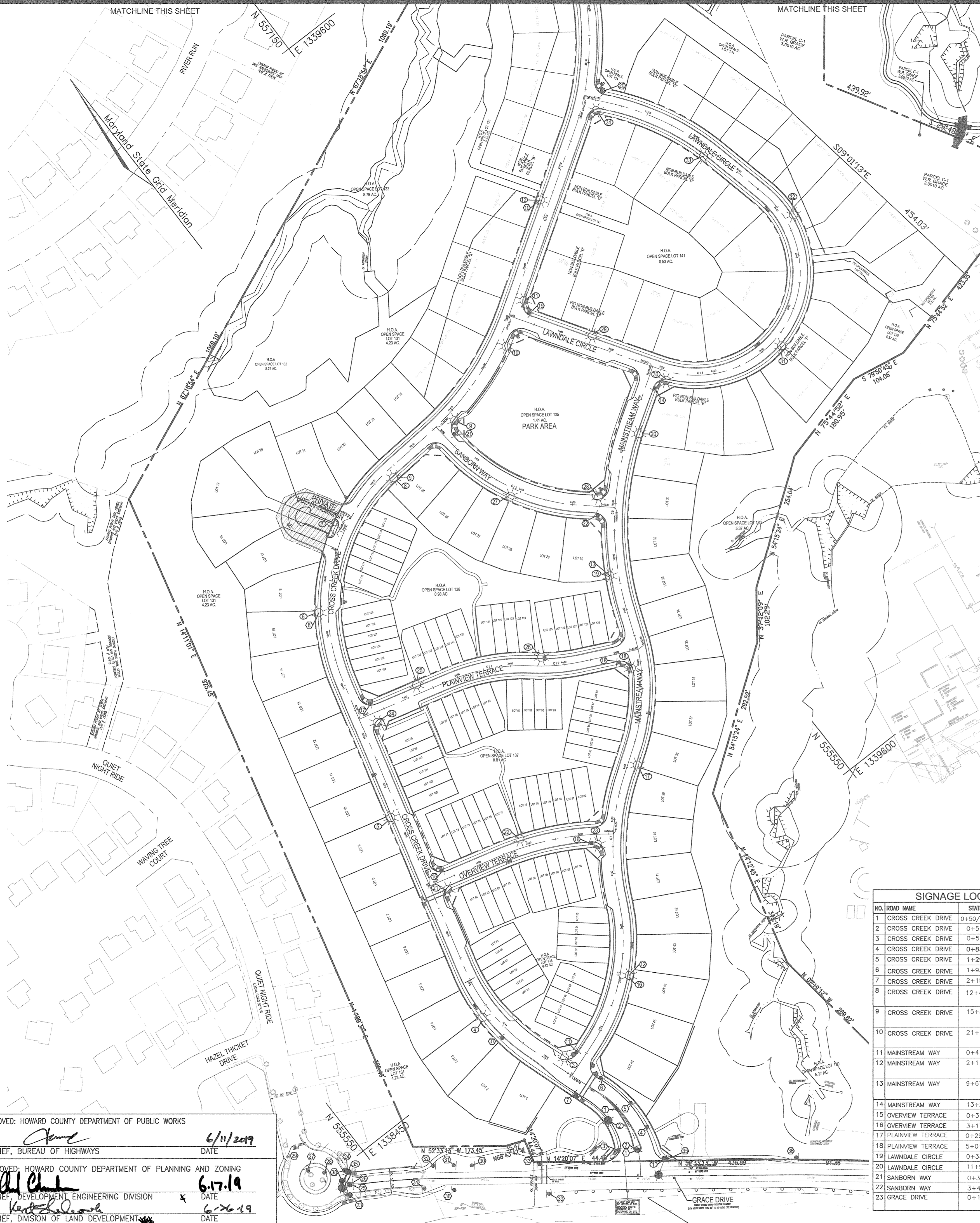
**ROBERT H. VOGEL, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

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 09-27-2020.

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

12 SHEET OF 74



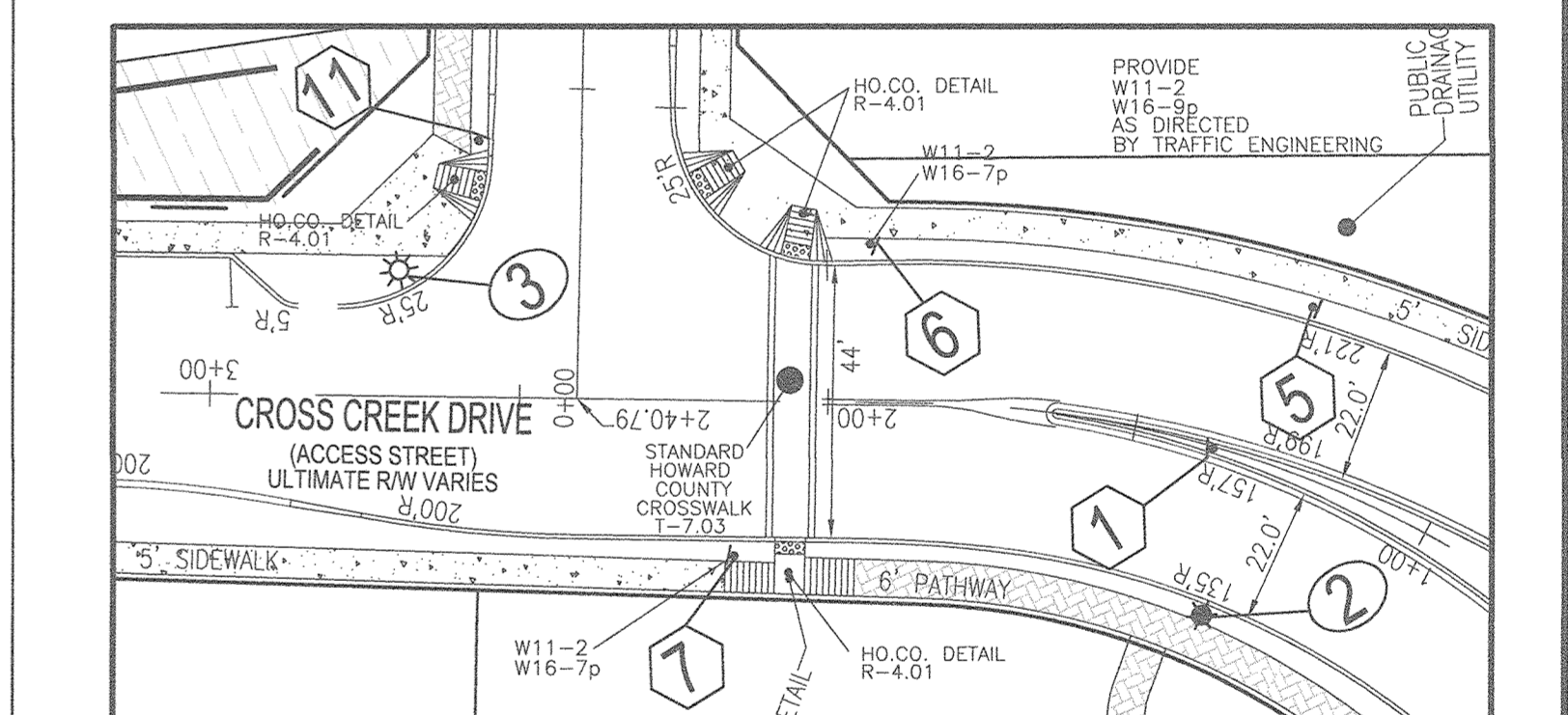
PLAN VIEW SCALE: 1"=100'

**STREET LIGHT LOCATIONS - SYMBOL ①**

SYMBOL	NO.	ROAD NAME	STATION	OFFSET	FIXTURE/POLE TYPE
☀	1	CROSS CREEK DRIVE	0+28	46' R	LED-250 COBBA FIXTURE MOUNTED ON A 12' FT ARM.
☀	2	CROSS CREEK DRIVE	1+30	26' L	LED-150 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE.
☀	3	CROSS CREEK DRIVE	2+70	20' R	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE.
☀	4	CROSS CREEK DRIVE	4+35	18' L	
☀	5	CROSS CREEK DRIVE	8+40	17' L	
☀	6	CROSS CREEK DRIVE	12+40	17' L	
☀	7	CROSS CREEK DRIVE	13+93	17' L	
☀	8	CROSS CREEK DRIVE	15+34	17' R	
☀	9	CROSS CREEK DRIVE	16+89	16' R	
☀	10	CROSS CREEK DRIVE	18+52	18' R	
☀	11	CROSS CREEK DRIVE	19+43	17' L	
☀	12	CROSS CREEK DRIVE	21+28	17' L	
☀	13	CROSS CREEK DRIVE	25+50	16' R	
☀	14	CROSS CREEK DRIVE	27+53	16' L	
☀	15	CROSS CREEK DRIVE	29+23	29' R	
☀	16	MAINSTREAM WAY	2+11	17' R	
☀	17	MAINSTREAM WAY	6+10	17' R	
☀	18	MAINSTREAM WAY	7+90	18' L	
☀	19	MAINSTREAM WAY	9+67	17' L	
☀	20	MAINSTREAM WAY	12+38	17' R	
☀	21	OVERVIEW TERRACE	0+28	19' R	
☀	22	OVERVIEW TERRACE	1+87	16.5' L	
☀	23	OVERVIEW TERRACE	3+29	19.5' R	
☀	24	PLAINVIEW TERRACE	0+28	19' R	
☀	25	PLAINVIEW TERRACE	1+24	17' L	
☀	26	PLAINVIEW TERRACE	3+58	16' L	
☀	27	SANBORN WAY	1+86	15' R	
☀	28	SANBORN WAY	3+48	17.5' L	
☀	29	LAWDALE CIRCLE	1+59	16' L	
☀	30	LAWDALE CIRCLE	3+15	17' R	

**STREET LIGHT LOCATIONS - SYMBOL ①**

SYMBOL	NO.	ROAD NAME	STATION	OFFSET	FIXTURE/POLE TYPE
☀	31	LAWDALE CIRCLE	5+32	17' R	LED-100 WATT COLONIAL FIXTURE MOUNTED ON A 14' BLACK FIBERGLASS POLE.
☀	32	LAWDALE CIRCLE	7+72	17' R	
☀	33	LAWDALE CIRCLE	9+67	16' L	
☀	34	LAWDALE CIRCLE	11+95	19' L	
☀	35	GRACE DRIVE	0	0	REMOVE EXISTING LCC/6100 AND REPLACE WITH A LED-200 COBBA FIXTURE MOUNTED ON A 30' BRONZE FIBERGLASS POLE WITH 12' ARM ANGLE OVER THE NEW CROSSWALK.



CROSSWALK DETAILING/SIGNAGE SCALE: 1"=30'

**SIGNAGE LOCATION CHART - SYMBOL ①**

NO.	ROAD NAME	STATION	OFFSET	TYPE	SIZE COLUMN
1	CROSS CREEK DRIVE	0+50/1+37	0	KEEP RIGHT	
2	CROSS CREEK DRIVE	0+51	4' LT	R1-1 STOP SIGN	
3	CROSS CREEK DRIVE	0+56	36' LT	R1-1 STOP SIGN	
4	CROSS CREEK DRIVE	0+83	29' RT	R2-1 SPEED LIMIT "25"	
5	CROSS CREEK DRIVE	1+29	26' RT	W11-2 W16-9p (FYG)	
6	CROSS CREEK DRIVE	1+93	26' RT	W11-2 W16-7p (FYG)	
7	CROSS CREEK DRIVE	2+15	25' LT	W11-2 W16-7p (FYG)	
8	CROSS CREEK DRIVE	12+40	17' LT	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE	
9	CROSS CREEK DRIVE	15+34	17' RT	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE	
10	CROSS CREEK DRIVE	21+28	17' LT	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE	
11	MAINSTREAM WAY	0+41	17' LT	R1-1 STOP SIGN	
12	MAINSTREAM WAY	2+11	17' RT	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE	24" x 30"
13	MAINSTREAM WAY	9+67	17' LT	R2-1 SPEED LIMIT "25" MOUNTED TO STREET LIGHT POLE	24" x 30"
14	MAINSTREAM WAY	13+28	17' RT	R1-1 STOP SIGN	
15	OVERVIEW TERRACE	0+31	17.5' RT	R1-1 STOP SIGN	
16	OVERVIEW TERRACE	3+17	16' RT	R1-1 STOP SIGN	
17	PLAINVIEW TERRACE	0+29	18' LT	R1-1 STOP SIGN	
18	PLAINVIEW TERRACE	5+01	16.5' LT	R1-1 STOP SIGN	
19	LAWDALE CIRCLE	0+33	17' LT	R1-1 STOP SIGN	
20	LAWDALE CIRCLE	11+92	17.5' RT	R1-1 STOP SIGN	
21	SANBORN WAY	0+33	16' LT	R1-1 STOP SIGN	
22	SANBORN WAY	3+49	16' RT	R1-1 STOP SIGN	
23	GRACE DRIVE	0+15	34.7' LT	W11-15 FYG (30X30) W16-7P FYG (24X12)	

**NOTE**  
 1. ALL SIGN LOCATIONS ARE APPROXIMATE. HOWARD COUNTY TRAFFIC SHALL FIELD APPROVE OR MARK ALL SIGN LOCATIONS PRIOR TO ANY SIGNS BEING INSTALLED. CALL 410-313-3752.  
 2. FOR GRACE DRIVE, QUIET NIGHT PLACE, AND CROSS CREEK DRIVE ENTRANCE SIGNAGE & TYPICAL CROSSWALK SIGNAGE, REFER TO DETAILS ON SHEET 5.  
 3. ALL SIGN POST USED FOR TRAFFIC CONTROL SIGNS INSTALLED IN THE COUNTY RIGHT-OF-WAY SHALL BE MOUNTED ON A 2" GALVANIZED STEEL PERFORATED, (QUICK PUNCH) SQUARE TUBE POST (1 1/2 GAUGE) INSERTED INTO A 2-1/2" GALVANIZED STEEL PERFORATED SQUARE TUBE SLEEVE (1/2 GAUGE-3" LONG). THE ANCHOR SHALL NOT EXTEND MORE THAN TWO (2) "QUICK PUNCH" HOLES ABOVE GROUND LEVEL. A GALVANIZED STEEL POLE CAP SHALL BE MOUNTED ON THE TOP OF EACH POST.

**SIGNAGE LOCATION CHART - SYMBOL ①**

NO.	ROAD NAME	STATION	OFFSET	TYPE	SIZE COLUMN
24	GRACE DRIVE	0+29	3.9' RT	W11-15 FYG (30X30) W16-7P FYG (24X12)	
25	GRACE DRIVE	0+18	15.9' LT	R4-7 KEEP RIGHT	
26	GRACE DRIVE	0+18	15.9' LT	(2) YELLOW O.M. OM1-3	
27	QUIET NIGHT	1+09	40.2' LT	R6-4 CHEVRON	
28	QUIET NIGHT	0+55	31.7' LT	R6-4 CHEVRON	
29	QUIET NIGHT	1+32	39.2' LT	SNS W11-15 W16-9P (FYG)	
30	GRACE DRIVE	11+77	23.5' LT	W2-6	
31	GRACE DRIVE	11+43	24' LT	R3-17, R3-17B	
32	GRACE DRIVE	11+05	24.1' LT	W3-2 W13-1	
33	GRACE DRIVE	11+03	24.2' LT	W11-1 W16-7P (FYG)	
34	GRACE DRIVE	10+88	18.1' RT	W11-1 W16-9P (FYG)	
35	GRACE DRIVE	15+39	30.9' LT	W11-1 W16-9P (FYG)	
36	GRACE DRIVE	11+43	22' RT	R3-17 R3-17cP (FYG)	
37	CROSS CREEK DRIVE	3+85	17.5' RT	W11-1 W16-9P (FYG)	
38	GRACE DRIVE	0+36	23.8' RT	R1-2 YIELD	

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.26.19

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN

STREET LIGHT AND TRAFFIC SIGNAGE LOCATION PLAN

**CEDAR CREEK - PHASE 1**

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
 PLATS 2333A-2333Z

TAX MAP 35, GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

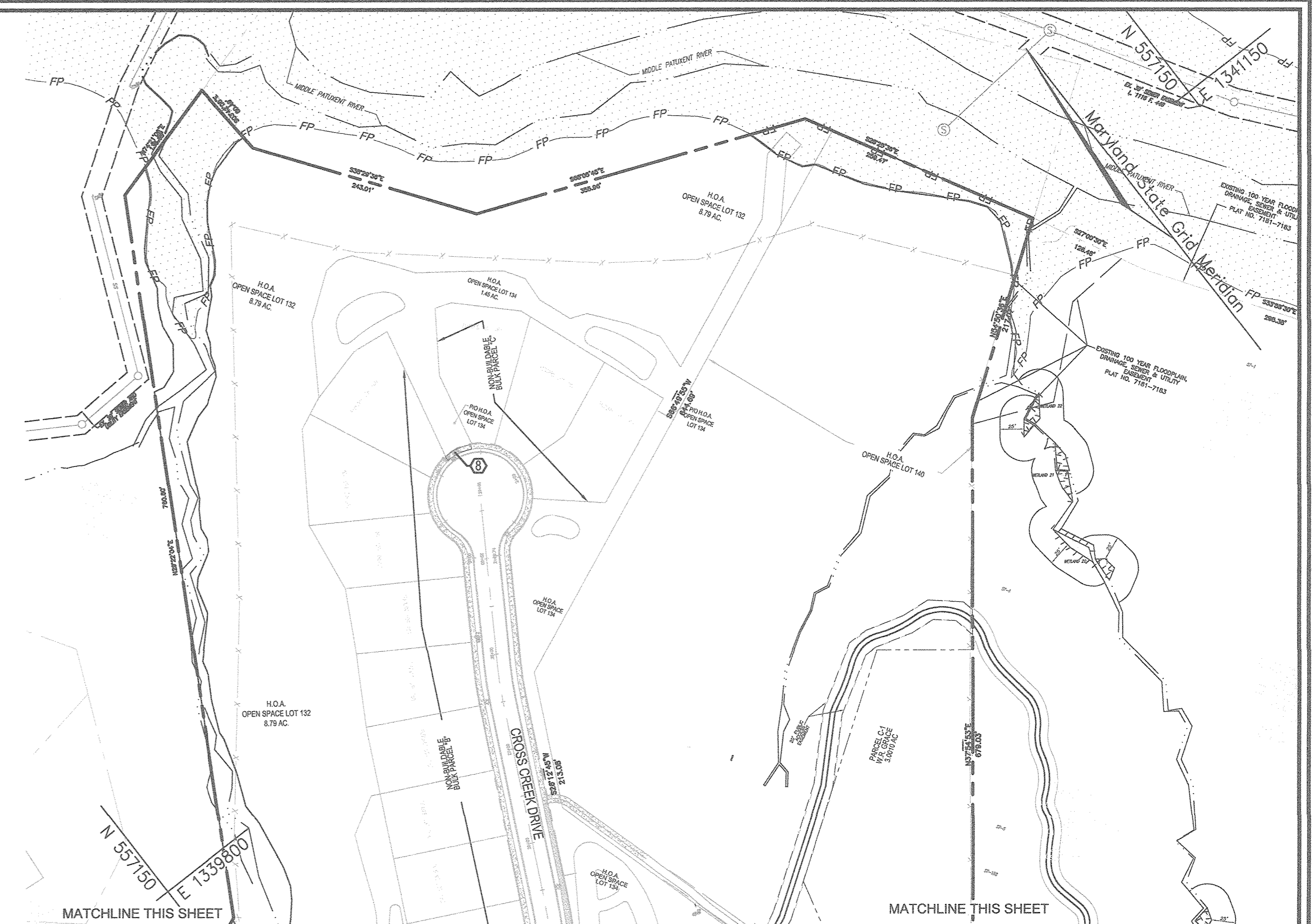
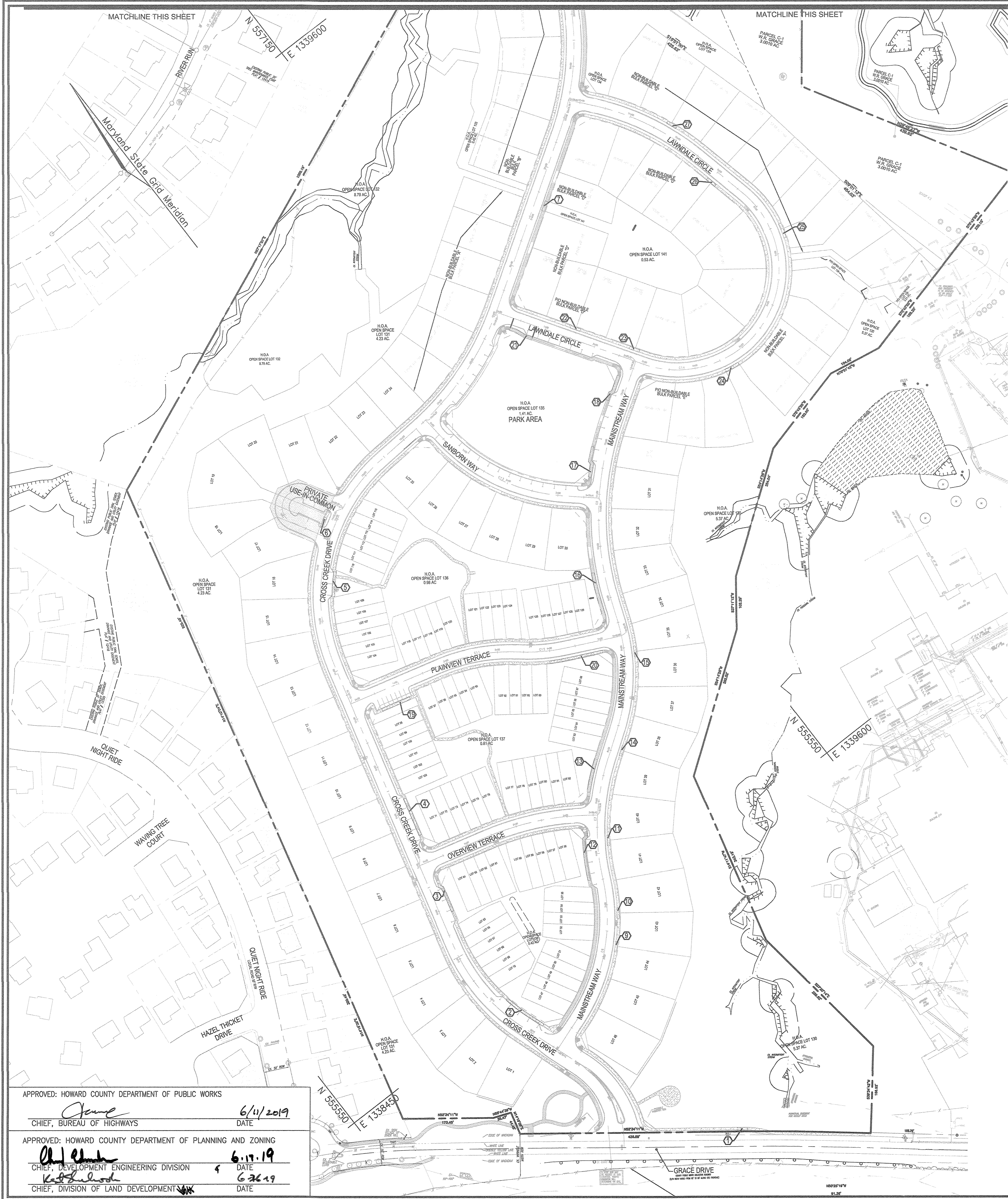
ZONED: CEP-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

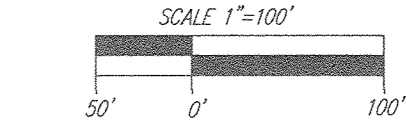
PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18193, EXPIRATION DATE: 09-27-2020.

DESIGN BY: VE+TC  
 DRAWN BY: VE+TC  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

13 SHEET OF 74



PLAN VIEW  
SCALE: 1"=100'

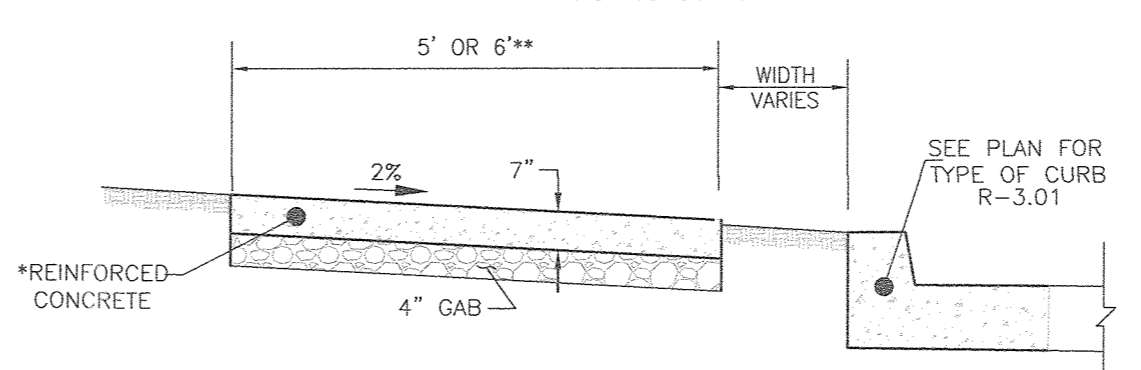


REINFORCED SIDEWALK LOCATION							
NO.	ROAD NAME	STATION	OFFSET	NO.	ROAD NAME	STATION	OFFSET
1	GRACE DRIVE	17+08.71	31.30'R	19	PLAINVIEW TERRACE	0+51.98	31.67'R
		17+28.75	31.28'R			1+10.00	31.67'R
2	CROSS CREEK DRIVE	2+88.82	22.67'R	20	PLAINVIEW TERRACE	4+00.00	19.0'R
		3+78.26	22.67'R			5+00.84	19.0'R
		5+89.67	22.67'R			0+36.60	18.0'R
3	CROSS CREEK DRIVE	6+49.26	19.00'R	21	LAWDALE CIRCLE	0+82.70	21.67'R
		7+50	22.67'R			1+44.81	19.00'L
		8+24.39	22.67'R			1+64.81	19.00'L
4	CROSS CREEK DRIVE	12+47.05	20.59'R	22	LAWDALE CIRCLE	2+64.81	19.00'L
		12+98.90	20.59'R			2+84.81	19.00'L
		13+87.48	19.00'L			4+51.83	19.00'R
5	CROSS CREEK DRIVE	13+94.65	19.00'L	23	LAWDALE CIRCLE	4+77.86	19.00'R
		21+18.62	18.00'L			7+25.41	19.00'R
		21+37.52	18.00'L			7+51.66	19.00'R
6	CROSS CREEK DRIVE	1+17.07	-	24	LAWDALE CIRCLE	8+86.93	19.0'L
		1+42.01	-			9+06.93	19.0'L
7	CROSS CREEK DRIVE	2+13.19	19.01'R	25	LAWDALE CIRCLE	10+12.11	19.0'R
		2+33.20	19.01'R			10+32.10	19.0'R
8	CROSS CREEK DRIVE	2+74.26	19.30'R	26	LAWDALE CIRCLE	10+12.11	19.0'R
		2+94.28	19.30'R			10+32.10	19.0'R
9	MAINSTREAM WAY	4+12.85	19.01'R	27	LAWDALE CIRCLE	10+12.11	19.0'R
		4+32.87	19.05'R			10+32.10	19.0'R
10	MAINSTREAM WAY	3+53.13	22.67'L	28	LAWDALE CIRCLE	10+32.10	19.0'R
		4+46.22	19.48'L			10+32.10	19.0'R
11	MAINSTREAM WAY	5+14.62	18.00'L	29	LAWDALE CIRCLE	10+32.10	19.0'R
		5+76.24	18.00'L			10+32.10	19.0'R
12	MAINSTREAM WAY	5+96.43	19.0'R	30	LAWDALE CIRCLE	10+32.10	19.0'R
		6+16.43	19.0'R			10+32.10	19.0'R
13	MAINSTREAM WAY	7+80.84	19.0'R	31	LAWDALE CIRCLE	10+32.10	19.0'R
		8+00.84	19.0'R			10+32.10	19.0'R
14	MAINSTREAM WAY	8+57.88	21.74'L	32	LAWDALE CIRCLE	10+32.10	19.0'R
		9+52.80	18.00'L			10+32.10	19.0'R
15	MAINSTREAM WAY	11+30.5	18.00'L	33	LAWDALE CIRCLE	10+32.10	19.0'R
		11+86.18	22.67'L			10+32.10	19.0'R
16	MAINSTREAM WAY	12+77.00	22.67'L	34	LAWDALE CIRCLE	10+32.10	19.0'R
		13+28.48	18.00'L			10+32.10	19.0'R

LEGEND:

- PROPOSED CURB AND GUTTER
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- PROPOSED SIDEWALK
- PROPOSED REINFORCED SIDEWALK
- PROPOSED STREET LIGHT
- PROPOSED STREET SIGN

DETAIL - REINFORCED CONCRETE SIDEWALK  
NOT TO SCALE



\* PROVIDE 7" REINFORCED CONCRETE SIDEWALKS NEAR MICRO BIO-RETENTION FACILITIES. REINFORCEMENT SHALL BE 6" x 6" W2.9x2.9 WIRE MESH OR #3 REINF BARS 12" O/C  
 \*\* - NORMAL TYPICAL ON-SITE SUBDIVISION SIDEWALK = 5' WIDE  
 - ON-SITE NEIGHBORHOOD PATHWAY (SIDEWALK) WHICH CONNECTS THE GRACE DRIVE 6' ASPHALT PATHWAY TO THE 6' ASPHALT PATHWAY LEADING FROM NEAR SWM #3 CONNECTING TO THE OFFSITE 6' ENVIRONMENTAL TRAIL SHALL BE A 6' CONCRETE SIDEWALK (KNOWN AS 6' NEIGHBORHOOD PATHWAY), CONSTRUCTED TO R-3.05 SPECIFICATIONS

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.17.19

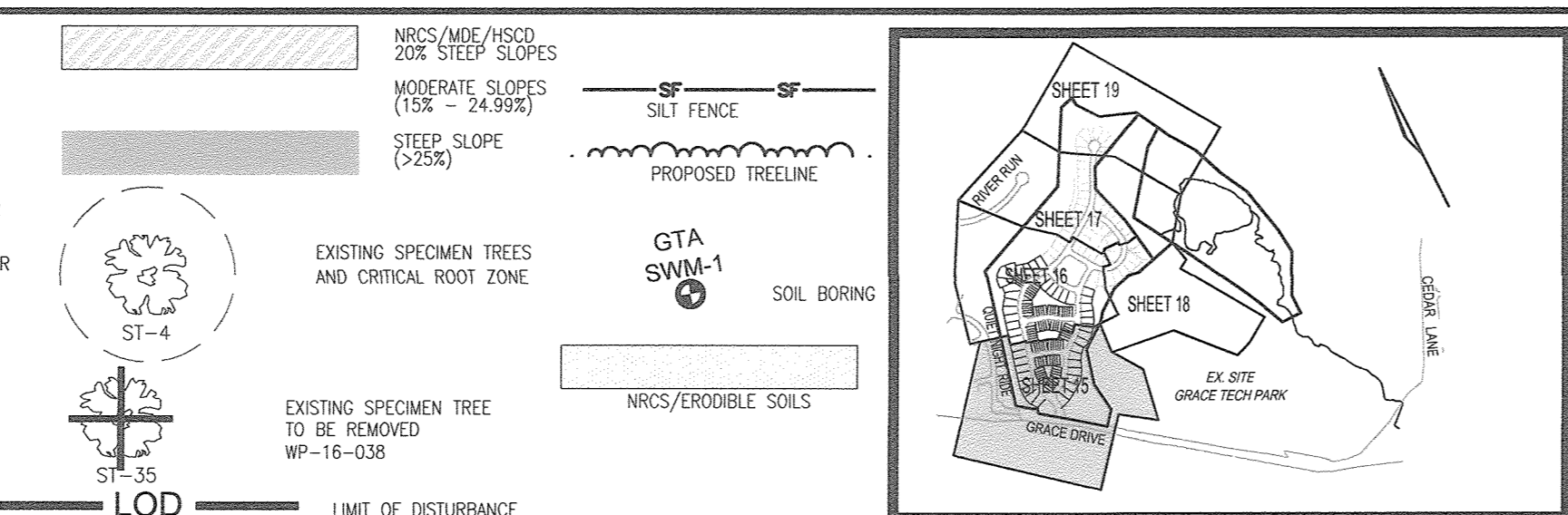
OWNER / DEVELOPER: T.M. 35 - P. 145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P. 145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRADE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE
FINAL ROAD CONSTRUCTION PLAN REINFORCED SIDEWALK LOCATION PLAN <b>CEDAR CREEK - PHASE 1</b> LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C" PLATS 23334-23337		
TAX MAP 35 GRID 21 5TH ELECTION DISTRICT DPZ REFERENCE: SEE SITE DATA		ZONED: CEF-R P/O PARCEL 145 HOWARD COUNTY, MARYLAND
<b>ROBERT H. VOGEL ENGINEERING, INC.</b> ENGINEERS • SURVEYORS • PLANNERS 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043 TEL: 410.461.7666 FAX: 410.461.8961		
DESIGN BY: VE+TG	PROFESSIONAL CERTIFICATE	
DRAWN BY: VE+TG	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: 09-27-2020	
CHECKED BY: RHV	DATE: APRIL 2019	
SCALE: AS SHOWN	W.O. NO.: 15-55	
14 SHEET OF 74		

**LEGEND:**

EXISTING CONTOUR	EXISTING STORM DRAIN	EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
PROPOSED CONTOUR	ELECTRIC CONDUIT	EXISTING SPECIMEN TREE TO BE REMOVED
EXISTING SPOT ELEVATION	EXISTING IIRLINE (FIELD LOCATED)	LIMIT OF DISTURBANCE
EXISTING CURB AND GUTTER	EXISTING STREAM	EARTH DIKE / CLEAN WATER DIKE
EXISTING UTILITY POLE	EXISTING STREAM BUFFER	SUPER SILT FENCE
EXISTING LIGHT POLE	EXISTING WETLAND BUFFER	
EXISTING MAILBOX	EXISTING FENCE	
EXISTING SIGN	PROPERTY LINE	
EXISTING SANITARY MANHOLE	RIGHT-OF-WAY LINE	
EXISTING SANITARY LINE	SOILS BOUNDARY	
EXISTING CLEANOUT	EX. MONITORING WELL	
EXISTING FIRE HYDRANT		
EXISTING WATER LINE		



**NOTES:**

- ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
- IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.

**NOTE:**

- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

**OWNER/DEVELOPER CERTIFICATION:**

I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT FROM TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-WAY ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

*Robert H. Vogel*  
OWNER/DEVELOPER SIGNATURE  
DATE: 5/15/19

*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
DATE: 5/15/19

ROBERT H. VOGEL MD REGISTRATION NO. 16193  
PRINTED NAME & TITLE (P.E., R.L.S., OR R.L.A. (circle one))

**DESIGN 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 SOIL CONSERVATION DISTRICT. HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
DATE: 5/15/19

ROBERT H. VOGEL MD REGISTRATION NO. 16193  
PRINTED NAME & TITLE (P.E., R.L.S., OR R.L.A. (circle one))

**NOTE:**

THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OUTFALL OCCURRING ALONG GRACE DRIVE A "NECESSARY DISTURBANCE" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

- NOTES**
- REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  - REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
  - REFER TO SHEETS 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.
  - REFER TO SHEETS 65-67 FOR SOIL BORINGS.
  - THE MONITORING WELL MW4 ON LOT 32 SHALL BE PROPERLY ABANDONED WITH DOCUMENTATION SENT TO THE HOWARD COUNTY HEALTH DEPARTMENT.
  - PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RRPPAP AT ALL LOCATIONS

**BASIN LEGEND:**

	GABION PROTECTION		EXISTING DRAINAGE DIVIDE
	REMOVABLE PUMP STATION		INTERIM DRAINAGE DIVIDE
	BAFFLE		PROPOSED DRAINAGE DIVIDE

**BASIN # 1**

<b>FACILITY TYPE:</b>	TEMPORARY BASIN
EX. DRAINAGE AREA:	4.30 AC.
INTERIM DRAINAGE AREA:	13.0 AC.
ULTIMATE DRAINAGE AREA:	9.3 AC.
TOTAL WET STORAGE PROVIDED:	23,400 CF
TOTAL DRY STORAGE PROVIDED:	23,400 CF
TOTAL STORAGE REQUIRED:	46,800 CF
TOTAL WET STORAGE PROVIDED:	23,534 CF
TOTAL DRY STORAGE PROVIDED:	23,892 CF
TOTAL STORAGE PROVIDED:	47,516 CF
BOTTOM ELEVATION:	373.00
RISER CREST ELEVATION:	377.00
WET STORAGE ELEVATION:	373.00-374.20
DRY STORAGE ELEVATION:	374.20-375.30
TOTAL STORAGE DEPTH:	2.3' (375.30-373.00)
TOP OF EMBANKMENT:	380.00 (SETTLED)
CLEANOUT ELEVATION:	373.70
SIDE SLOPES:	2:1 INSIDE 3:1 OUTSIDE
EMERGENCY SPILLWAY:	18'
Q1 (EX.):	0.0 CFS
Q1 (BASIN):	0.60 CFS *
THROUGH DEWATER DEVICE ORIFICE	
1 YR TSWM WSEL =	376.62
10 YR TSWM WSEL =	378.36
BAFFLE DESIGN:	SEE SHT 27

**OWNER / DEVELOPER**  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER (PARCEL C)**  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
3500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE
-----	----------	------

**FINAL ROAD CONSTRUCTION PLAN**

PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN

**CEDAR CREEK - PHASE 1**

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35, GRID 21  
6TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS

3900 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-27-2020

DESIGN BY:	VE+TG
DRAWN BY:	VE+TG
CHECKED BY:	RHV
DATE:	APRIL 2019
SCALE:	AS SHOWN
W.O. NO.:	15-55

15 SHEET OF 74



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*Jane*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Alfred*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6/12/19

*Robert H. Vogel*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6/26/19

**PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN**

SCALE: 1"=50'

MD ROUTE 32 - WB  
MD RT. 32 - WB  
STATE PUBLIC PRINCIPAL ARTERIAL ROADWAY  
(R/W WIDTH VARIES FROM 332' TO 364' ALONG SITE FRONTAGE)

GRACE DRIVE  
COUNTY PARKING COLLECTOR ROADWAY  
(R/W WIDTH VARIES FROM 60' TO 80' ALONG SITE FRONTAGE)

PROVIDE PSD-24  
MOUNTABLE BERM

MW1 SEE NOTE 6 HEREON

NOTE:  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

NOTES  
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.  
2. IMBRICATE SF/SF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2" IN ELEVATION.

NOTES  
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.  
2. REFER TO SHEET 28-29 FOR STANDARD DETAILS AND STABILIZATION NOTES.  
3. REFER TO SHEETS 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.  
4. REFER TO SHEET 65-67 FOR SOIL BORINGS.  
5. THE MONITORING WELL MW4 ON LOT 32 SHALL BE PROPERLY ABANDONED WITH DOCUMENTATION SENT TO THE HOWARD COUNTY HEALTH DEPARTMENT.  
6. PROVIDE SOIL STABILIZATION MATTING TO L.O.D. BEYOND END OF RR/RAP AT ALL LOCATIONS.

OWNER/DEVELOPER CERTIFICATION:  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, AND 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

DATE: 5/8/19  
DESIGNER'S SIGNATURE: [Signature]  
HOWARD S.C.D.

EXISTING DRAINAGE AREA  
SEDIMENT BASIN #2  
AREA = 1.4 ACRES±  
TC = 0.18 HOURS

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING FLOOD PLAN
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- LOD
- LIMIT OF DISTURBANCE
- EARTH DIKE
- CLEAN WATER DIKE
- SUPER SILT FENCE
- SILT FENCE
- PROPOSED TREE LINE
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL
- EXISTING SPECIMEN TREE TO BE REMOVED
- MODERATE SLOPES (15% - 24.99%)
- STEEP SLOPE (>25%)
- NRCS/AGE/HSCD 20% STEEP SLOPES
- NRCS/ERODIBLE SOILS

TRAP / BASIN LEGEND:

- GABION PROTECTION
- REMOVABLE PUMP STATION
- BAFFLE
- EXISTING DRAINAGE DIVIDE
- INTERIM DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE

NOTE:  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART.  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

ENGINEERED B-2 DIKE - DETAIL  
EARTH DIKE TRIANGULAR CHANNEL  
SIDE SLOPES = 4:1 APPROACH DIKE  
SIDE SLOPES = 2:1 DIKE  
SLOPE = 0.5% HYD RAD = 0.963 FT  
V2=3.30 FPS SHEAR STRESS = 0.286 LB/FT2  
d2=1.94' HYD RAD = 0.963 FT  
LINE W/ TSSMC 1.75 LB/SF

OWNER / DEVELOPER  
T.M. 35 - P. 145 (PARCEL B-1)  
SIMPSON OAKS CRPS, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P. 145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE
-----	----------	------

FINAL ROAD CONSTRUCTION PLAN  
PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
6311 ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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.  
EXPIRATION DATE: 09-27-2020

16 SHEET OF 74

KEY MAP  
NOT TO SCALE

MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	HYDRIC INCLUSIONS	K FACTOR	PERCENT FINE SAND	PERCENT SILT	PERCENT CLAY
BaA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES	NO
Cg	CECURIUS & HARBRO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES	NO
GaB	GLENVILLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO
GaB	GLENVILLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO
GmB	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES
GmC	GLENVILLE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	YES
GmB	GLENVILLE-URBAN LAND-UDORRHENSIS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES	YES
MaB1	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO
MaC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO
MaD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES	NO
MaF	MANOR-BRONNLOW COMPLEX, 25-50% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

NOTE:  
HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.25 AND WITH A SLOPE GREATER THAN 5 PERCENT

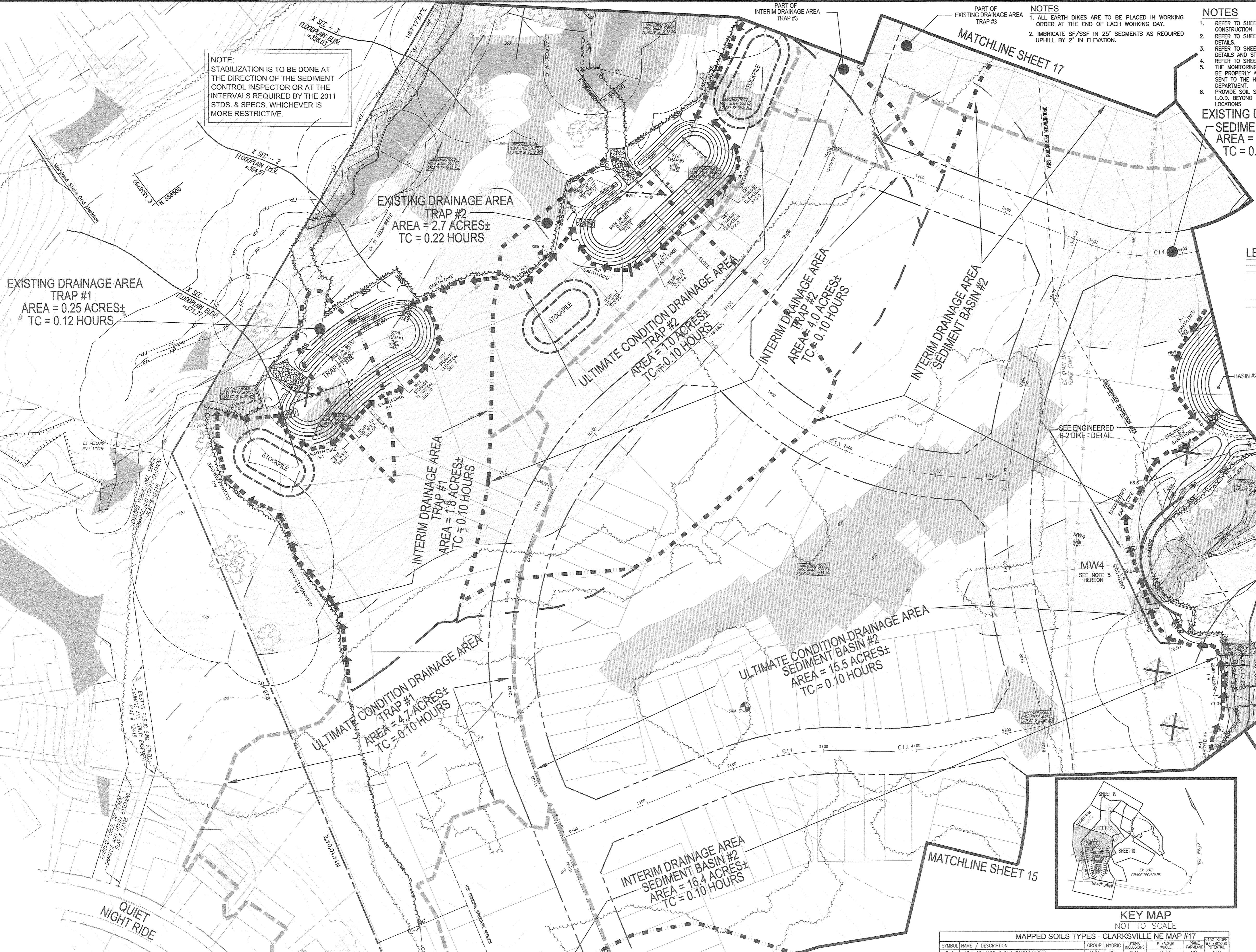
PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN

SCALE: 1"=50'  
50' 0 50' 100' 150'

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
[Signature] 6/11/2019  
CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
[Signature] 6.11.19  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

[Signature] 6.26.19  
CHIEF, DIVISION OF LAND DEVELOPMENT





MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17						
SYMBOL	NAME / DESCRIPTION	GROUP	HYDROIC	HYDROIC	PERCENT	OTHER
Bc	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	NO	0.37	NO
Co	COORUS & HATBORO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO
Gp	GLENELE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	NO
Gm	GLENELE-BROWN SAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO
GmB	GLENELE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES
GmC	GLENELE SILT LOAM, 8-10% SLOPES	C	NO	NO	0.43	YES
GmD	GLENELE-BROWN SAND COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO
Mb	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	NO
MbB	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	NO
MbD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO
MbE	MANOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO

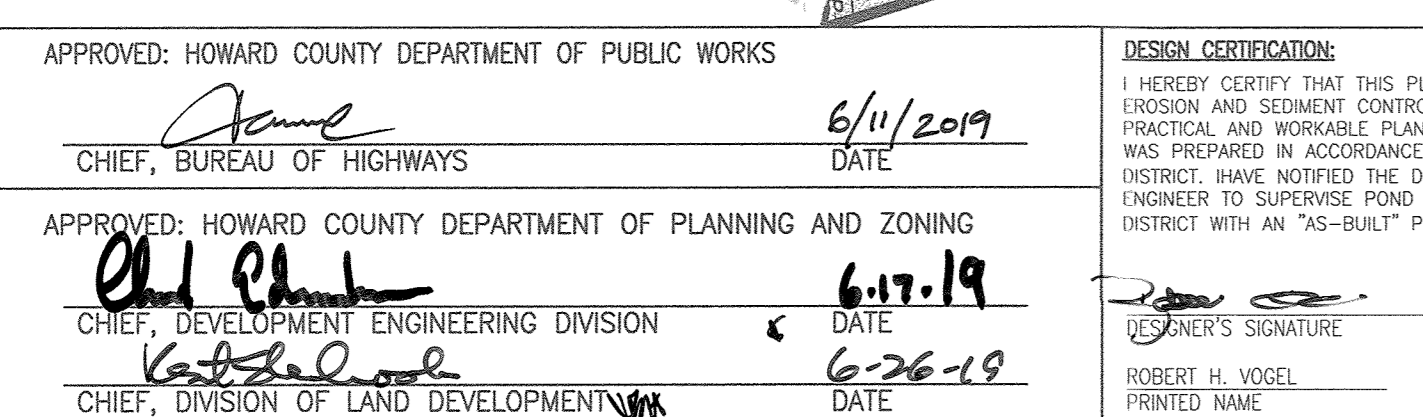
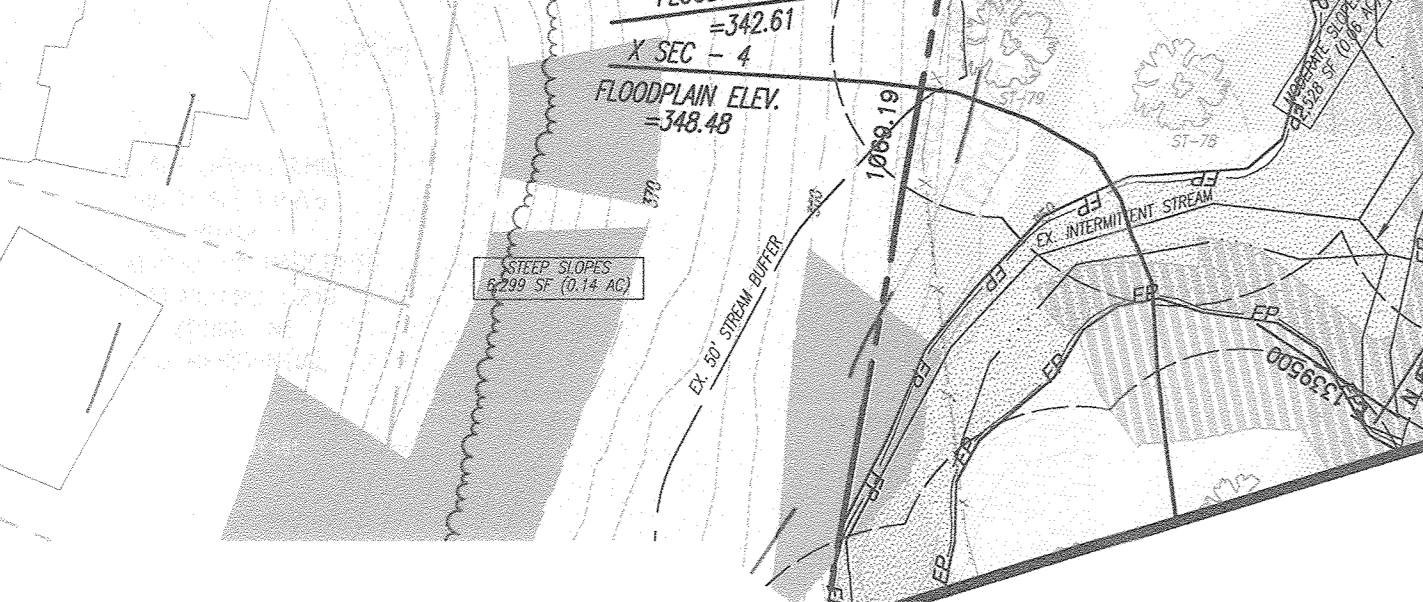
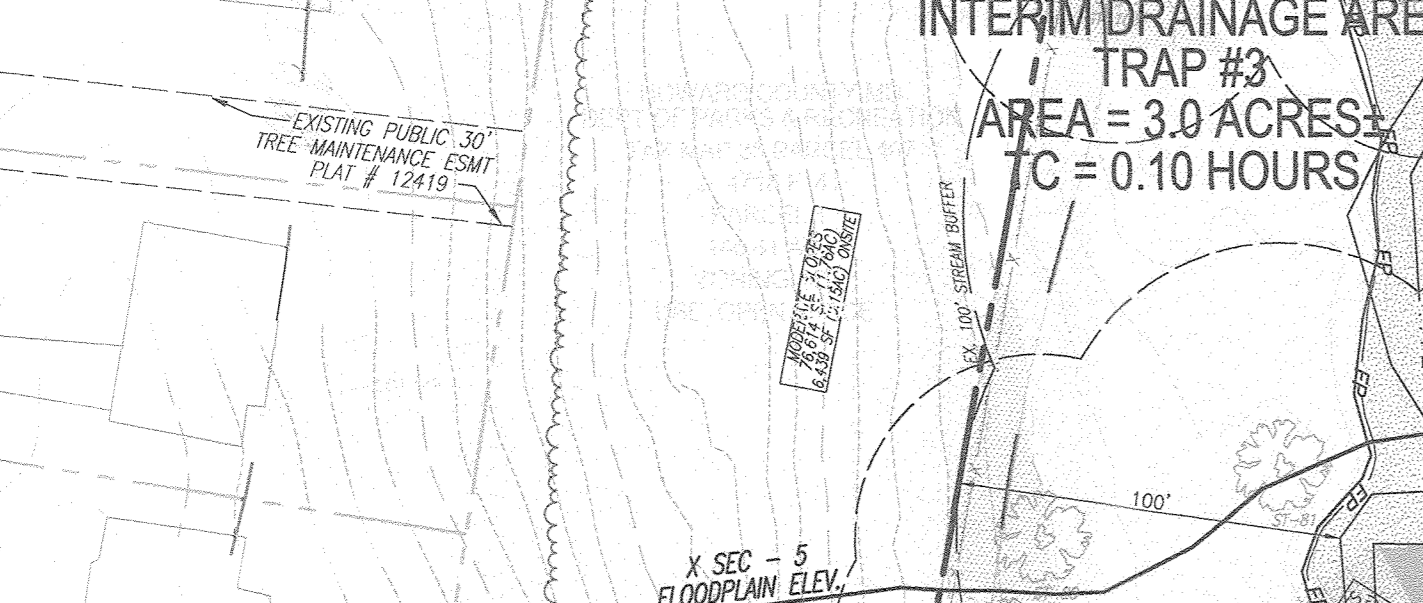
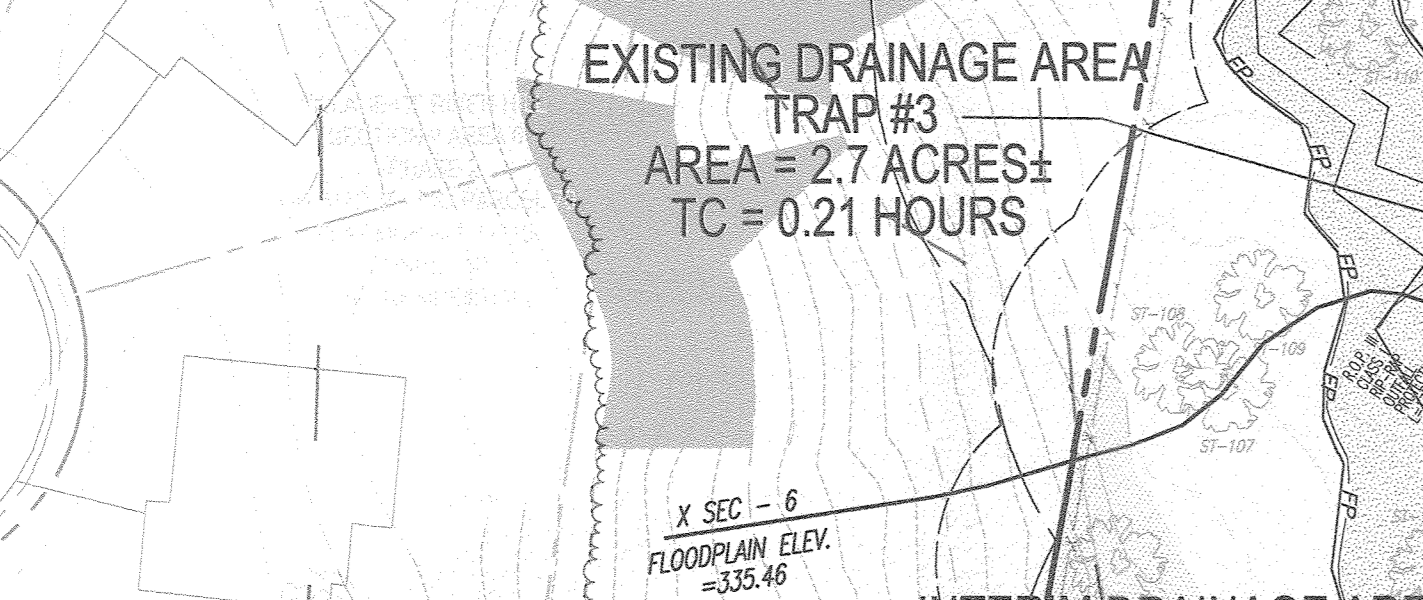
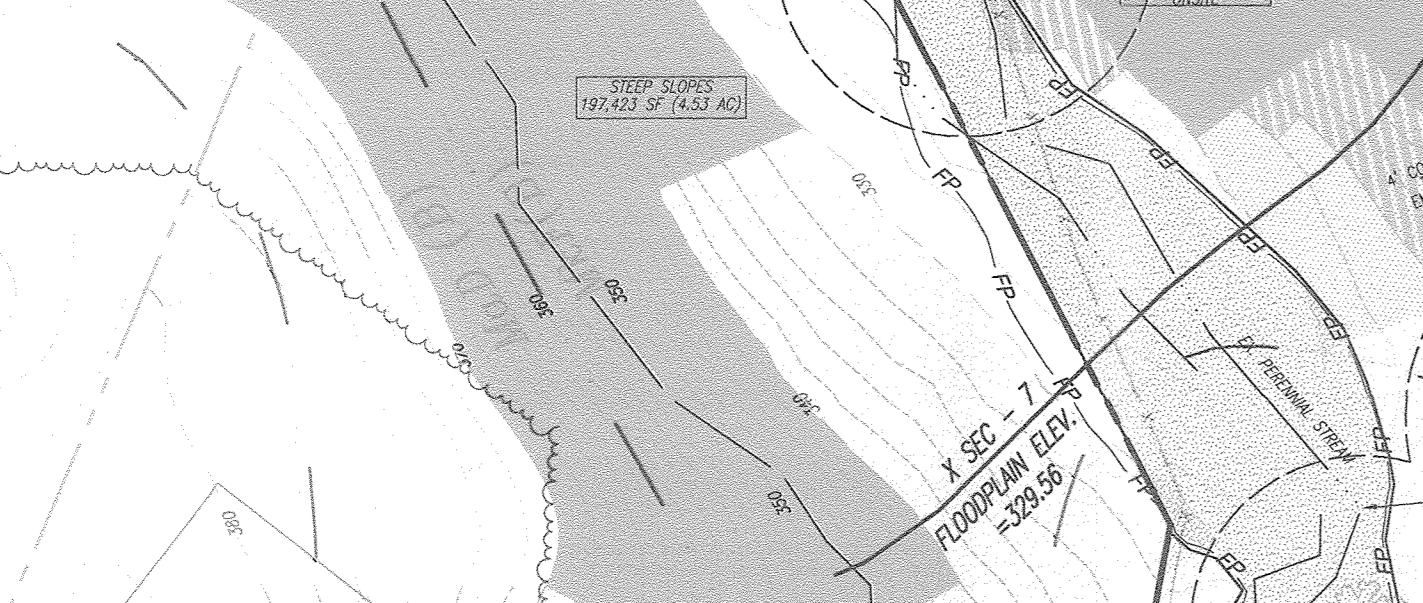
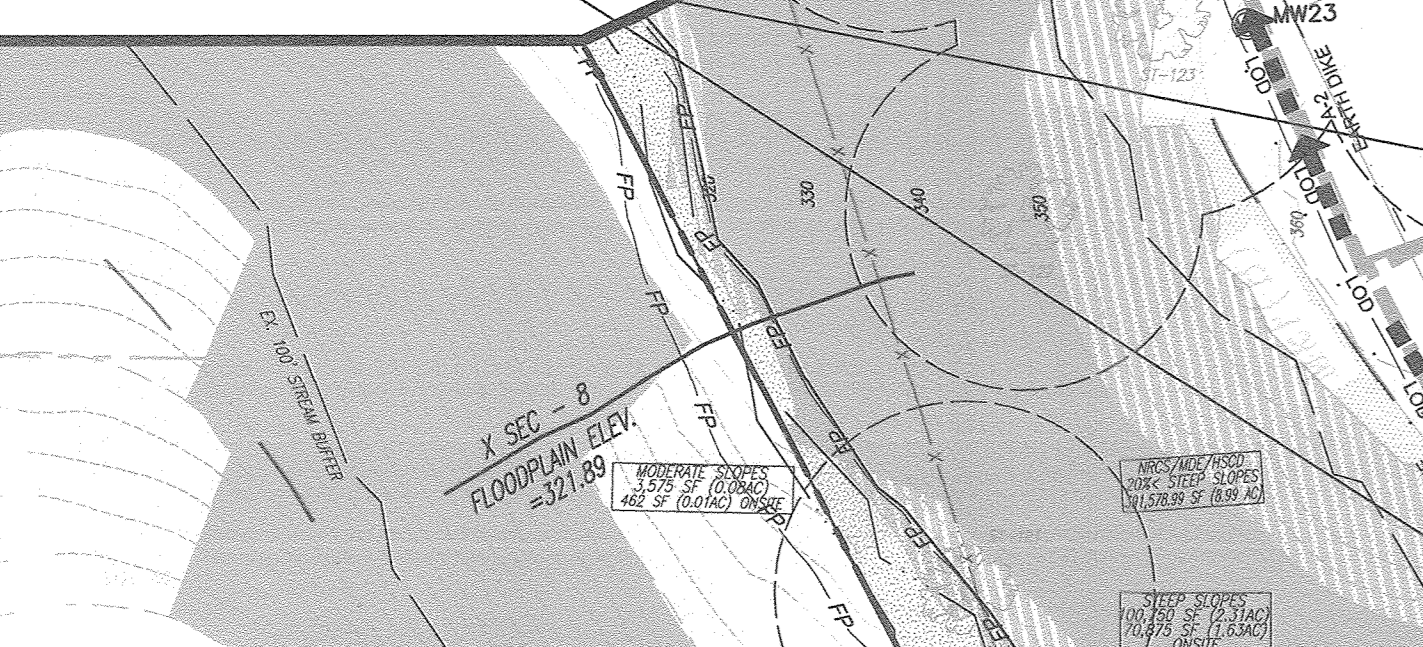
TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

NOTE: 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

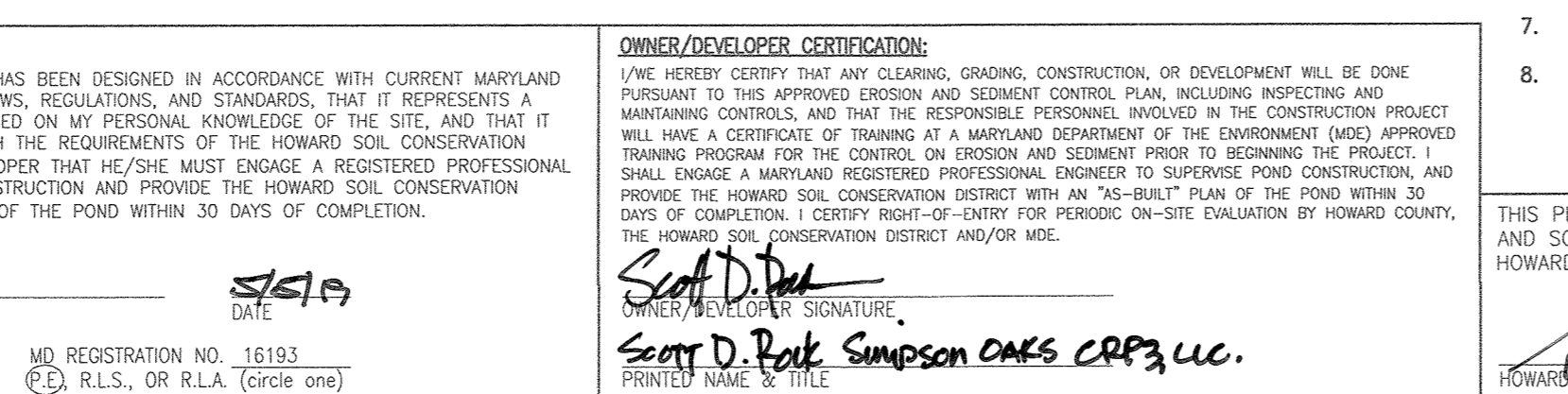
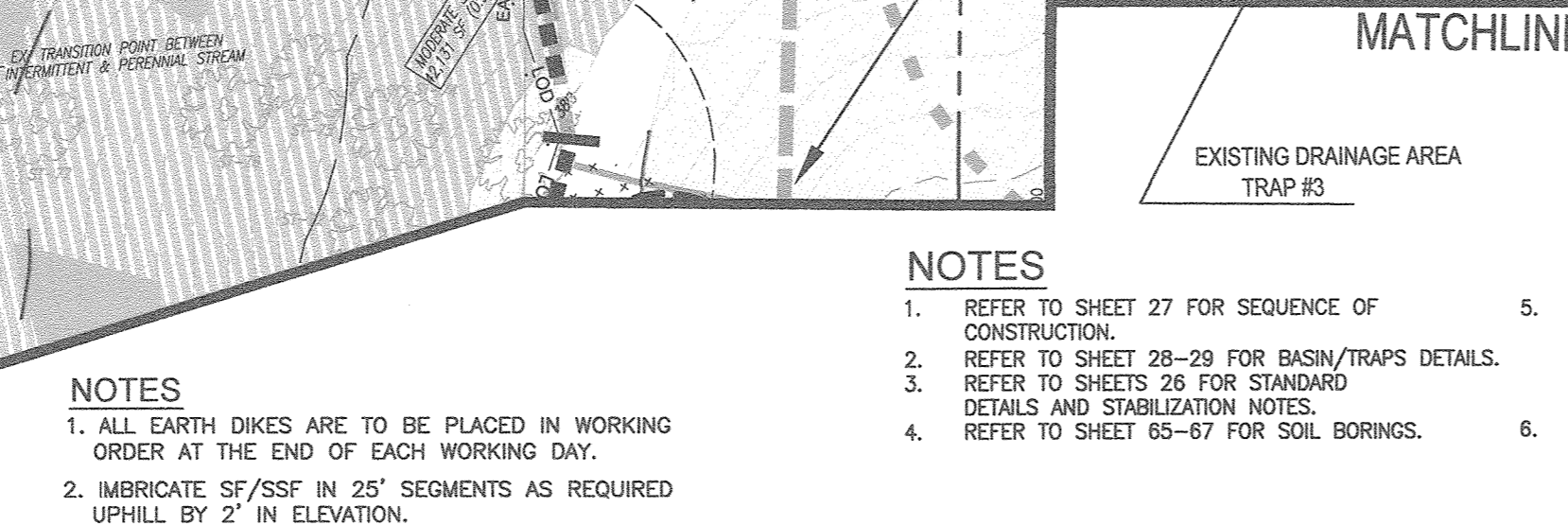
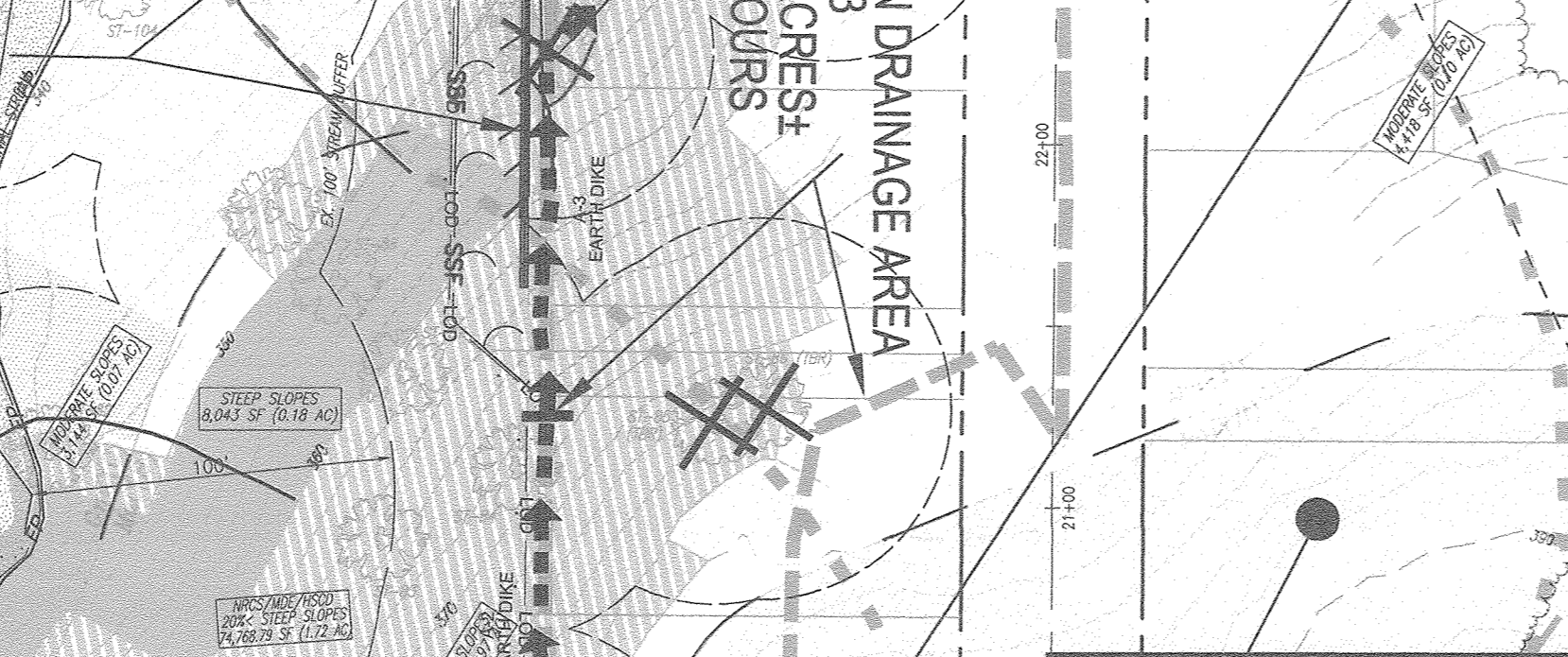
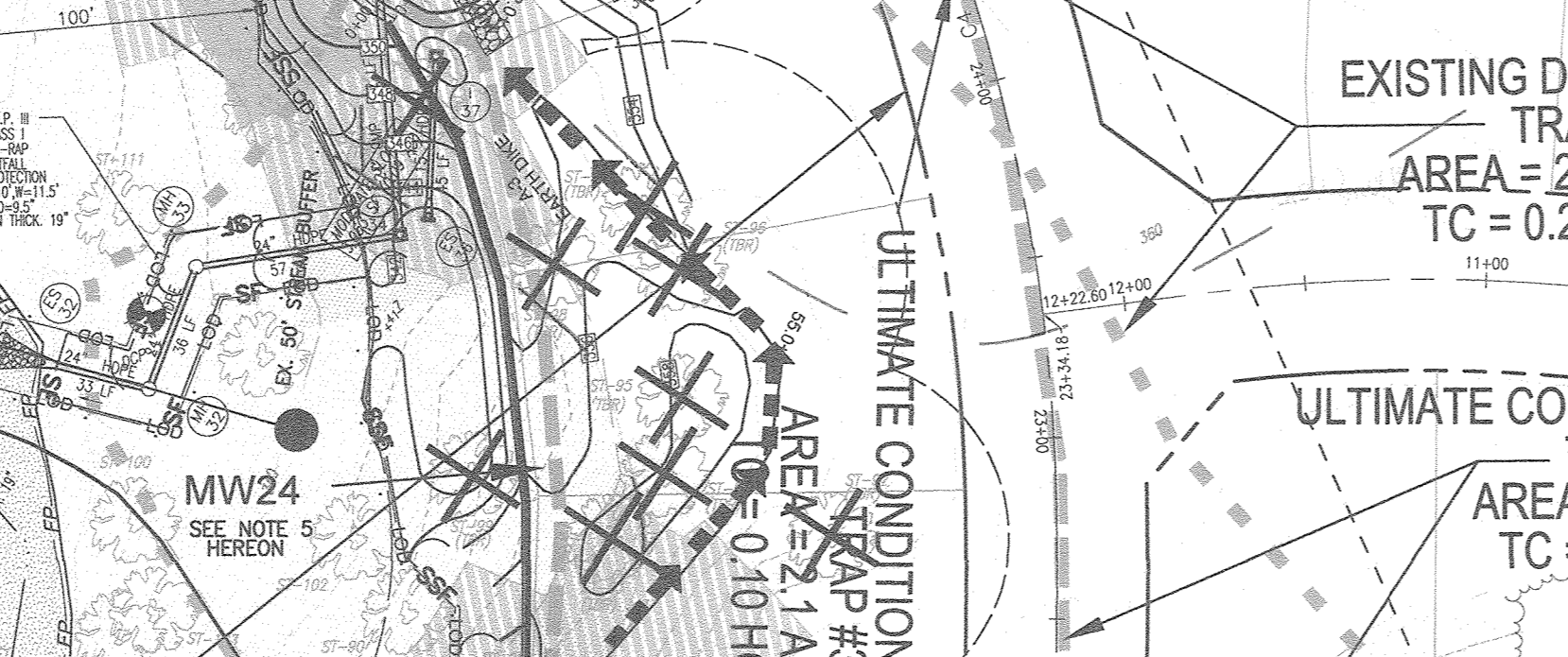
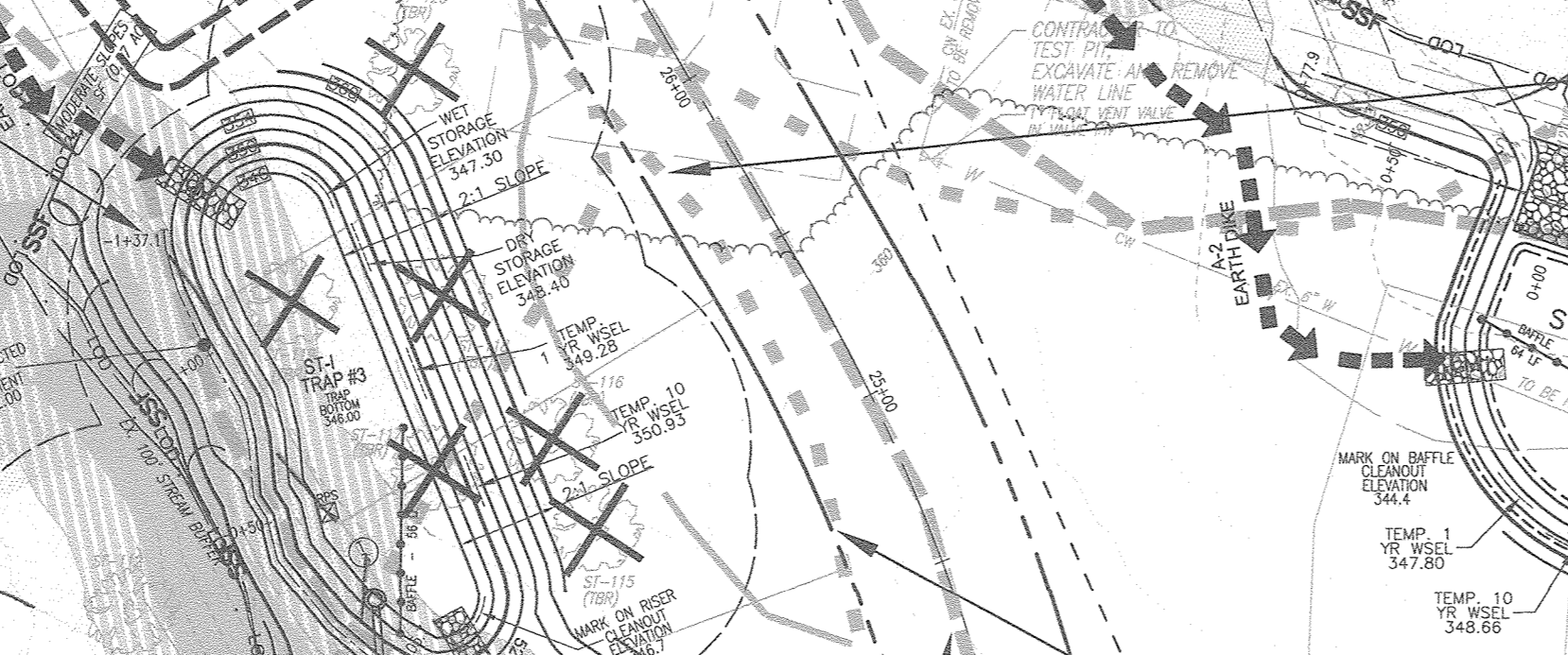
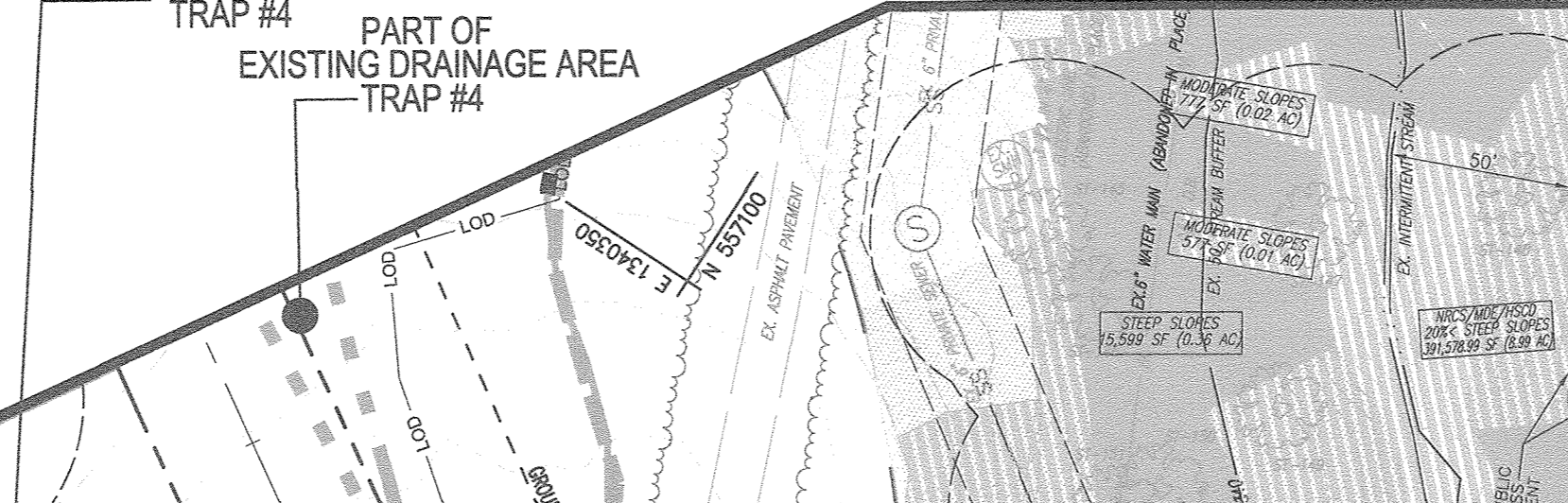
1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON OCTOBER 29, 2014. AVAILABLE ON-LINE AT: <http://websoilsurvey.nrcs.usda.gov/napp/index.html>

2. HYDROIC SOIL INFORMATION ADAPTED FROM THE NATIONAL HYDROIC SOILS LIST, AT: <http://nrcs.usda.gov/hydroic/>, CONSULTED ON OCTOBER 29, 2014.

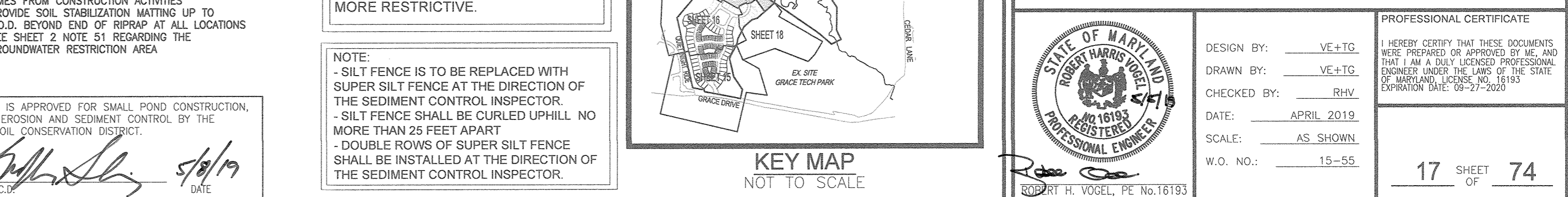
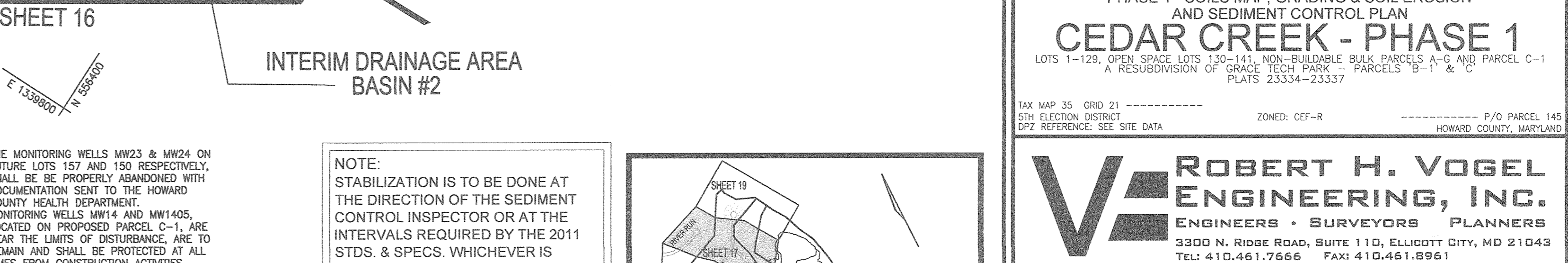
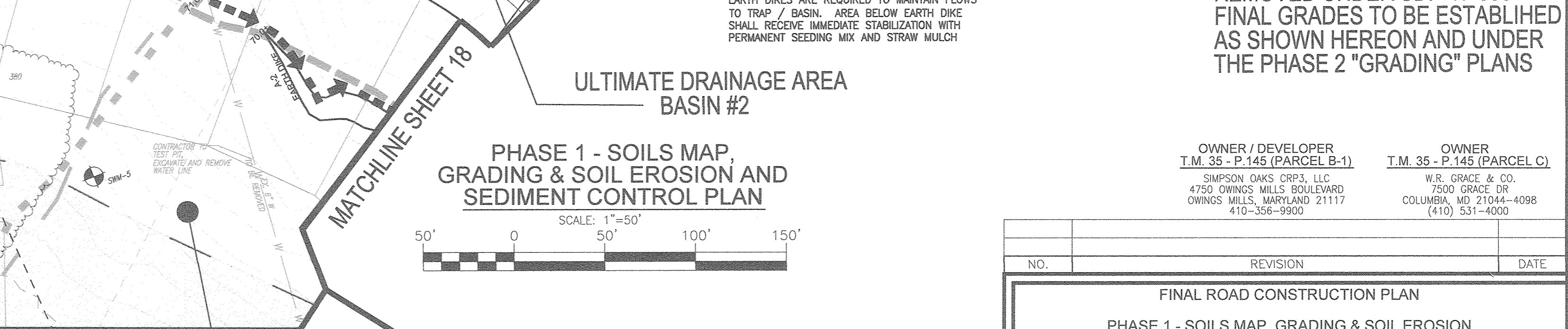
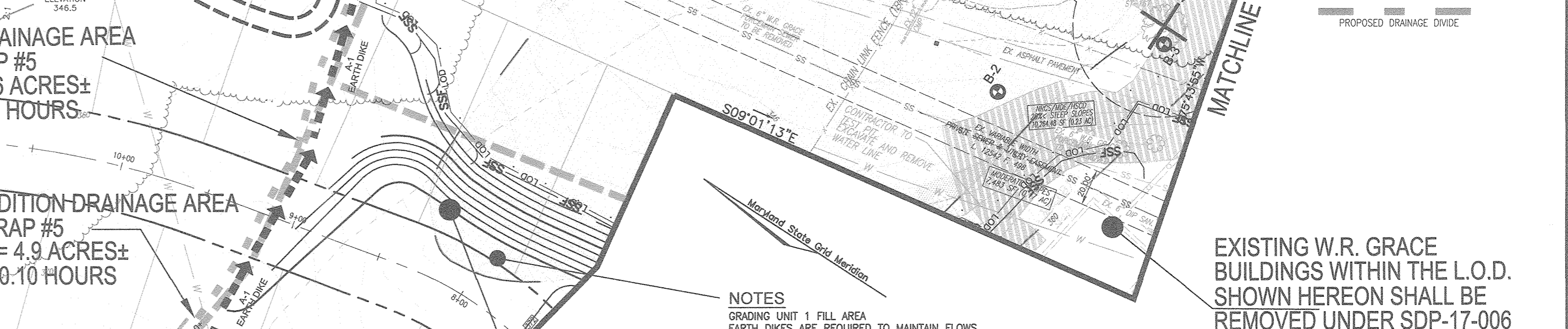
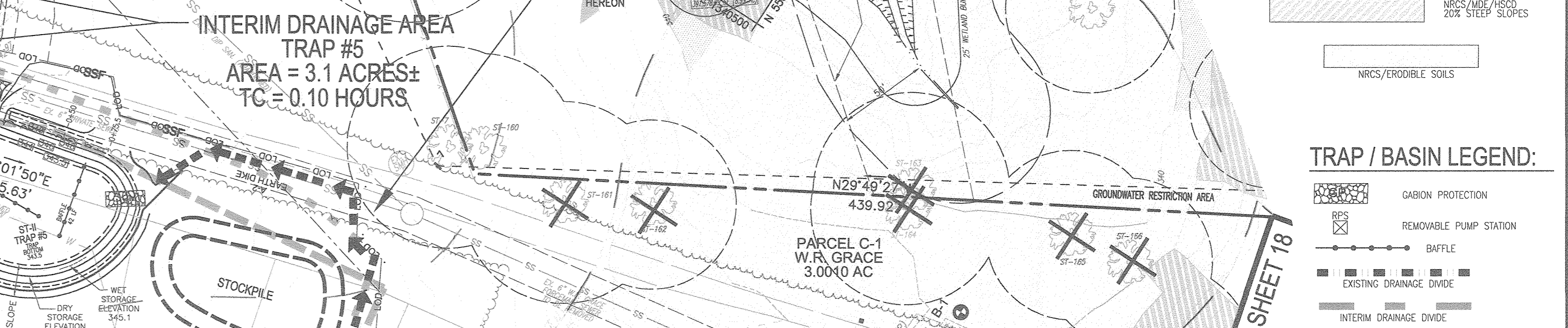
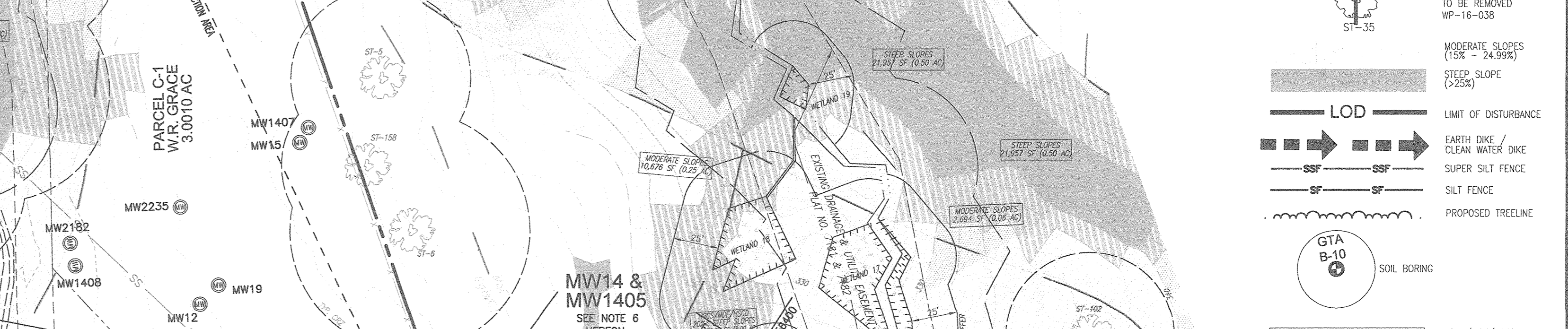
INTERIM DRAINAGE AREA TRAP #3  
AREA = 3.0 ACRES±  
TC = 0.10 HOURS



MATCHLINE SHEET 19



MATCHLINE SHEET 18



LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- FP EXISTING FLOOD PLAN
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL
- EXISTING SPECIMEN TREE TO BE REMOVED WP-16-038
- MODERATE SLOPES (15% - 24.99%)
- STEEP SLOPE (>25%)
- LIMIT OF DISTURBANCE
- EARTH DIKE / CLEAN WATER DIKE
- SUPER SILT FENCE
- SILT FENCE
- PROPOSED TREELINE
- SOIL BORING
- NRCS/MSD/ASCS 20% STEEP SLOPES
- NRCS/ERODIBLE SOILS

TRAP / BASIN LEGEND:

- GABION PROTECTION
- REMOVABLE PUMP STATION
- BAFFLE
- EXISTING DRAINAGE DIVIDE
- INTERIM DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE

EXISTING W.R. GRACE BUILDINGS WITHIN THE L.O.D. SHOWN HEREON SHALL BE REMOVED UNDER SDP-17-006 FINAL GRADES TO BE ESTABLISHED AS SHOWN HEREON AND UNDER THE PHASE 2 "GRADING" PLANS

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 6-17-19

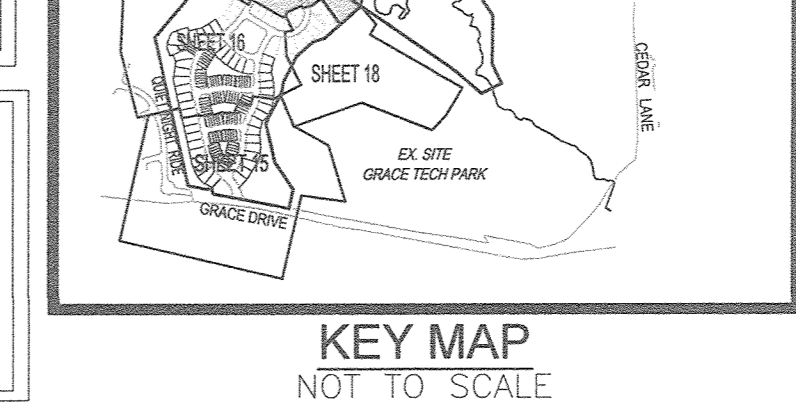
DESIGN CERTIFICATION:  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS, THAT IT REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

OWNER/DEVELOPER CERTIFICATION:  
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL, ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

NOTES:  
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.  
2. REFER TO SHEET 28-29 FOR BASIN/TRAPS DETAILS.  
3. REFER TO SHEETS 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.  
4. REFER TO SHEET 65-67 FOR SOIL BORINGS.  
5. THE MONITORING WELLS MW23 & MW24 ON FUTURE LOTS 157 AND 150 RESPECTIVELY, SHALL BE PROPERLY ABANDONED WITH DOCUMENTATION SENT TO THE HOWARD COUNTY HEALTH DEPARTMENT.  
6. MONITORING WELLS MW14 AND MW1405, LOCATED ON PROPOSED PARCEL C-1, ARE NEAR THE LIMITS OF DISTURBANCE, ARE TO REMAIN AND SHALL BE PROTECTED AT ALL TIMES FROM CONSTRUCTION ACTIVITIES.  
7. PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RRAP AT ALL LOCATIONS.  
8. SEE SHEET 2 NOTE 51 REGARDING THE GROUNDWATER RESTRICTION AREA.

NOTE:  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

NOTE:  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART.  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.



NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN  
PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 ORD 21 - 5TH ELECTION DISTRICT  
ZONED: CEF-R  
P/O PARCEL 145  
DPZ REFERENCE: SEE SITE DATA  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7565 FAX: 410.461.8961

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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: 09-27-2020

17 SHEET OF 74

ULTIMATE DRAINAGE AREA  
SEDIMENT BASIN #2  
AREA = 15.5 ACRES±  
TC = 0.10 HOURS

INTERIM DRAINAGE AREA  
SEDIMENT BASIN #2  
AREA = 16.4 ACRES±  
TC = 0.10 HOURS

EXISTING DRAINAGE AREA  
SEDIMENT BASIN #2  
AREA = 1.4 ACRES±  
TC = 0.18 HOURS

PHASE 1 - SOILS MAP,  
GRADING & SOIL EROSION AND  
SEDIMENT CONTROL PLAN

SCALE: 1"=50'  
50' 0 50' 100' 150'

"W.R. GRACE" POND  
TO BE RECONSTRUCTED  
PER MD-378 SPECIFICATIONS  
SEE DETAILS HEREIN  
SEE SEQUENCE OF CONSTRUCTION

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION,  
AND SOIL EROSION AND SEDIMENT CONTROL BY THE  
HOWARD SOIL CONSERVATION DISTRICT.

*Scott D. Pook* 5/11/19  
DATE

**OWNER/DEVELOPER CERTIFICATION:**  
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE  
PURSUANT TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN INCLUDING INSPECTING AND  
MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT  
WILL HAVE A CERTIFICATE OF TRAINING AT A HANDBOOK DEPARTMENT OF THE APPROVED  
TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I  
SHALL ENGAGE A HANDBOOK REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND  
PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30  
DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY,  
DISTRICT OF HOWARD COUNTY AND ANY AGENCIES.

*Scott D. Pook*  
OWNER/DEVELOPER SIGNATURE  
**Scott D. Pook Simpson Oaks CRP, LLC**  
PRINTED NAME & TITLE

**DESIGN 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 SOIL CONSERVATION  
DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL  
ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION  
DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*Robert H. Vogel* 5/11/19  
DESIGNER'S SIGNATURE  
**ROBERT H. VOGEL**  
PRINTED NAME  
MD REGISTRATION NO. 16193  
(P.E., R.L.S., OR R.L.A. (circle one))

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

*James* 6/11/2019  
CHIEF, BUREAU OF HIGHWAYS  
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Al Chish* 6.17.19  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE  
*Walt* 6.26.19  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EX. ELECTRIC CONDUIT
- EX. ZONING LINE
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EXISTING FLOOD PLAN
- EXISTING TREENE (FIELD LOCATED)
- EXISTING STERAM
- EXISTING STERAM BUFFER
- EXISTING WETLAND BUFFER
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- EX. MONITORING WELL
- EXISTING FLOOD PLAN
- EXISTING SPECIMEN TREE TO BE REMOVED
- EXISTING SPECIMEN TREE TO BE REMOVED WP-15-038
- LOD
- LIMIT OF DISTURBANCE
- EARTH DIKE / CLEAN WATER DIKE
- SUPER SILT FENCE
- SILT FENCE
- PROPOSED TREENE
- MODERATE SLOPES (1.5% - 24.99%)
- STEEP SLOPES (25%+)
- NIICS/ERODIBLE SOILS

EXISTING W.R. GRACE  
BUILDINGS WITHIN THE  
L.O.D. SHOWN HEREON  
SHALL BE REMOVED  
UNDER SDP-17-006 FINAL  
GRADES TO BE ESTABLISHED  
AS SHOWN HEREON

NOTE

THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENVIRONMENTAL ENCROACHMENTS FOR THE RECONSTRUCTION OF THE OFF-SITE W.R. GRACE FARM POND TO MEET CURRENT MD-378 SPECIFICATIONS "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

BASIN LEGEND:

- GABION PROTECTION
- REMOVABLE PUMP STATION
- BAFFLE
- EXISTING DRAINAGE DIVIDE
- INTERIM DRAINAGE DIVIDE
- PROPOSED DRAINAGE DIVIDE

BASIN #2

FACILITY TYPE: TEMPORARY BASIN  
EX. DRAINAGE AREA: 1.40 AC.  
INTERIM DRAINAGE AREA: 16.4 AC.  
ULTIMATE DRAINAGE AREA: 15.5 AC.  
TOTAL WET STORAGE ROD: 29,520 CF  
TOTAL DRY STORAGE ROD: 29,520 CF  
TOTAL STORAGE REQUIRED: 59,040 CF  
TOTAL WET STORAGE PRVD: 30,588 CF  
TOTAL DRY STORAGE PRVD: 31,291 CF  
TOTAL STORAGE PROVIDED: 61,879 CF  
BOTTOM ELEV.: 360.00  
RISER CREST ELEVATION: 365.00  
WET STORAGE ELEVATION: 360.00-361.50  
DRY STORAGE ELEVATION: 361.50-362.90  
TOTAL STORAGE DEPTH: 2.9' (362.90-360.00)  
TOP OF EMBANKMENT: 368.00 (SETTLED)  
CLEANOUT ELEVATION: 360.80  
SIDE SLOPES: 2:1 INSIDE, 3:1 OUTSIDE  
EMERGENCY SPILLWAY: 18'  
Q1 (EX.): 0.0 CFS  
Q1 (BASIN): 0.70 CFS  
THROUGH DEWATER DEVICE ORIFICE  
1 YR. TSWM WSEL = 364.58  
10 YR. TSWM WSEL = 366.52  
BAFFLE DESIGN: SEE SHT 27

NOTE:  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

NOTE:  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	PERMEABILITY	K FACTOR	PRIME FIRMNESS	CLAY CONTENT	ERODIBILITY
Co	COODRUS & HARBORO SILT LOAM, 0-3% SLOPES	C	NO	PARTIALLY	0.37	NO	YES	NO
GsB	GLENELE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO
GsB	GLENELE-URBAN LAND-DEVELOPMENTS COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO
GmB	GLENELE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES
GmC	GLENELE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	YES
GsB	GLENELE-URBAN LAND-DEVELOPMENTS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES	NO
MmB	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO
MmC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO
MmD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES	NO
MmF	MANOR-URBAN LAND-DEVELOPMENTS COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.35	NO	YES	NO

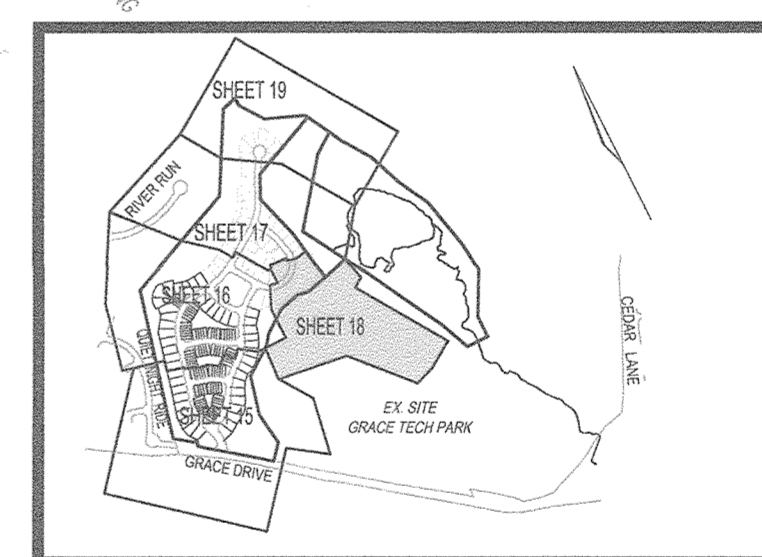
TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

NOTES

- REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
- REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
- REFER TO SHEETS 28 FOR STANDARD DETAILS AND STABILIZATION NOTES.
- REFER TO SHEET 65-67 FOR SOIL BORINGS.
- THE MONITORING WELL MW25 LOCATED ON OPEN SPACE LOT 139 IS TO REMAIN AND SHALL BE PROTECTED / PLACED WITHIN A MANHOLE UNTIL W.R. GRACE IS ALLOWED TO REMOVE THE WELL.
- PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL LOCATIONS.

NOTES

- ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
- IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.



W R GRACE & CO - CONN  
7450 GRACE DRIVE  
TAX MAP 35 PARCEL 367  
LOT 2  
L. 4799 F. 44  
PLAT NO. 3990  
7.12 AC.  
ZONING: PEC  
USE: RESIDENTIAL  
TAX ACCOUNT #05-373093

OWNER / DEVELOPER  
T.M. 35 - P. 145 (PARCEL B-1)  
SIMPSON OAKS CRP, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-366-9900

OWNER  
T.M. 35 - P. 145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
PHASE 1 - SOILS MAP, GRADING & SOIL EROSION  
AND SEDIMENT CONTROL PLAN  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 DRD 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

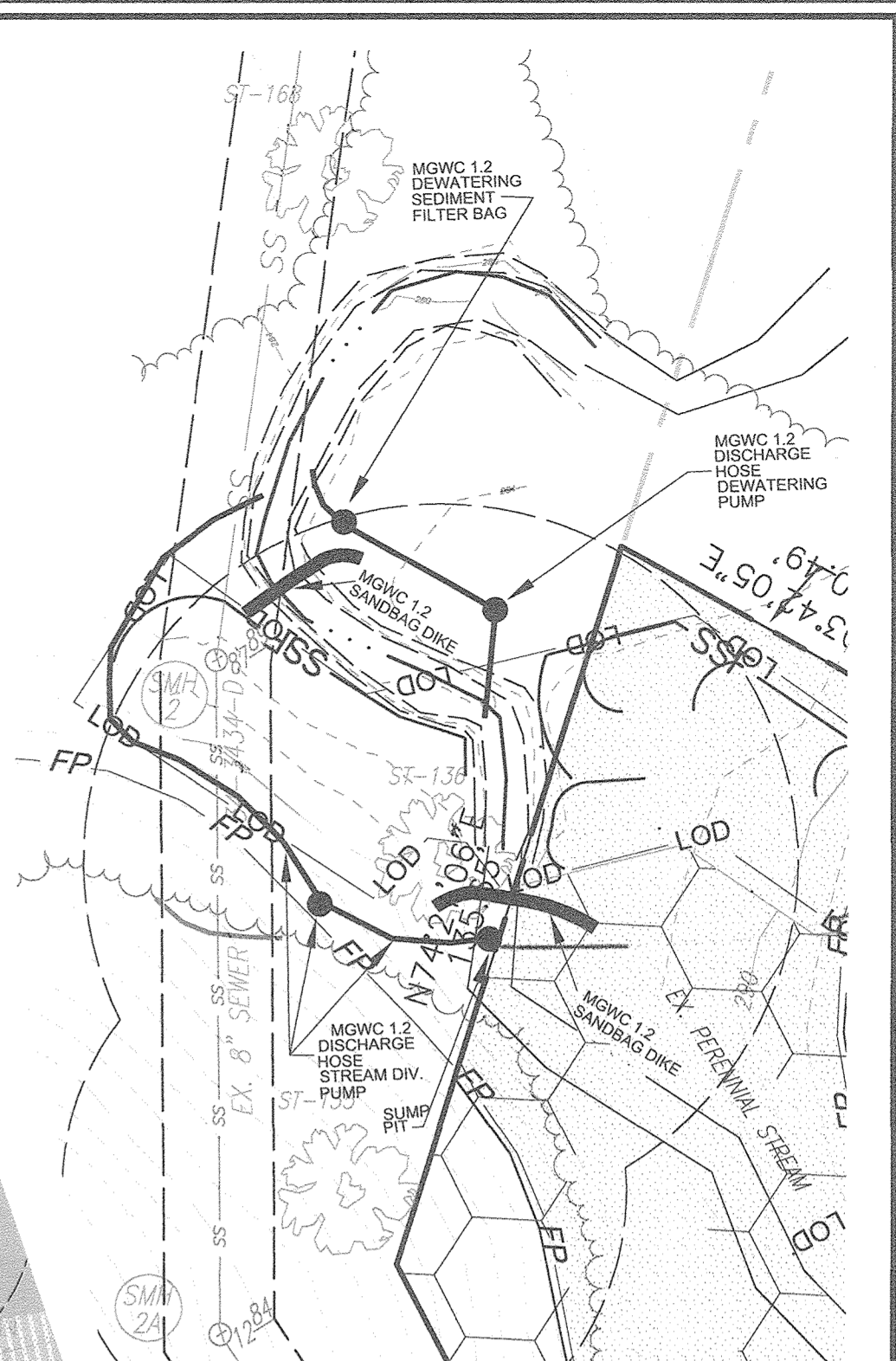
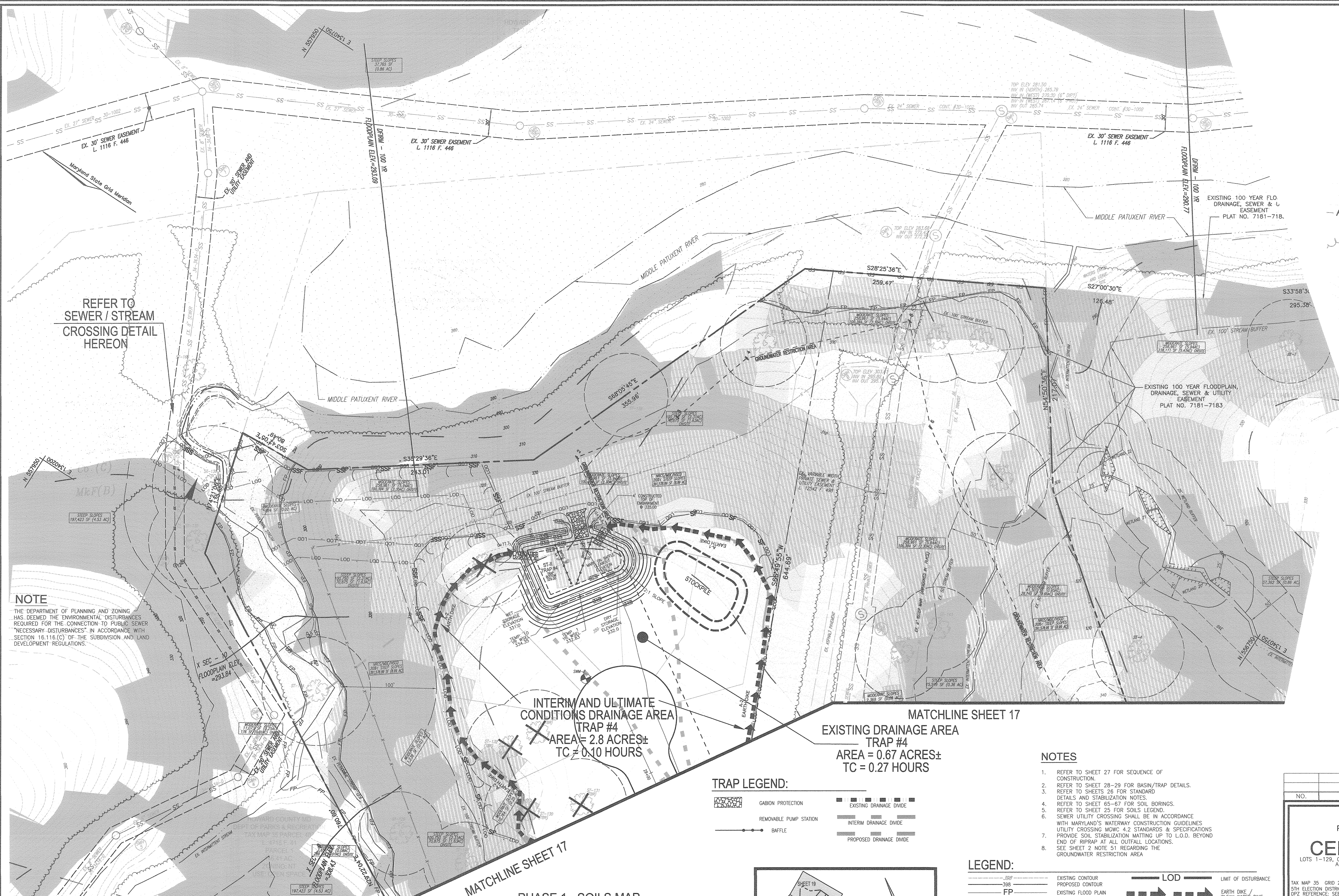
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL**  
ENGINEERS • SURVEYORS PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

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: 09-27-2020

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

18 SHEET OF 74



**SEWER / STREAM CROSSING DETAIL**  
SCALE: 1"=50'  
DETAILS SHEET 28

- NOTES**
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
  2. IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.

**NOTE:**  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

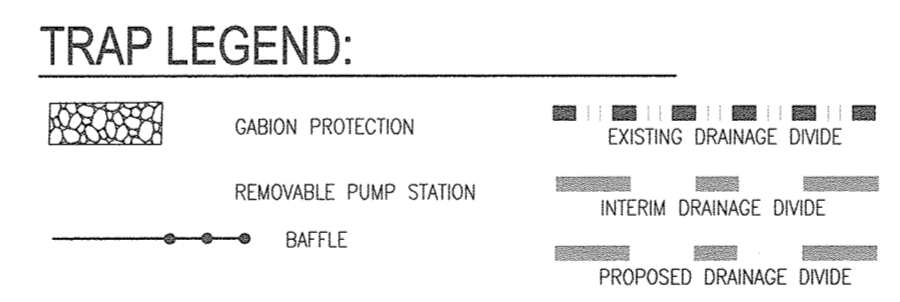
**NOTE:**  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

REFER TO SEWER / STREAM CROSSING DETAIL HEREON

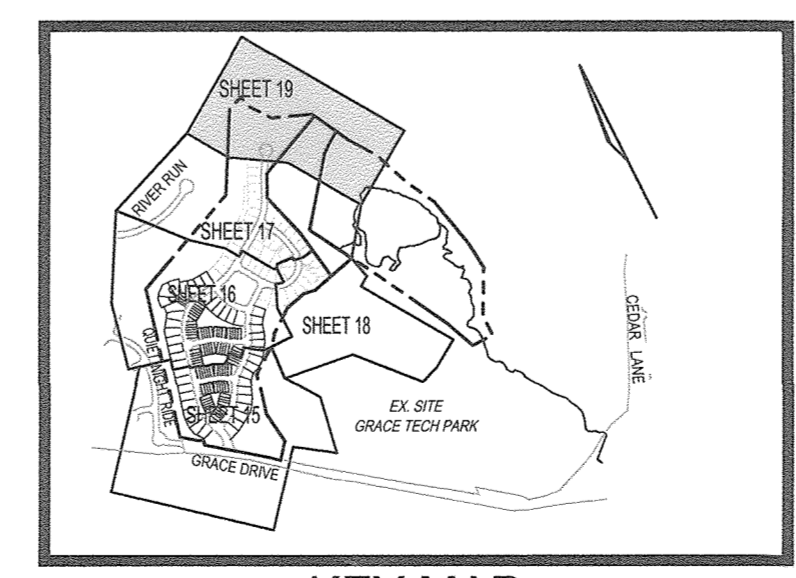
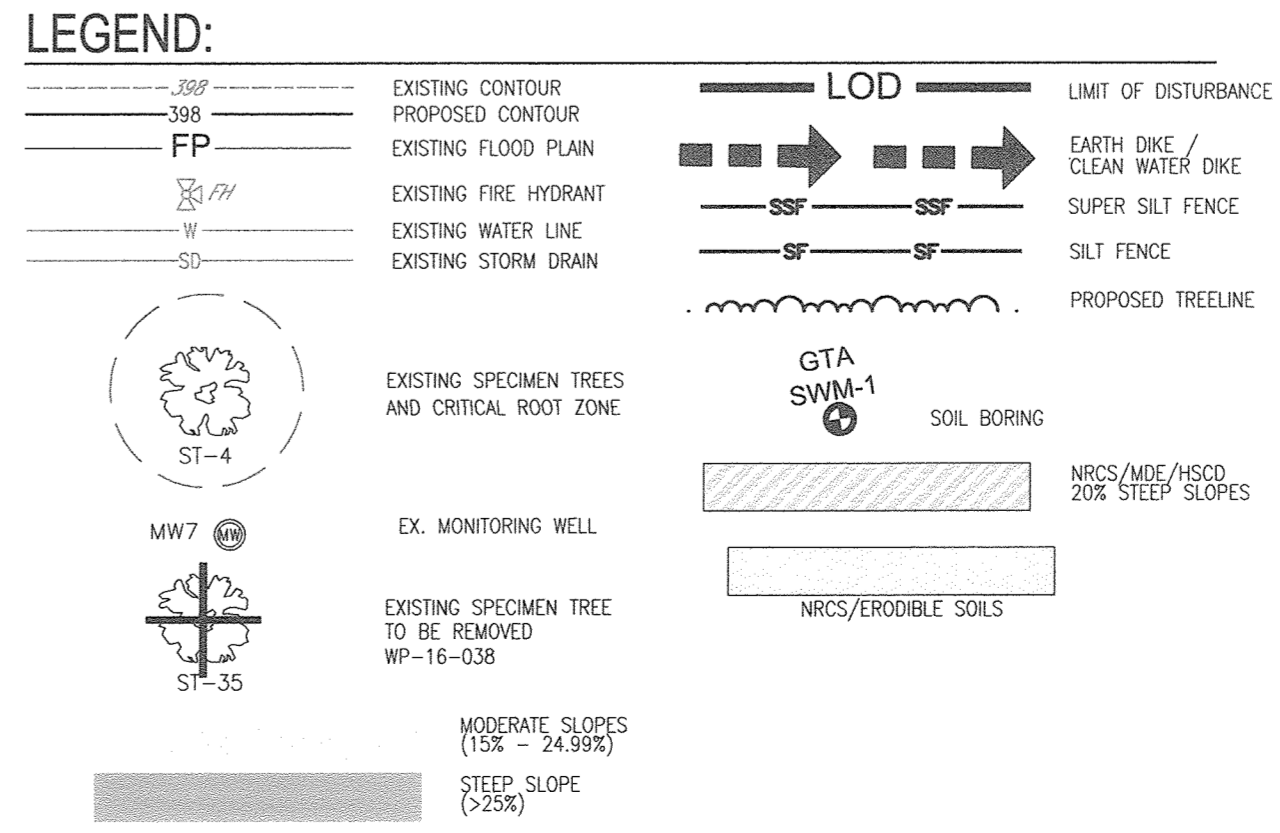
**NOTE**  
THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE ENVIRONMENTAL DISTURBANCES REQUIRED FOR THE CONNECTION TO PUBLIC SEWER "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 18.116 (C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

**INTERIM AND ULTIMATE CONDITIONS DRAINAGE AREA TRAP #4**  
AREA = 2.8 ACRES±  
TC = 0.10 HOURS

**EXISTING DRAINAGE AREA TRAP #4**  
AREA = 0.67 ACRES±  
TC = 0.27 HOURS

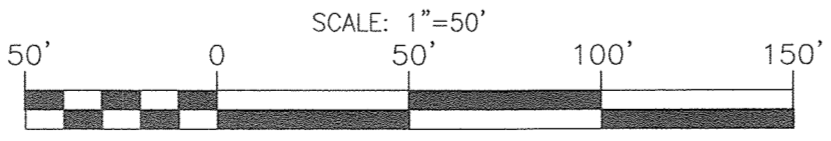


- NOTES**
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  2. REFER TO SHEETS 28-29 FOR BASIN/TRAP DETAILS.
  3. REFER TO SHEETS 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.
  4. REFER TO SHEET 65-67 FOR SOIL BORINGS.
  5. REFER TO SHEET 25 FOR SOILS LEGEND.
  6. SEWER UTILITY CROSSING SHALL BE IN ACCORDANCE WITH MARYLAND'S WATERWAY CONSTRUCTION GUIDELINES UTILITY CROSSING MGWC 4.2 STANDARDS & SPECIFICATIONS PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.
  7. SEE SHEET 2 NOTE 51 REGARDING THE GROUNDWATER RESTRICTION AREA



**KEY MAP**  
NOT TO SCALE

**PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN**



**SEWER MAIN NOTE**  
THE DEVELOPER WILL OBTAIN ALL NECESSARY STATE PERMITS FOR THE PROPOSED ENVIRONMENTAL IMPACTS. MDE TRACKING NUMBER IS: 201861491 \ N/A ALL WORK IN THE NONTIDAL WETLANDS, WETLAND BUFFERS SHALL BE COMPLETED PER THE BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS. SEE SHEET 24

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Robert H. Vogel* 6-17-19  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*Robert H. Vogel* 6-26-19  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD COUNTY SOIL CONSERVATION DISTRICT.  
*Scott D. Rouk* 5/8/19  
HOWARD COUNTY SOIL CONSERVATION DISTRICT DATE

**DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*Robert H. Vogel* 5/8/19  
DESIGNER'S SIGNATURE DATE  
ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
P.E. R.L.S. OR R.L.A. (circle one)

**OWNER/DEVELOPER CERTIFICATION:**  
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD COUNTY SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD COUNTY SOIL CONSERVATION DISTRICT AND/OR MDE.

*Scott D. Rouk*  
OWNER/DEVELOPER SIGNATURE  
SCOTT D. ROUK SIMPSON OAKS CAPCO, LLC.  
PRINTED NAME & TITLE

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
PHASE 1 - SOILS MAP, GRADING & SOIL EROSION AND SEDIMENT CONTROL PLAN  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1 A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 GRD 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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: 09-27-2020

19 SHEET OF 74

**LEGEND:**

EXISTING CONTOUR	EXISTING STORM DRAIN	EXISTING STORM DRAIN	EXISTING STORM DRAIN
PROPOSED CONTOUR	EX. ELECTRIC CONDUIT	EXISTING THELINE	EXISTING THELINE
EXISTING SPOT ELEVATION	EXISTING CURB AND GUTTER	EXISTING STRAM	EXISTING STRAM BUFFER
EXISTING UTILITY POLE	EXISTING LIGHT POLE	EXISTING WETLAND	EXISTING WETLAND BUFFER
EXISTING SANITARY MANHOLE	EXISTING SIGN	EXISTING FENCE	EXISTING FENCE BUFFER
EXISTING SANITARY LINE	EXISTING SANITARY MANHOLE	PROPERTY LINE	RIGHT-OF-WAY LINE
EXISTING CLEANOUT	EXISTING FIRE HYDRANT	SOILS BOUNDARY	
EXISTING WATER LINE			

MODERATE SLOPES (1% - 24.99%)	FOREST CONSERVATION AREA (REFORESTATION)	SILT FENCE	CLUMP INLET PROTECTION
STEEP SLOPE (>25%)	FOREST CONSERVATION AREA (RETENTION)	CURB	STANDARD INLET PROTECTION
EX. MONITORING WELL	MICRO BIODIVERSITY AREA	PROPOSED CURB	PERMANENT CHANNEL PROTECTION PSSMC = 1.75 LB/FT <sup>2</sup>
PROPOSED CURB	PROP. 10' TREE MAINTENANCE EASEMENT	LOD	TEMPORARY CHANNEL PROTECTION TSSMC = 1.50 LB/FT <sup>2</sup>
EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE	LIMIT OF DISTURBANCE	SSS	ERODIBLE SOILS
PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT	PROPOSED TREE LINE		
PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT	EARTH DIKE CLEAN WATER DIKE		
	WICK AND PRESS 30% STEEP SLOPES		

**NOTE:**

- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.
- SILT FENCE SHALL BE CURLED UPHILL. NO MORE THAN 25 FEET APART
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

**NOTE:**

STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

**OWNER/DEVELOPER CERTIFICATION:**

I HEREBY CERTIFY THAT ANY GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND MDE.

*Scott D. Park*  
OWNER/DEVELOPER SIGNATURE  
Scott D. Park P.M., Simpson Oaks Crp3, LLC.  
PRINTED NAME & TITLE

**DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

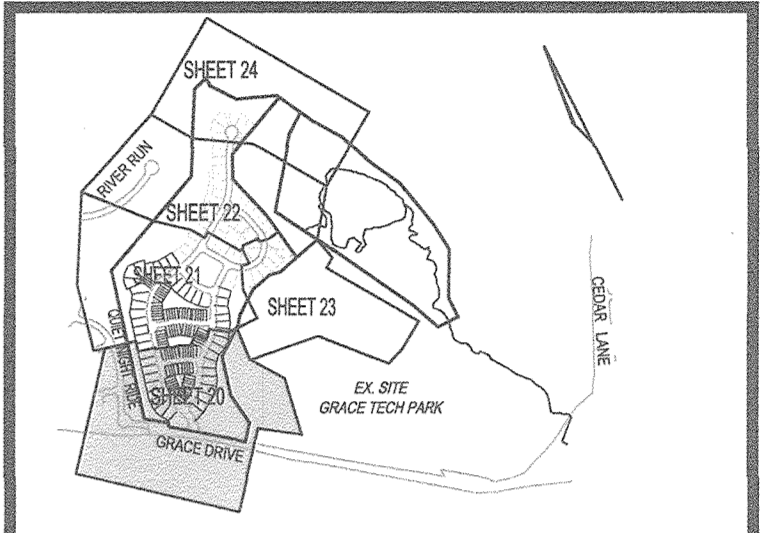
*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
(P.E., R.L.S., OR R.L.A. [circle one])  
DATE: 5/16/19

**NOTE:**

THE DEPARTMENT OF PLANNING AND ZONING HAS REVIEWED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OUTFALL OCCURRING ALONG GRACE DRIVE A "NECESSARY DISTURBANCE" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

*Robert H. Vogel*  
DATE: 5/16/19



**SWALE TO I-127**  
BOTTOM = 2.0'  
SIDE SLOPES = 2.25:1  
SLOPE = 2.5%  
Q10 = 1.49 CFS\*  
V10 = 2.38 FPS  
d10 = 0.24'

IMMEDIATELY STABILIZE ENTIRE CUT SLOPE WITH PSSMS 2.25 LB/FT<sup>2</sup>  
PROVIDE PSSMC 1.75 LB/FT<sup>2</sup> IN BENCH SWALE AND STABILIZE WITH PERMANENT SEED MIX

**SWALE TO I-221**  
BOTTOM = 2.0'  
SIDE SLOPES = 2.25:1  
SLOPE = 3.1%  
Q10 = 0.21 CFS\*  
V10 = 1.32 FPS  
d10 = 0.07'

IMMEDIATELY STABILIZE ENTIRE CUT SLOPE WITH PSSMS 2.25 LB/FT<sup>2</sup>  
PROVIDE PSSMC 1.75 LB/FT<sup>2</sup> IN BENCH SWALE AND STABILIZE WITH PERMANENT SEED MIX

**SWALE TO I-218A**  
PROVIDE PSSMC 1.75 LB/FT<sup>2</sup> IN BENCH SWALE AND STABILIZE WITH PERMANENT SEED MIX

**NOTE:**

TREE PROTECTION FENCING SHALL BE INSTALLED AROUND TREES TO REMAIN. SEE DETAIL SHEET 51.

IMMEDIATELY STABILIZE ENTIRE CUT SLOPE WITH PSSMS 2.25 LB/FT<sup>2</sup>

REFER TO SHEET 29 FOR SEDIMENT CONTROL FENCE RECONFIGURATION AFTER STABILIZATION

- NOTES**
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
  2. IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.
  3. UNLESS DETAILED HEREON, STORM DRAIN OUTFALL PROTECTION SHALL BE ROP III CLASS 1, L=9.5', W=11', D50 = 9.5' AND MIN THICKNESS OF 19".
  4. PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

- NOTES**
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  2. REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
  3. REFER TO SHEET 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.
  4. REFER TO SHEET 25 FOR SOILS LEGEND.

**OWNER / DEVELOPER**  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE
	FINAL ROAD CONSTRUCTION PLAN	
	PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN	
	<b>CEDAR CREEK - PHASE 1</b>	
	LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1	
	A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"	
	PLATS 23334-23337	

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA  
ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-27-2009

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

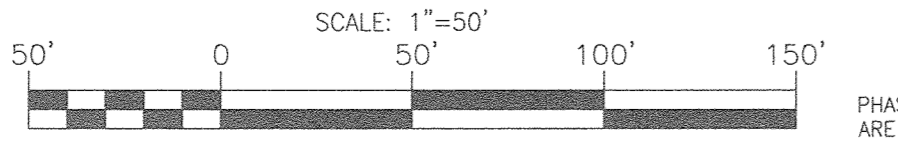
20 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Robert H. Vogel*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

*Robert H. Vogel*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.26.19

**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**



PHASE 1 - SEDIMENT CONTROLS ARE SHOWN HEREON AND ARE TO BE UTILIZED. REMOVAL OF ANY DEVICE SHALL BE AS DIRECTED BY THE SEDIMENT CONTROL INSPECTOR.



- NOTES**
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
  2. IMBRICATE SF/SF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2" IN ELEVATION.
  3. UNLESS DETAILED HEREON, STORM DRAIN OUTFALL PROTECTION SHALL BE RPP H CLASS 1, L=9.5', W=11', D50 = 9.5" AND MIN THICKNESS OF 18".
  4. PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

**OWNER/DEVELOPER CERTIFICATION:**  
 I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

*Scott D. Paul*  
 OWNER/DEVELOPER SIGNATURE  
**SCOTT D. PAUL PM Simpson OAKS CPP3, LLC.**  
 PRINTED NAME & TITLE

**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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

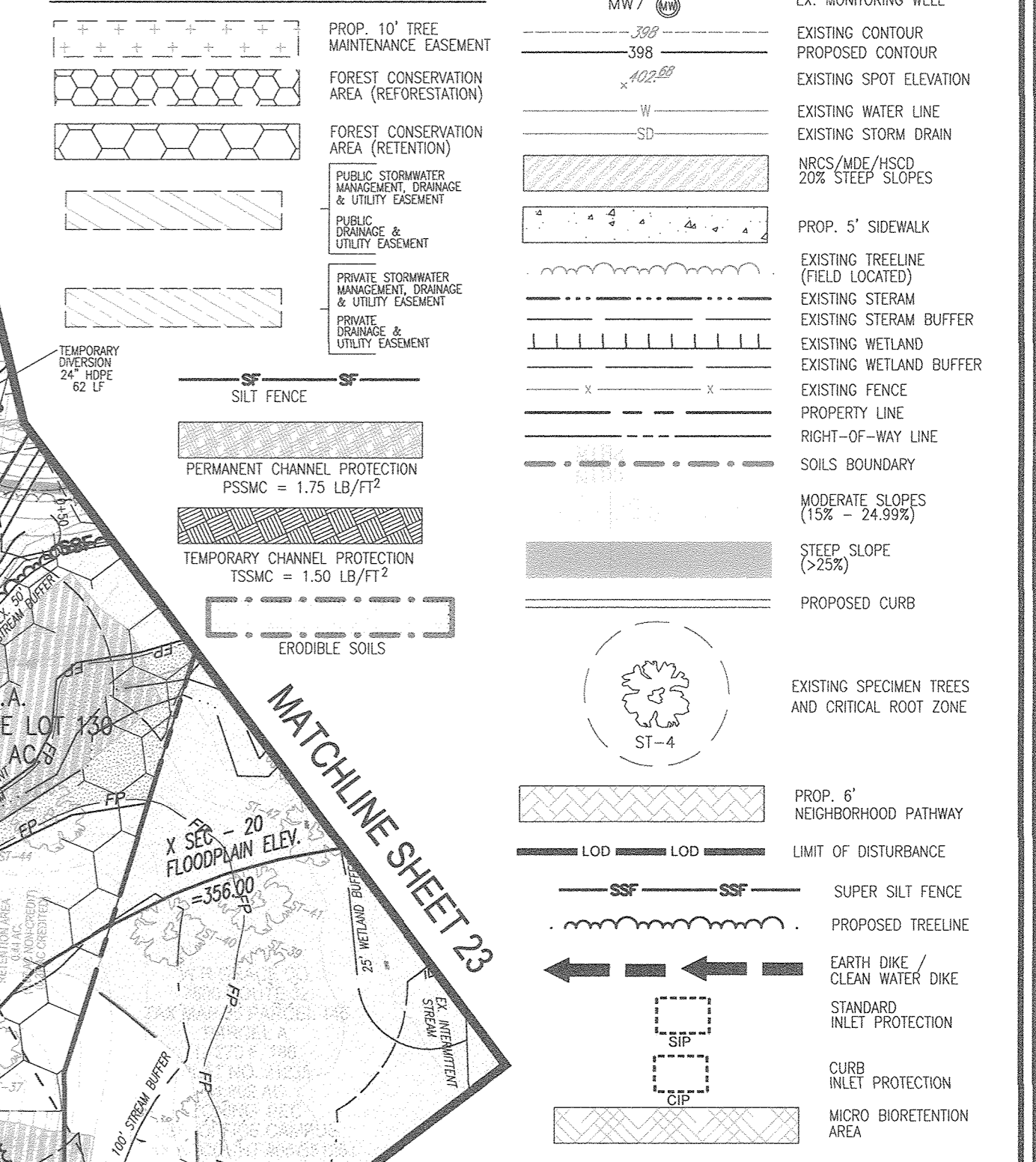
*Robert H. Vogel*  
 DESIGNER'S SIGNATURE  
**ROBERT H. VOGEL**  
 PRINTED NAME

MD REGISTRATION NO. 16193  
 (P.E., R.L.S., OR R.L.A. (circle one))  
 DATE: **5/18/19**

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

*Robert H. Vogel*  
 HOWARD S.C.D. DATE: **5/18/19**

**LEGEND:**



- NOTES**
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  2. REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
  3. REFER TO SHEETS 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.
  4. REFER TO SHEET 65-67 FOR SOIL BORINGS.

**OWNER / DEVELOPER**  
 T.M. 35 - P.145 (PARCEL C-1) & T.M. 35 - P.412 (PARCEL B-1)  
 SIMPSON OAKS CPP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER**  
 T.M. 35 - P.145 (PARCEL C) & T.M. 35 - P.412 (PARCEL A)  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL**  
**ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8951

**PROFESSIONAL CERTIFICATE**

DESIGN BY: **VE+TG**  
 DRAWN BY: **VE+TG**  
 CHECKED BY: **RHV**  
 DATE: **APRIL 2019**  
 SCALE: **AS SHOWN**  
 W.O. NO.: **15-55**

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: 09-27-2023

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

21 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*Stamp*  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: **6/11/2019**

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Stamp*  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: **6-17-19**

*Stamp*  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: **6-26-19**

**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**  
 SCALE: 1"=50'  
 50' 0 50' 100' 150'

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	PERCENT SAND	PERCENT SILT	PERCENT CLAY	PERCENT ORGANIC	PERCENT ROCK	PERCENT COBBLES	PERCENT GRAVEL	PERCENT STONES	PERCENT Boulders
BaA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES	NO	NO	NO	NO	NO
Cp	CEORGUS & HAYWARD SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY*	0.37	NO	YES	NO	NO	NO	NO	NO
GhB	GLENLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO	NO	NO	NO	NO
GhD	GLENLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO	NO	NO	NO
GmB	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY*	0.43	YES	YES	NO	NO	NO	NO	NO
GmC	GLENVILLE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	NO	NO	NO	NO	NO
GmD	GLENVILLE-URBAN LAND-UDORIENTS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES	NO	NO	NO	NO	NO
MbB	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO	NO	NO	NO
MbC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO	NO	NO	NO
MdD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES	NO	NO	NO	NO	NO
MdF	MANOR-BRONZLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES	NO	NO	NO	NO	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

**NOTES:**  
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.15 AND WITH A SLOPE GREATER THAN 5 PERCENT

MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17									
SYMBOL	NAME / DESCRIPTION	GROUP	HYDROIC INCLUSIONS	K FACTOR	PERM. FARMLAND	ERODIBLE	ST-1	ST-2	ST-3
So	SAND, SLEIGHTLY TO 1 PERCENT SLOPES	C/20	YES	0.37	NO	NO	NO	NO	NO
Co	CODRUS & HATBORO SLEIGHTLY TO 3 PERCENT SLOPES	C	PARTIALLY	0.37	NO	NO	NO	NO	NO
GaB	GLENVIEW LOAM, 3 TO 8 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
GaB	GLENVIEW-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	0.28	NO	NO	NO	NO	NO
GmB	GLENVIEW SLEIGHTLY TO 8 PERCENT SLOPES	C	PARTIALLY	0.43	YES	YES	YES	YES	YES
GmC	GLENVIEW SLEIGHTLY TO 8-15% SLOPES	C	NO	0.43	YES	YES	YES	YES	YES
GmB	GLENVIEW-URBAN LAND COMPLEX, 0-8% SLOPES	C	NO	0.43	NO	NO	NO	NO	NO
MaB	MAJOR LOAM, 3-8% SLOPES	B	NO	0.28	YES	NO	NO	NO	NO
MaC	MAJOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	0.28	YES	NO	NO	NO	NO
MaD	MAJOR LOAM, 15-25% SLOPES	B	NO	0.28	NO	NO	NO	NO	NO
MbF	MAJOR-BRONZLOW COMPLEX, 25-55% SLOPES, VERY ROCKY	B	NO	0.32	NO	NO	NO	NO	NO

NOTE: 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

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON OCTOBER 26, 2014. AVAILABLE ONLINE AT: <http://websoilsurvey.nrcs.usda.gov/wfquery/qw.cgi>

2. HYDROIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDROIC SOILS LIST, AT: <http://soils.usda.gov/soils/hydroic/>, CONSULTED ON OCTOBER 26, 2014.



**LEGEND:**

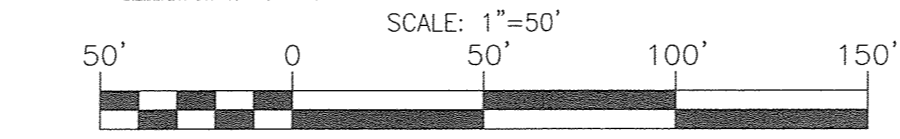
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING FLOOD PLAN
- EXISTING FLOOD HYDANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL
- EXISTING SPECIMEN TREE TO BE REMOVED
- MODERATE SLOPES (1:08 - 24:59)
- STEEP SLOPE (>25%)
- LOD - LIMIT OF DISTURBANCE
- SSF - SUPER SILT FENCE
- SF - SILT FENCE
- PROPOSED TREE LINE
- SUPER SILT FENCE
- EARTH DIKE / CLEAN WATER DIKE
- SILT FENCE
- CURB INLET PROTECTION
- STANDARD INLET PROTECTION
- PERMANENT CHANNEL PROTECTION (PSSMC = 1.75 LB/FT<sup>2</sup>)
- TEMPORARY CHANNEL PROTECTION (TSSMC = 1.50 LB/FT<sup>2</sup>)
- ERODIBLE SOILS
- PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT

EXISTING W.R. GRACE BUILDINGS WITHIN THE L.O.D. SHOWN HEREON SHALL BE REMOVED UNDER SDP-17-006 FINAL GRADES TO BE ESTABLISHED AS SHOWN HEREON AND UNDER THE PHASE 2 "GRADING" PLANS

- NOTES**
- REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  - REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
  - REFER TO SHEET 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.

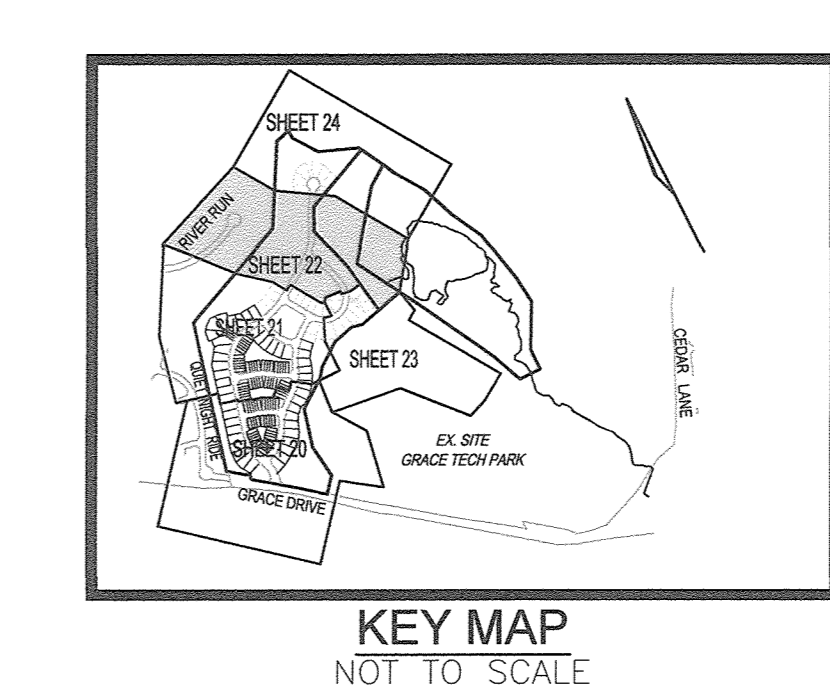
- NOTES**
- ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORK DAY.
  - IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.
  - PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**



**NOTE:** STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

**NOTE:** SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR. SILT FENCE SHALL BE CURLED UPHILL. NO MORE THAN 25 FEET APART. DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF ENGINEERING  
 DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-22-19

**DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

DESIGNER'S SIGNATURE: *Robert H. Vogel*  
 DATE: 5/17/19  
 PRINTED NAME: ROBERT H. VOGEL  
 M.D. REGISTRATION NO. 16193  
 R.L.S., OR R.L.A. (circle one)

**OWNER/DEVELOPER CERTIFICATION:**  
 I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

OWNER/DEVELOPER SIGNATURE: *Scott D. Poole*  
 DATE: 5/17/19  
 PRINTED NAME & TITLE: SCOTT D. POOLE, P.M., SIMPSON OAKS CRP3, LLC

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

**FINAL ROAD CONSTRUCTION PLAN**  
**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
 PLATS 23-334 - 23-337

TAX MAP 35 GRID 21  
 6TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE  
 DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHW  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

22 SHEET OF 74

ROBERT H. VOGEL, PE No.16193

NOTE:  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

NOTE  
PHASE 1 SF5F TO BE RELOCATED TO BELOW SWMF #2 LIMIT OF WORK

NOTE  
CONTRACTOR SHALL LOCATE EXISTING SEWER MAINS AND SUPPORTS IN THE VICINITY OF THE POND OUTFALL PIPE ALIGNMENT WELL IN ADVANCE OF CONSTRUCTION.  
UNINTERRUPTED SERVICE SHALL REMAIN DURING ALL PHASES OF POND RECONSTRUCTION

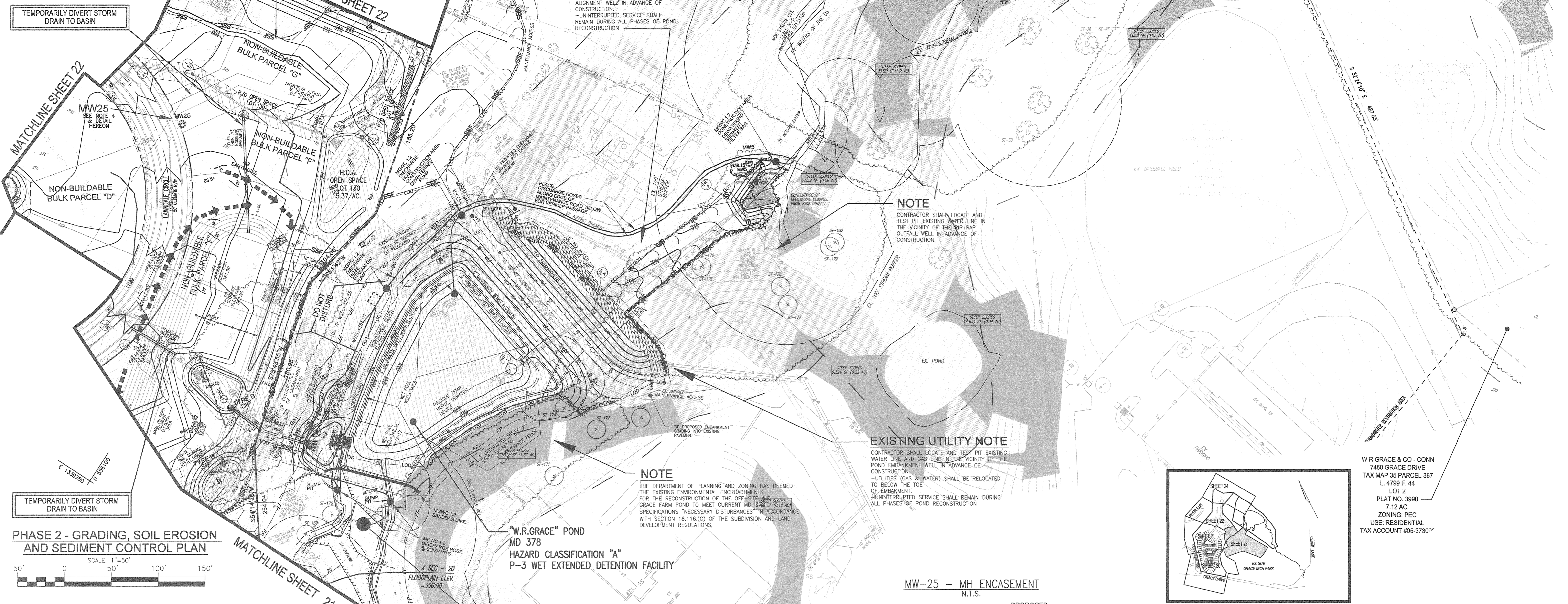
LEGEND:

- 398 --- EXISTING CONTOUR
- 398 --- EXISTING FLOOD PLAIN
- 398 --- EXISTING FIRE HYDRANT
- 398 --- EXISTING WATER LINE
- 398 --- EXISTING STORM DRAIN
- 398 --- EX. MONITORING WELL
- 398 --- EXISTING SPECIMEN TREE TO BE REMOVED
- 398 --- EX. MONITORING WELL
- 398 --- EX. MONITORING WELL
- 398 --- EX. MONITORING WELL

- LOD --- LIMIT OF DISTURBANCE
- SSF --- SUPER SILT FENCE
- SF --- SILT FENCE
- SF --- PROPOSED TREELINE
- SF --- SUPER SILT FENCE
- SF --- SUPER SILT FENCE
- SF --- EARTH DIKE / CLEAN WATER DIKE
- SF --- LIMIT OF DISTURBANCE
- SF --- SUPER SILT FENCE
- SF --- SILT FENCE
- SF --- PROPOSED TREELINE
- SF --- SUPER SILT FENCE
- SF --- SUPER SILT FENCE
- SF --- EARTH DIKE / CLEAN WATER DIKE

- SF --- PERMANENT CHANNEL PROTECTION PSSMC = 1.75 LB/FT<sup>2</sup>
- SF --- CURB INLET PROTECTION
- SF --- STANDARD INLET PROTECTION
- SF --- TEMPORARY CHANNEL PROTECTION TSSMC = 1.50 LB/FT<sup>2</sup>
- SF --- ERODIBLE SOILS

NOTE:  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL. NO MORE THAN 25 FEET APART  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.



PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN  
SCALE: 1"=50'  
50' 0 50' 100' 150'

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
*Scott D. Raitt* 5/6/19  
HOWARD S.C.D. DATE

OWNER/DEVELOPER CERTIFICATION:  
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL ON EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDC.

*Scott D. Raitt*  
OWNER/DEVELOPER SIGNATURE  
Scott D. Raitt, P.E. SIMPSON OAKS CRP3, LLC  
PRINTED NAME & TITLE

DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*Robert H. Vogel* 6/11/2019  
DESIGNER'S SIGNATURE DATE  
ROBERT H. VOGEL MD REGISTRATION NO. 16193  
PRINTED NAME (circle one) P.E. R.L.S., OR R.L.A. (circle one)

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS 6/11/2019 DATE

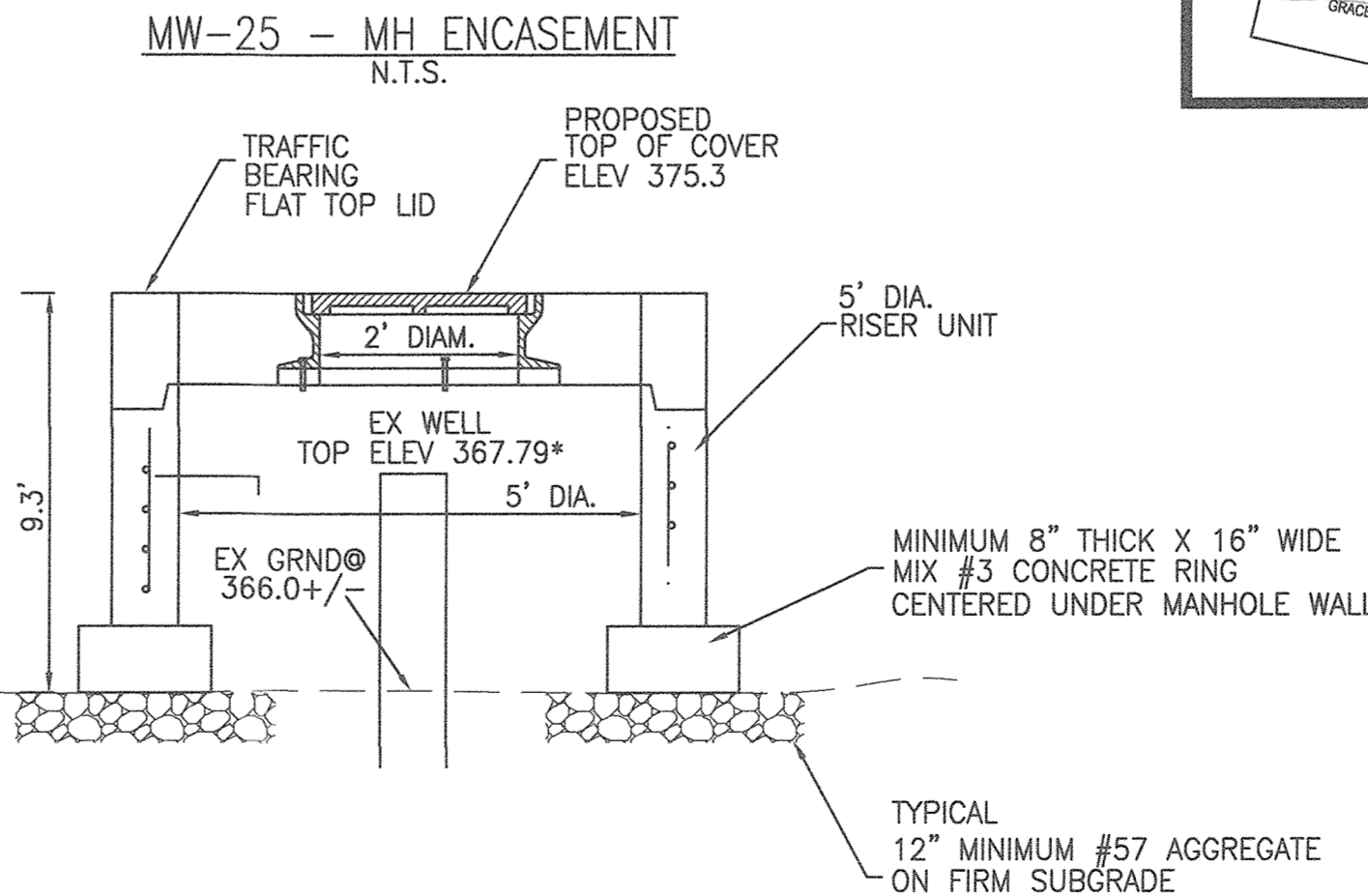
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION 6/17/19 DATE  
CHIEF, DIVISION OF LAND DEVELOPMENT 6/26/19 DATE

"W.R. GRACE" POND  
MD 378  
HAZARD CLASSIFICATION "A"  
P-3 WET EXTENDED DETENTION FACILITY

NOTE  
THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENVIRONMENTAL ENCROACHMENTS FOR THE RECONSTRUCTION OF THE OFF-SITE GRADE FARM POND TO MEET CURRENT MD-16.116(C) SPECIFICATIONS "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

NOTE  
CONTRACTOR SHALL LOCATE AND TEST PIT EXISTING WATER LINE AND GAS LINE IN THE VICINITY OF THE RIP RAP OUTFALL WELL IN ADVANCE OF CONSTRUCTION.  
UTILITIES (GAS & WATER) SHALL BE RELOCATED TO BELOW THE TOE OF EMBANKMENT.  
UNINTERRUPTED SERVICE SHALL REMAIN DURING ALL PHASES OF POND RECONSTRUCTION

EXISTING UTILITY NOTE  
CONTRACTOR SHALL LOCATE AND TEST PIT EXISTING WATER LINE AND GAS LINE IN THE VICINITY OF THE POND EMBANKMENT WELL IN ADVANCE OF CONSTRUCTION.  
UTILITIES (GAS & WATER) SHALL BE RELOCATED TO BELOW THE TOE OF EMBANKMENT.  
UNINTERRUPTED SERVICE SHALL REMAIN DURING ALL PHASES OF POND RECONSTRUCTION



NOTE  
THE DEVELOPER WILL OBTAIN ALL NECESSARY STATE PERMITS FOR THE PROPOSED ENVIRONMENTAL IMPACTS.  
-MDE FILE NO. 19-168-0028  
-MDE TRACKING NUMBER IS: #201861491  
-NWN  
ALL WORK IN THE NONTIDAL WETLANDS, WETLAND BUFFERS SHALL BE COMPLETED PER THE BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS. SEE SHEET 28.

HSCD NOTES  
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.  
2. IMBRICATE SF/SSF IN 2' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.  
3. PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

NOTES  
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.  
2. REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.  
3. REFER TO SHEET 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.  
4. THE MONITORING WELL MW25, LOCATED ON OPEN SPACE LOT 139, IS TO REMAIN AND SHALL BE PROTECTED / PLACED WITHIN A MANHOLE UNTIL SUCH TIME W.R. GRACE IS ALLOWED TO REMOVE/ABANDON THE WELL.

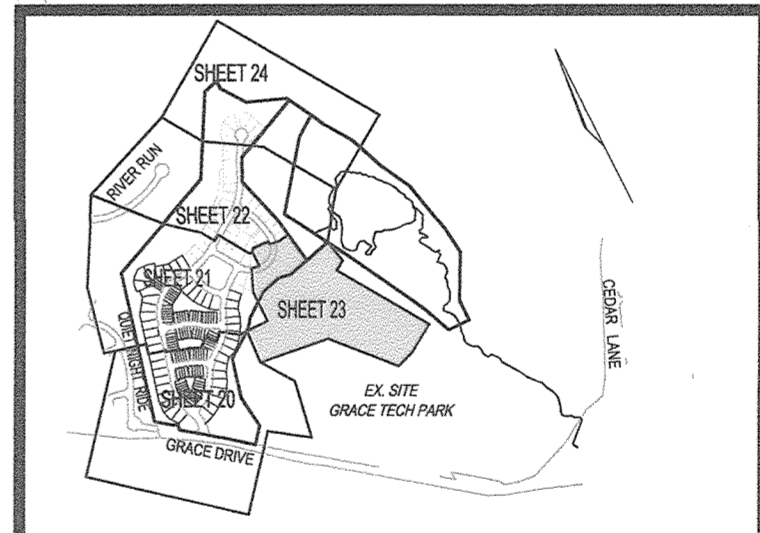
MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	THROW INCLUSIONS	% FACTOR	W/ FROST POTENTIAL	MINOR FARMLAND	CRS	SLOPE
HsA	HALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES		
Os	COORGAN & HARBORO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES		
GsB	GLENGLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO		
GsE	GLENGLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO		
GsB	GLENGLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES		
GmC	GLENGLE SILT LOAM, 8-16% SLOPES	C	NO	NO	0.43	YES	YES		
GsE	GLENGLE-URBAN LAND-UDORHENTIS COMPLEX, 0-8% SLOPES	D	NO	NO	0.43	NO	YES		
MsB	MANOR LOAM, 4-8% SLOPES	B	NO	NO	0.28	YES	NO		
MsC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO		
MsD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES		
MsE	MANOR-SPRINGBROOK COMPLEX, 20-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES		

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

NOTE  
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

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON DECEMBER 29, 2014. AVAILABLE ON-LINE AT: [http://websoilsurvey.nrcs.usda.gov/home\\_page.do](http://websoilsurvey.nrcs.usda.gov/home_page.do)  
2. HSCD SOIL INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST. AT: <http://fscs.usda.gov/USE/ANDRSD/>, CONSULTED ON DECEMBER 29, 2014.



OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER (PARCEL C)  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

W R GRACE & CO - CONN  
7450 GRACE DRIVE  
TAX MAP 35 PARCEL 367  
L. 4799 F. 44  
LOT 2  
PLAT NO. 3990  
7.12 AC.  
ZONING: PEC  
USE: RESIDENTIAL  
TAX ACCOUNT #05-37300"

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN  
PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA  
ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELIGOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

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: 09-27-2020

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

23 SHEET OF 74



REFER TO SEWER / STREAM CROSSING DETAIL SHEET 19

**NOTE**  
THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE ENVIRONMENTAL DISTURBANCES REQUIRED FOR THE CONNECTION TO PUBLIC SEWER "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 18.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

**NOTE:**  
STABILIZATION IS TO BE DONE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR OR AT THE INTERVALS REQUIRED BY THE 2011 STDS. & SPECS. WHICHEVER IS MORE RESTRICTIVE.

**NOTE:**  
- SILT FENCE IS TO BE REPLACED WITH SUPER SILT FENCE AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.  
- SILT FENCE SHALL BE CURLED UPHILL NO MORE THAN 25 FEET APART  
- DOUBLE ROWS OF SUPER SILT FENCE SHALL BE INSTALLED AT THE DIRECTION OF THE SEDIMENT CONTROL INSPECTOR.

**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**

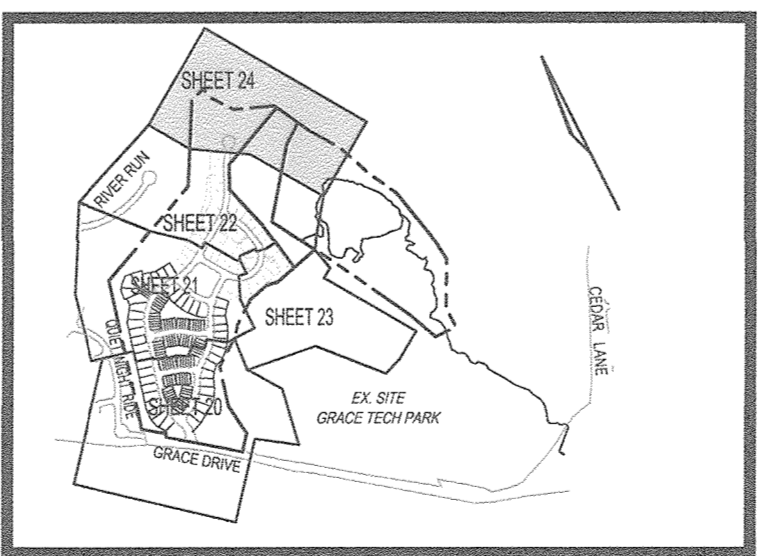
SCALE: 1"=50'  
50' 0 50' 100' 150'

MATCHLINE SHEET 22

- NOTES**
1. ALL EARTH DIKES ARE TO BE PLACED IN WORKING ORDER AT THE END OF EACH WORKING DAY.
  2. IMBRICATE SF/SSF IN 25' SEGMENTS AS REQUIRED UPHILL BY 2' IN ELEVATION.
  3. PROVIDE SOIL STABILIZATION MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

**LEGEND:**

- |             |  |              |  |
|-------------|--|--------------|--|
| ---388---   | EXISTING CONTOUR                               | ---SSF---    | PROPOSED FREELINE  |
| ---388---   | PROPOSED CONTOUR                               | ---SSF---    | SUPER SILT FENCE   |
| ---FP---    | EXISTING FLOOD PLAN                            | ---E.D.---   | EARTH DIKE / CLEAN WATER DIKE                              |
| ---FH---    | EXISTING FIRE HYDRANT                          | ---SF---     | SILT FENCE   |
| ---W---     | EXISTING WATER LINE                            | ---LOD---    | LIMIT OF DISTURBANCE                                       |
| ---SD---    | EXISTING STORM DRAIN                           | ---ST-4---   | STANDARD INLET PROTECTION                                  |
| ---T---     | EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE | ---E.S.---   | ERODIBLE SOILS   |
| ---MW7---   | EX. MONITORING WELL                            | ---P.S.---   | PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT  |
| ---ST-35--- | EXISTING SPECIMEN TREE TO BE REMOVED           | ---P.S.E.--- | PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT |



- NOTES**
1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.
  2. REFER TO SHEET 28-29 FOR BASIN/TRAP DETAILS.
  3. REFER TO SHEET 26 FOR STANDARD DETAILS AND STABILIZATION NOTES.
  4. REFER TO SHEET 25 FOR SOILS LEGEND.

**OWNER / DEVELOPER**  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

**FINAL ROAD CONSTRUCTION PLAN**  
**PHASE 2 - GRADING, SOIL EROSION AND SEDIMENT CONTROL PLAN**  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA  
ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHW  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A BUILT LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2020

24 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6-26-19

**DESIGN 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 SOIL CONSERVATION DISTRICT. HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
R.L.S. OR R.L.A. (circle one)

**OWNER/DEVELOPER CERTIFICATION:**  
I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING INSPECTING AND MAINTAINING CONTROLS AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

SCOTT D. PAUL  
OWNER/DEVELOPER SIGNATURE  
SCOTT D. PAUL, PM SIMPSON OAKS CRP3, LLC  
PRINTED NAME & TITLE

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

DATE: 5/8/19

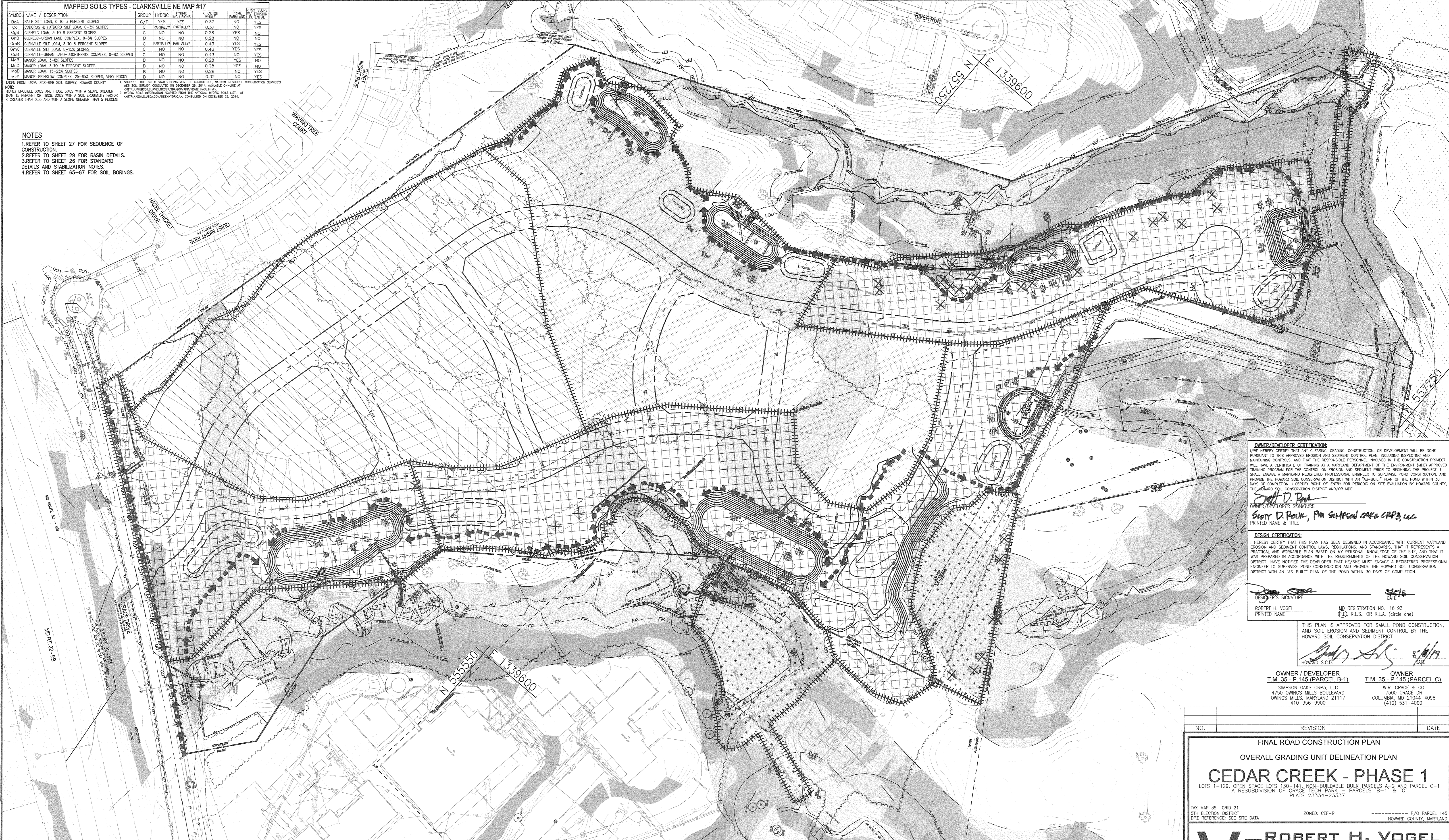


**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	HYDRIC INDICATORS	K FACTOR	PERCENT ORGANIC MATTER	PERCENT SAND	PERCENT SILT	PERCENT CLAY
BaA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES		
Cc	COBOLUS & HARBRO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES		
CcB	GLENEIG LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO		
CcB	GLENEIG-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO		
CcBb	GLENEIG SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES		
CcC	GLENEIG SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES		
CcD	GLENEIG-URBAN LAND-UDORIENTS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO		
MuB	MINOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO		
MuB	MINOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO		
MuB	MINOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES		
MuF	MINOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES		

NOTES:  
 1. SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT <http://soils.usda.gov/survey/hydro/>, CONSULTED ON DECEMBER 26, 2014.  
 2. HYDRIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT <http://soils.usda.gov/survey/hydro/>, CONSULTED ON DECEMBER 26, 2014.  
 3. HYDRIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT <http://soils.usda.gov/survey/hydro/>, CONSULTED ON DECEMBER 26, 2014.  
 4. HYDRIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT <http://soils.usda.gov/survey/hydro/>, CONSULTED ON DECEMBER 26, 2014.

**NOTES**  
 1. REFER TO SHEET 27 FOR SEQUENCE OF CONSTRUCTION.  
 2. REFER TO SHEET 29 FOR BASIN DETAILS.  
 3. REFER TO SHEET 28 FOR STANDARD DETAILS AND STABILIZATION NOTES.  
 4. REFER TO SHEET 65-67 FOR SOIL BORINGS.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 6-17-19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

**OVERALL GRADING UNIT DELINEATION PLAN**  
 SCALE 1"=100'

**LEGEND:**

--- 300 ---	EXISTING CONTOUR	--- 300 ---	EXISTING CONTOUR	--- 300 ---	EXISTING CONTOUR
--- 398 ---	PROPOSED CONTOUR	--- 398 ---	PROPOSED CONTOUR	--- 398 ---	PROPOSED CONTOUR
---	EXISTING CURB AND GUTTER	---	EXISTING CURB AND GUTTER	---	EXISTING CURB AND GUTTER
---	EXISTING UTILITY POLE	---	EXISTING UTILITY POLE	---	EXISTING UTILITY POLE
---	EXISTING LIGHT POLE	---	EXISTING LIGHT POLE	---	EXISTING LIGHT POLE
---	EXISTING SIGN	---	EXISTING SIGN	---	EXISTING SIGN
---	EXISTING STORM DRAIN	---	EXISTING STORM DRAIN	---	EXISTING STORM DRAIN
---	EX. ELECTRIC CONDUIT	---	EX. ELECTRIC CONDUIT	---	EX. ELECTRIC CONDUIT
---	EXISTING TREE LINE (FIELD LOCATED)	---	EXISTING TREE LINE (FIELD LOCATED)	---	EXISTING TREE LINE (FIELD LOCATED)
---	EXISTING STERAM	---	EXISTING STERAM	---	EXISTING STERAM
---	EXISTING STERAM BUFFER	---	EXISTING STERAM BUFFER	---	EXISTING STERAM BUFFER
---	EXISTING WETLAND	---	EXISTING WETLAND	---	EXISTING WETLAND
---	EXISTING WETLAND BUFFER	---	EXISTING WETLAND BUFFER	---	EXISTING WETLAND BUFFER
---	EXISTING FENCE	---	EXISTING FENCE	---	EXISTING FENCE
---	PROPERTY FENCE	---	PROPERTY FENCE	---	PROPERTY FENCE
---	RIGHT-OF-WAY LINE	---	RIGHT-OF-WAY LINE	---	RIGHT-OF-WAY LINE
---	MODERATE SLOPES (1% - 24.99%)	---	MODERATE SLOPES (1% - 24.99%)	---	MODERATE SLOPES (1% - 24.99%)
---	STEEP SLOPE (>25%)	---	STEEP SLOPE (>25%)	---	STEEP SLOPE (>25%)
---	GRADING UNIT 1	---	GRADING UNIT 1	---	GRADING UNIT 1
---	GRADING UNIT 2	---	GRADING UNIT 2	---	GRADING UNIT 2
---	GRADING UNIT 3	---	GRADING UNIT 3	---	GRADING UNIT 3
---	GRADING UNIT 4	---	GRADING UNIT 4	---	GRADING UNIT 4
---	LIMIT OF DISTURBANCE	---	LIMIT OF DISTURBANCE	---	LIMIT OF DISTURBANCE
---	EARTH DIKE / CLEAN WATER DIKE	---	EARTH DIKE / CLEAN WATER DIKE	---	EARTH DIKE / CLEAN WATER DIKE
---	SUPER SILT FENCE	---	SUPER SILT FENCE	---	SUPER SILT FENCE
---	SILT FENCE	---	SILT FENCE	---	SILT FENCE
---	SOILS BOUNDARY	---	SOILS BOUNDARY	---	SOILS BOUNDARY

**OWNER/DEVELOPER CERTIFICATION:**  
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[Signature]  
 OWNER/DEVELOPER SIGNATURE  
 SUZIE D. PAUL, PM SIMPSON OAKS CRP3, LLC  
 PRINTED NAME & TITLE

**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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

[Signature]  
 DESIGNER'S SIGNATURE  
 ROBERT H. VOGEL  
 PRINTED NAME

MD REGISTRATION NO. 16193  
 (P.E.) R.L.S., OR R.L.A. (circle one)  
 DATE: 5/6/19

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

[Signature]  
 HOWARD S.C.D.  
 DATE: 5/6/19

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**OVERALL GRADING UNIT DELINEATION PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK, PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35, GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**  
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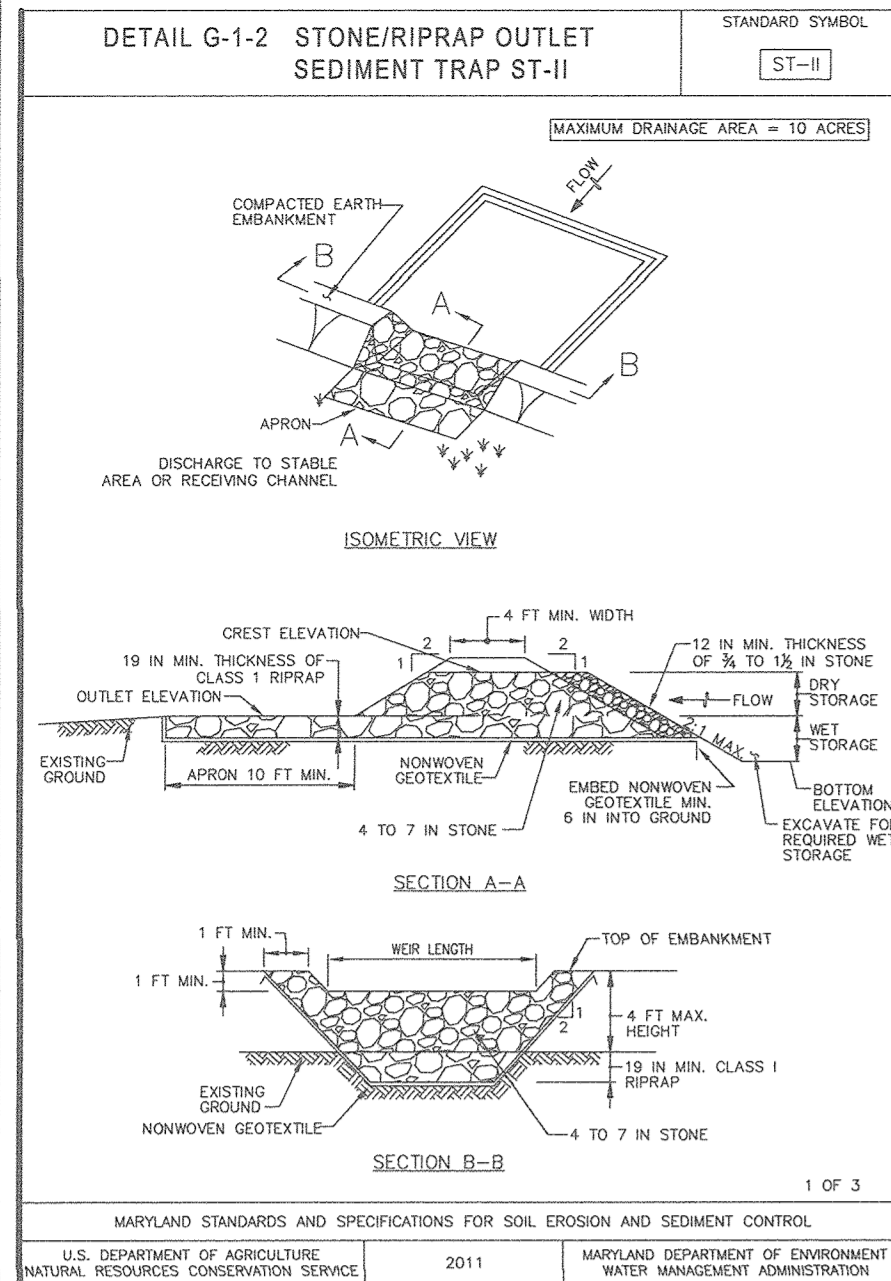
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL, 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

25 SHEET OF 74

ROBERT H. VOGEL, PE No.16193

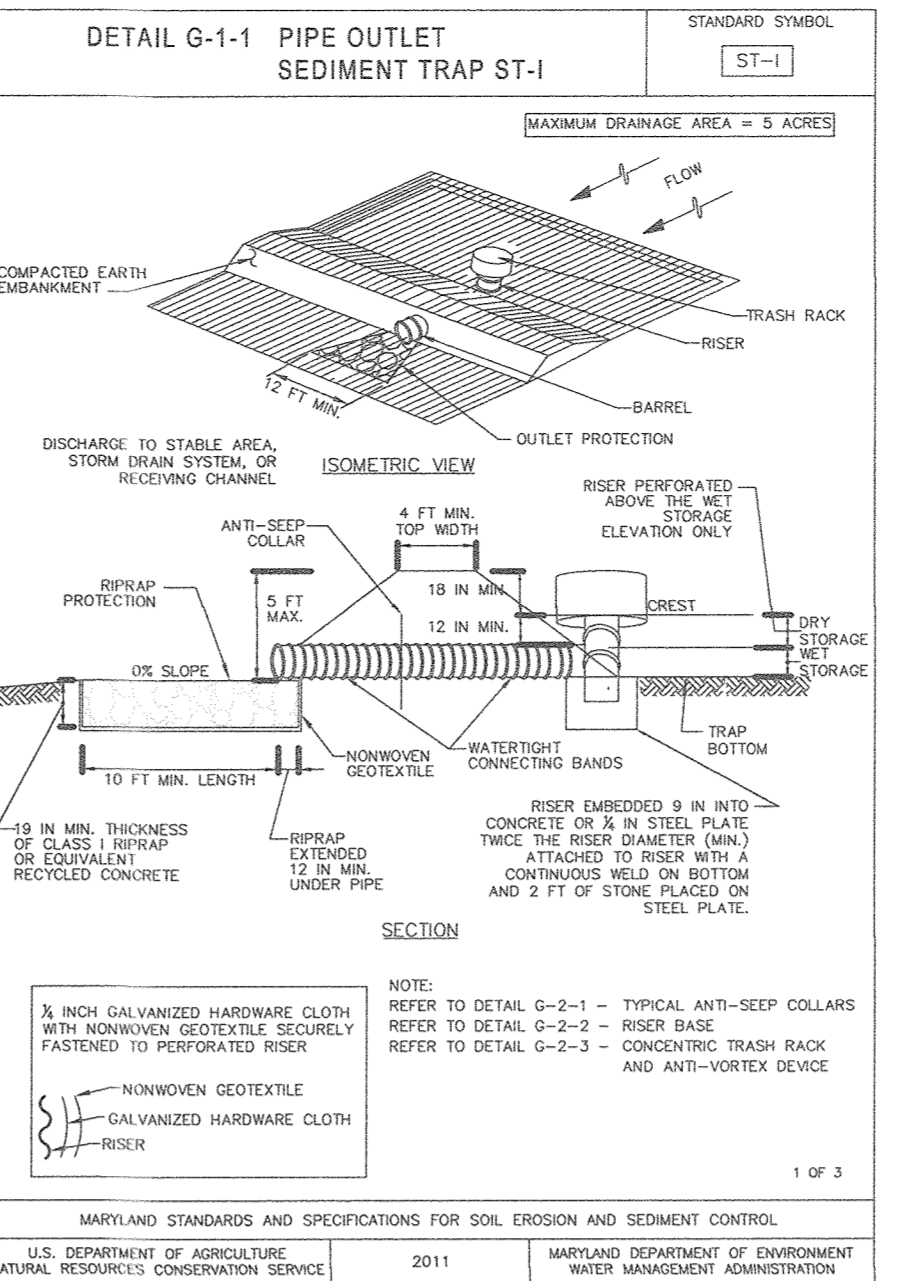
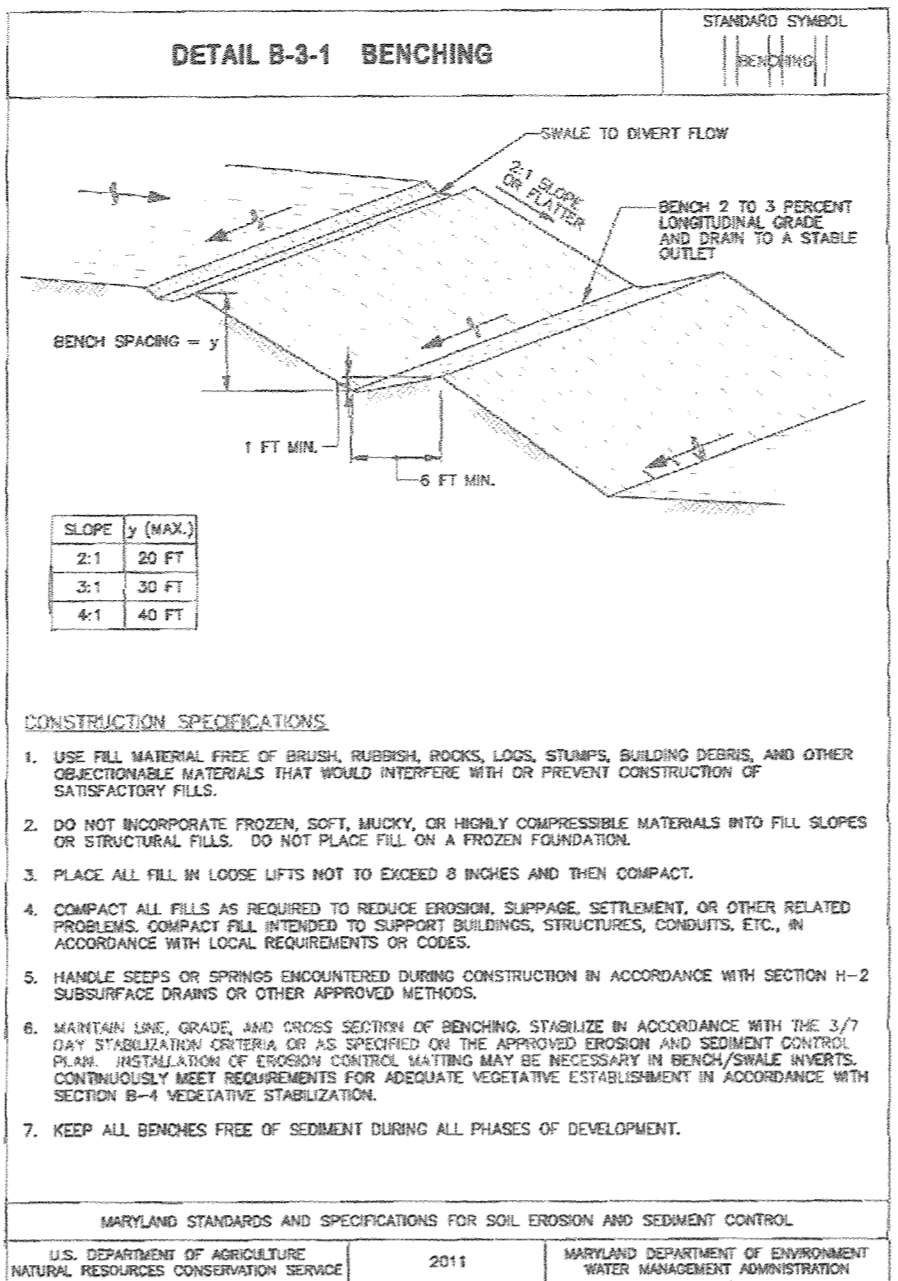




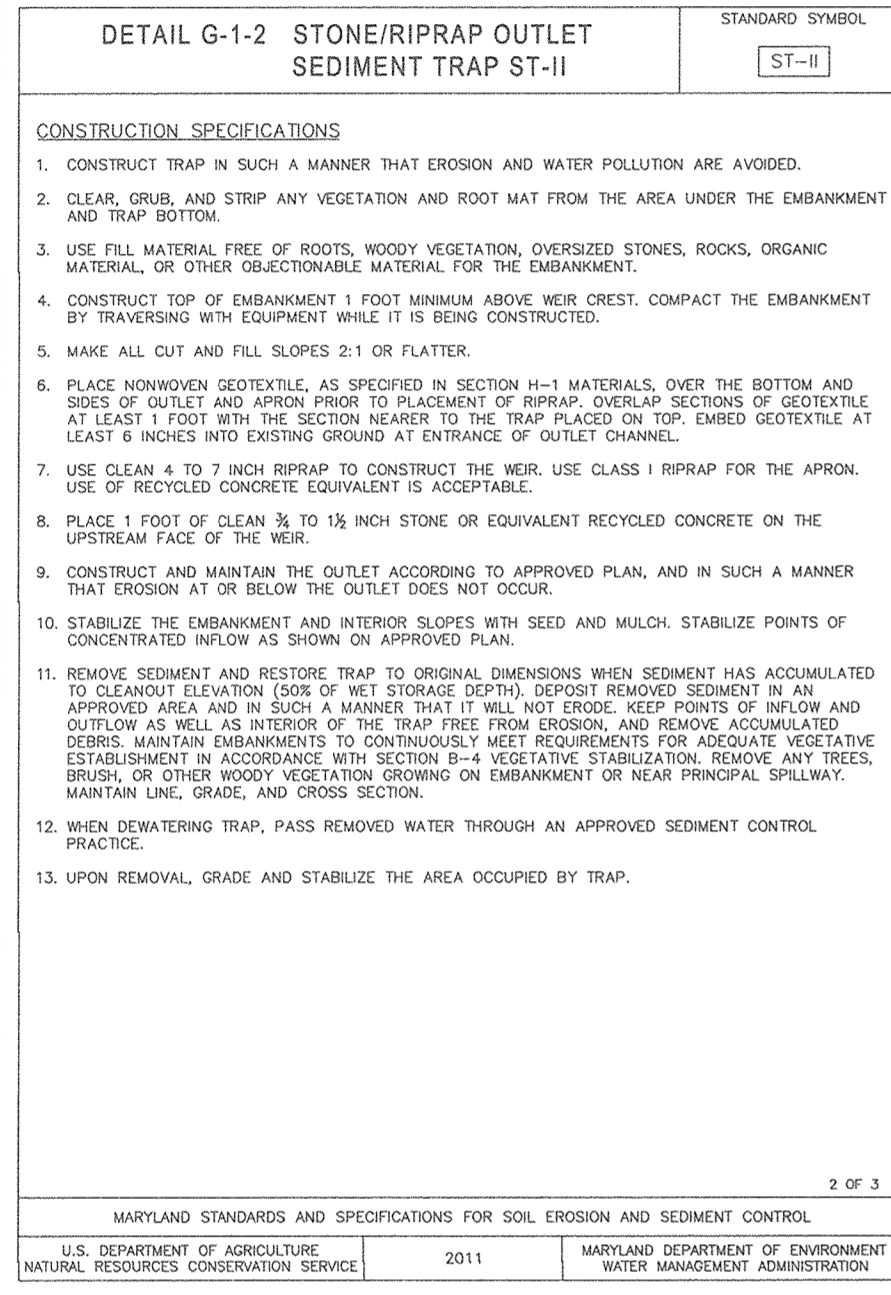


STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II, TRAP NO. # 1	
DRAINAGE AREA - INITIAL	0.25 ACRES
DRAINAGE AREA - INTERIM	0.80 ACRES
DRAINAGE AREA - FINAL	4.30 ACRES
TOTAL STORAGE REQUIRED	16,800 CF
TOTAL STORAGE PROVIDED	17,278 CF
WET STORAGE REQUIRED	8,460 CF
WET STORAGE PROVIDED	8,601 CF
DRY STORAGE REQUIRED	8,460 CF
DRY STORAGE PROVIDED	8,678 CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	380.1 FT
TRAP BOTTOM ELEVATION	378.8 FT
TRAP BOTTOM DIMENSIONS	10' 0" x 4' 0" FT x FT
WEIR LENGTH	4.7 AC x 4 = 19'
WEIR CREST (DRY STORAGE) ELEVATION	383.0 FT
CLEANOUT ELEVATION	379.5 FT
TOP OF EMBANKMENT ELEVATION	394.0 FT
WEIR SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN

STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II, TRAP NO. # 5	
DRAINAGE AREA - INITIAL	0.67 ACRES
DRAINAGE AREA - INTERIM	2.80 ACRES
DRAINAGE AREA - FINAL	2.80 ACRES
TOTAL STORAGE REQUIRED	10,080 CF
TOTAL STORAGE PROVIDED	13,407 CF
WET STORAGE REQUIRED	5,040 CF
WET STORAGE PROVIDED	8,445 CF
DRY STORAGE REQUIRED	5,040 CF
DRY STORAGE PROVIDED	5,052 CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	330.0 FT
TRAP BOTTOM ELEVATION	329.0 FT
TRAP BOTTOM DIMENSIONS	7' 6" x 4' 0" FT x FT
WEIR LENGTH	2.8 AC x 4 = 11'
WEIR CREST (DRY STORAGE) ELEVATION	332.0 FT
CLEANOUT ELEVATION	329.7 FT
TOP OF EMBANKMENT ELEVATION	335.0 FT
WEIR SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN

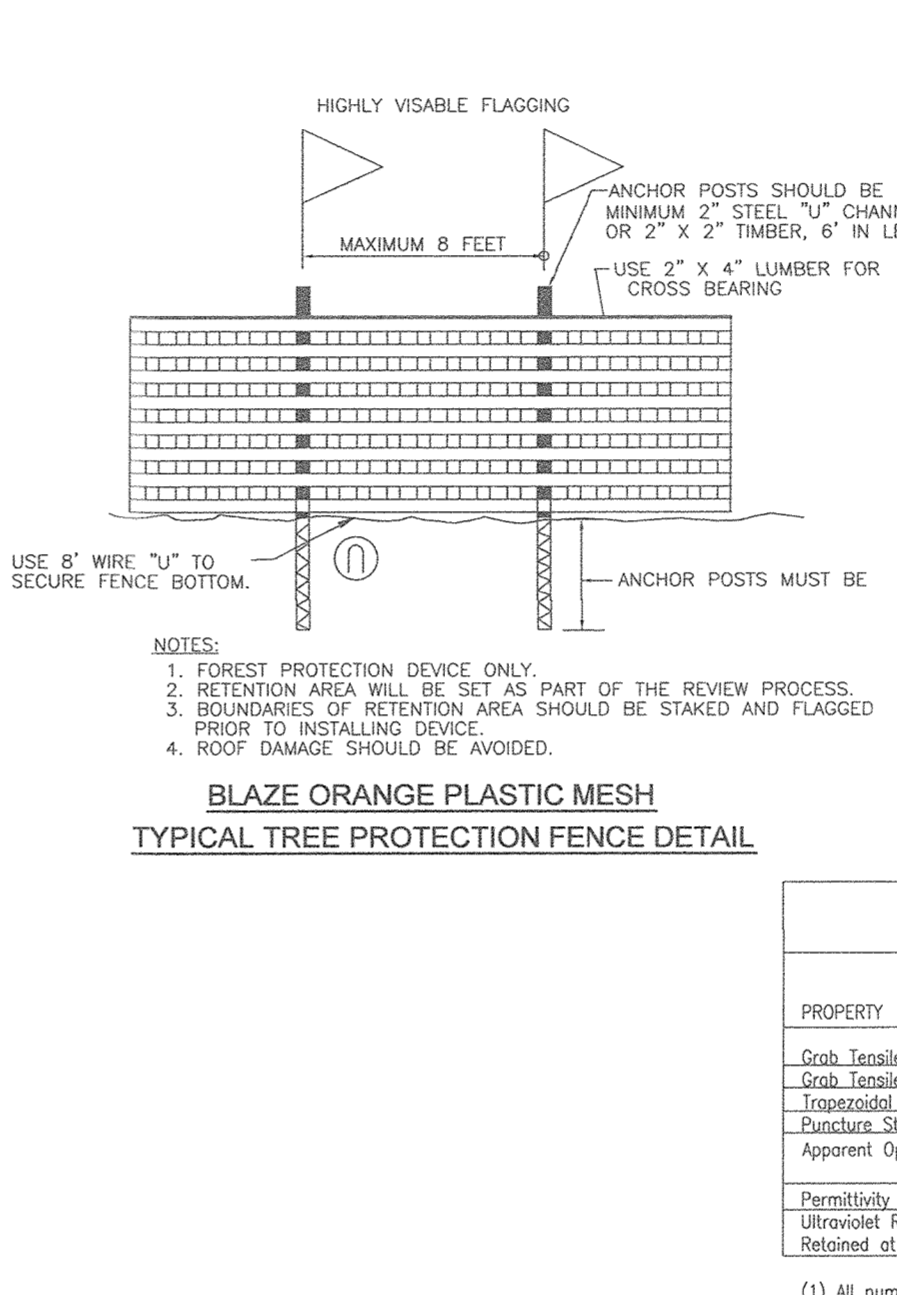
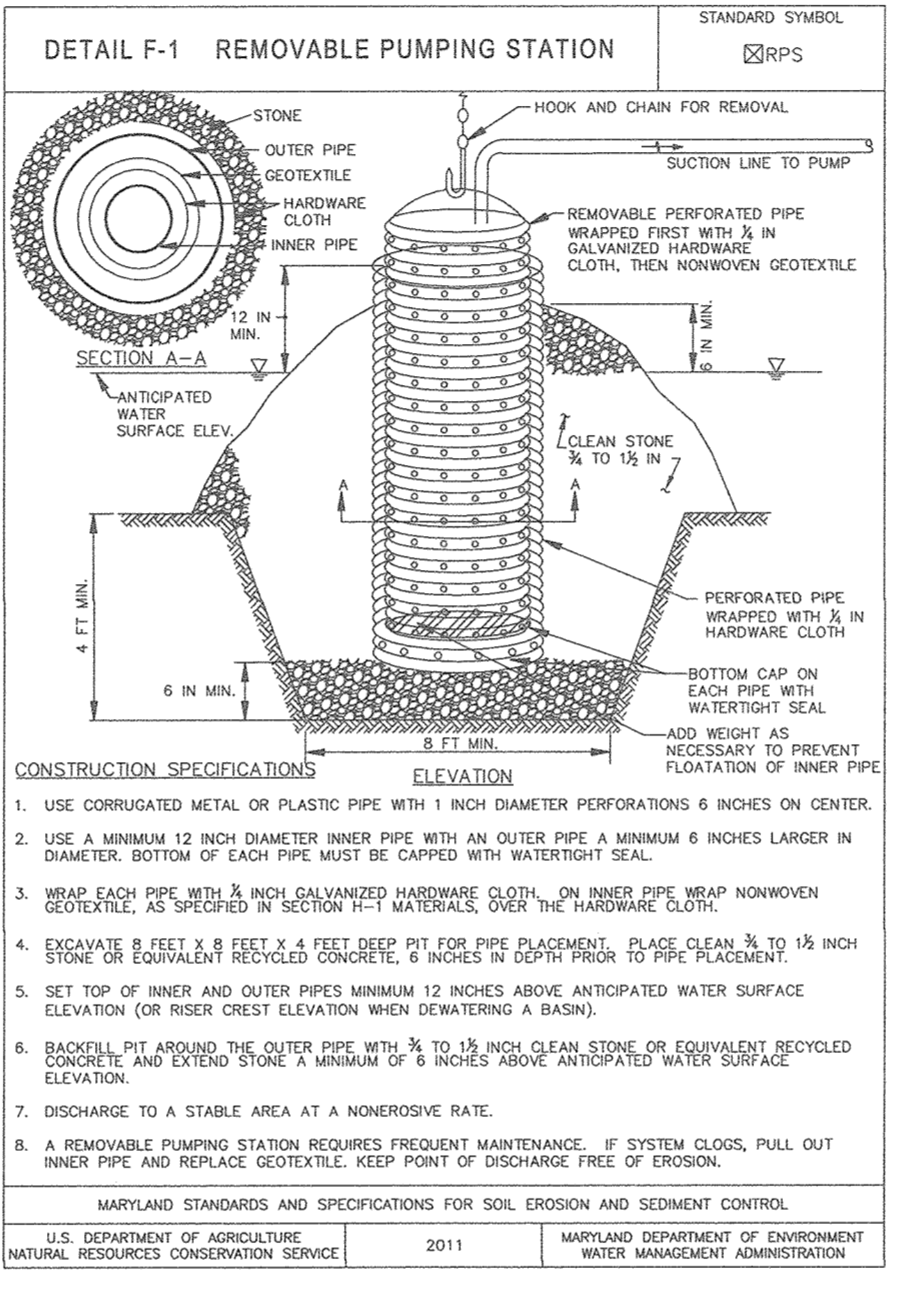


PIPE OUTLET SEDIMENT TRAP ST-I, TRAP # 3	
DRAINAGE AREA - INITIAL	2.70 ACRES
DRAINAGE AREA - INTERIM	3.20 ACRES
DRAINAGE AREA - FINAL	2.10 ACRES
TOTAL STORAGE REQUIRED	10,800 CF
TOTAL STORAGE PROVIDED	11,350 CF
WET STORAGE REQUIRED	5,400 CF
WET STORAGE PROVIDED	5,686 CF
DRY STORAGE REQUIRED	5,400 CF
DRY STORAGE PROVIDED	5,664 CF
TRAP BOTTOM ELEVATION	346.0 FT
TRAP BOTTOM DIMENSIONS	10' 0" x 4' 0" FT x FT
WEIR CREST (DRY STORAGE) ELEVATION	347.5 FT
OUTLET PROTECTION - LENGTH	34.73 FT
CLEANOUT ELEVATION	346.7 FT
TOP OF EMBANKMENT ELEVATION	352.0 FT
SIDE SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CMP
RISER DIAMETER	33 IN
BARREL DIAMETER	24 IN
TRASH RACK DIAMETER	48 IN
TRASH RACK HEIGHT	25 IN
ANTI-SEEP COLLAR DIMENSIONS	6.0 x 6.0 FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN



STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II, TRAP NO. # 2	
DRAINAGE AREA - INITIAL	2.70 ACRES
DRAINAGE AREA - INTERIM	4.00 ACRES
DRAINAGE AREA - FINAL	1.0 ACRES
TOTAL STORAGE REQUIRED	14,400 CF
TOTAL STORAGE PROVIDED	16,988 CF
WET STORAGE REQUIRED	7,200 CF
WET STORAGE PROVIDED	9,500 CF
DRY STORAGE REQUIRED	7,200 CF
DRY STORAGE PROVIDED	7,419 CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	372.0 FT
TRAP BOTTOM ELEVATION	370.0 FT
TRAP BOTTOM DIMENSIONS	10' 0" x 4' 0" FT x FT
WEIR LENGTH	4.7 AC x 4 = 19'
WEIR CREST (DRY STORAGE) ELEVATION	373.0 FT
CLEANOUT ELEVATION	371.5 FT
TOP OF EMBANKMENT ELEVATION	376.0 FT
SIDE SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN

STONE/RIPRAP OUTLET SEDIMENT TRAP ST-II, TRAP NO. # 5	
DRAINAGE AREA - INITIAL	2.80 ACRES
DRAINAGE AREA - INTERIM	3.10 ACRES
DRAINAGE AREA - FINAL	4.90 ACRES
TOTAL STORAGE REQUIRED	17,840 CF
TOTAL STORAGE PROVIDED	18,406 CF
WET STORAGE REQUIRED	8,820 CF
WET STORAGE PROVIDED	9,121 CF
DRY STORAGE REQUIRED	8,820 CF
DRY STORAGE PROVIDED	9,285 CF
EXISTING GROUND ELEVATION AT OUTLET (WET STORAGE ELEVATION)	345.0 FT
TRAP BOTTOM ELEVATION	343.5 FT
TRAP BOTTOM DIMENSIONS	10' 0" x 4' 0" FT x FT
WEIR LENGTH	4.3 AC x 4 = 20'
WEIR CREST (DRY STORAGE) ELEVATION	346.5 FT
CLEANOUT ELEVATION	344.4 FT
TOP OF EMBANKMENT ELEVATION	349.0 FT
SIDE SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN



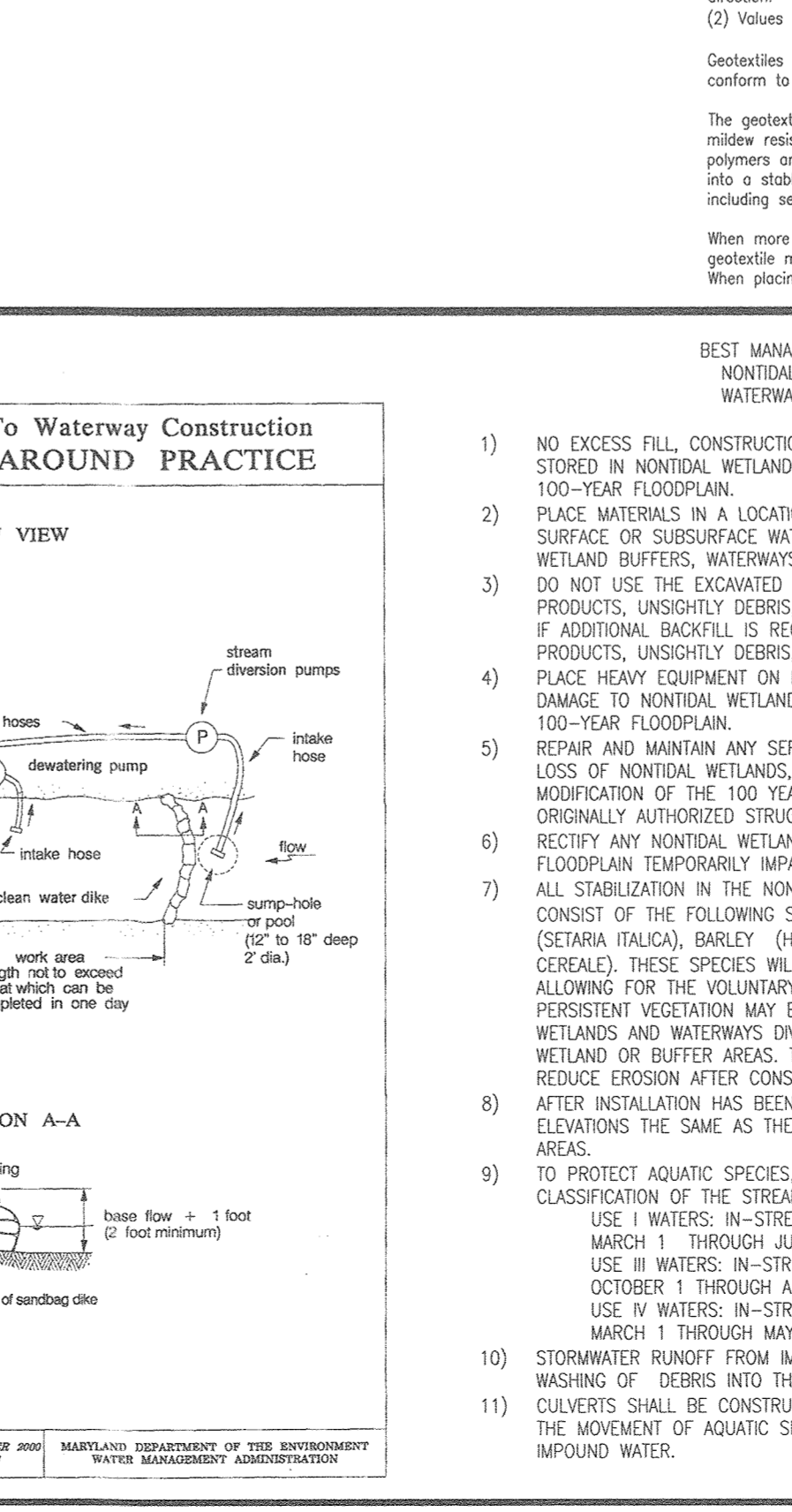
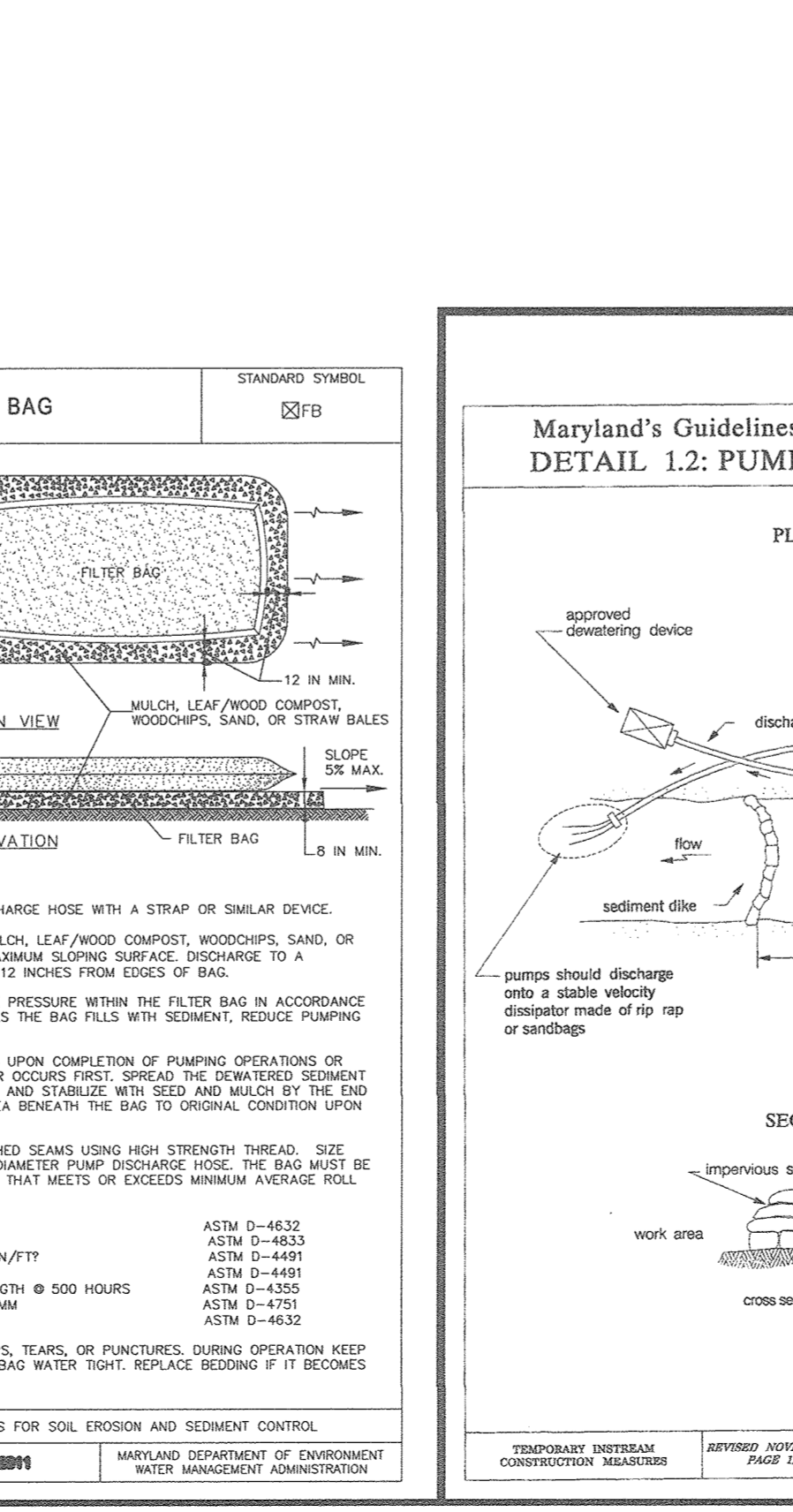
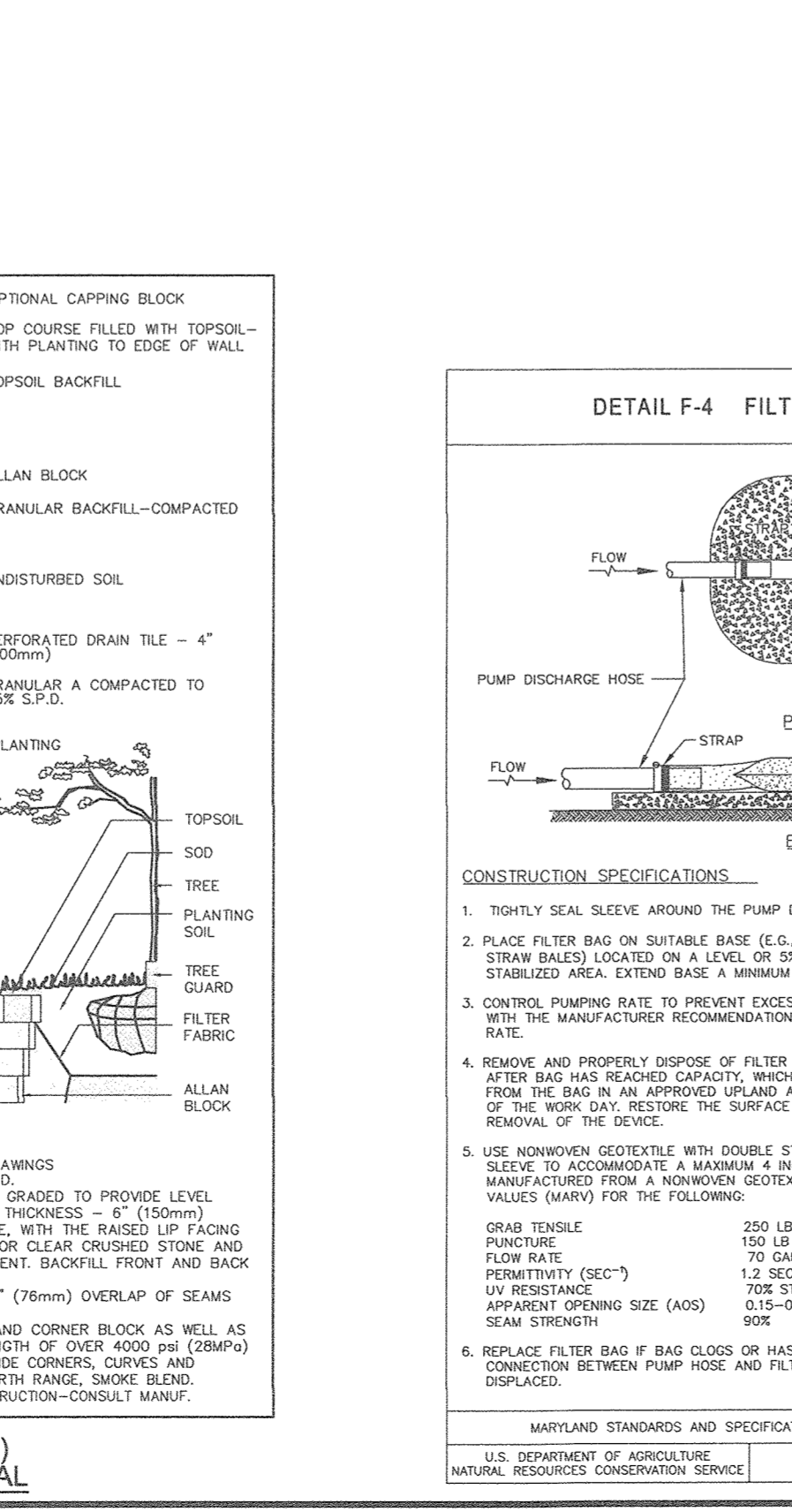
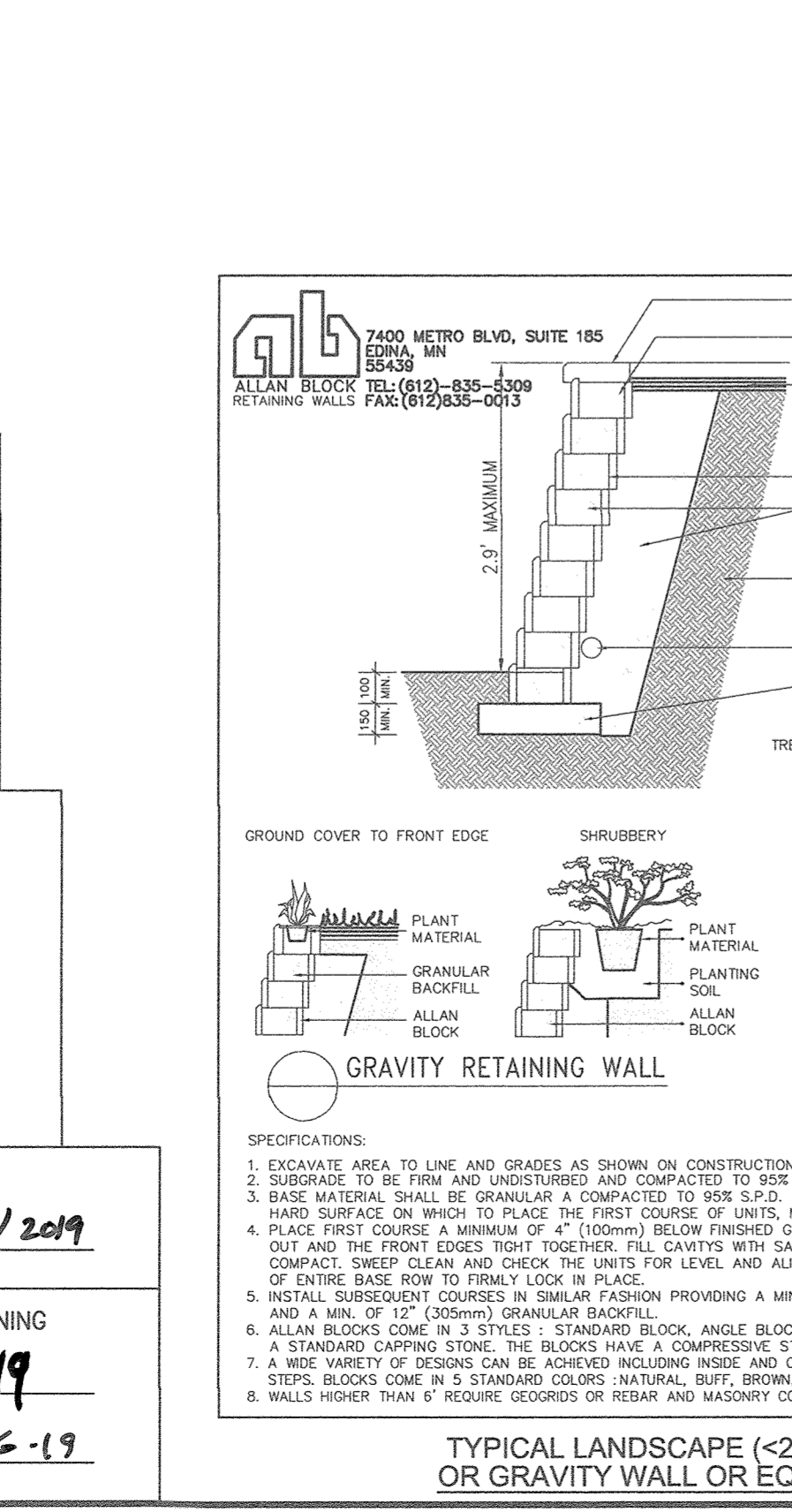
Plant Species	Seeding Rate		Recommended Seeding Dates by Plant Hardiness Zone			
	lb/ac	lb/1000 sq ft	5b and 6a	6b	7a and 7b	8a and 8b
Annual Ryegrass (Lolium perenne)	40	1.0	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
Barley (Hordeum vulgare)	50	2.2	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
Oats (Avena sativa)	75	1.7	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
Wheat (Triticum aestivum)	100	2.8	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
Crack Rice (Oryza sativa)	112	2.8	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
Perennial Ryegrass (Lolium perenne)	30	0.7	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31
Perennial Fescue (Festuca perenne)	30	0.5	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

**OWNER/DEVELOPER CERTIFICATION:**  
I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING RESPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A HOWARD COUNTY DEPARTMENT OF ENVIRONMENT (MCP) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT FROM BEGINNING THE PROJECT. I SHALL EMPLOY A HOWARD REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PROPOSED ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR USE.

**DESIGN 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 PERSONAL KNOWLEDGE OF THE SITE, AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. HAVE NOTICED THE BOUNDARY OF THE HOWARD SOIL CONSERVATION DISTRICT AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

**APPROVED:** HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
**APPROVED:** HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING



PROPERTY	TEST METHOD	WOVEN Silt Filter			WOVEN Monofilament Geotextile			NONWOVEN Geotextile		
		MO	CO	DO	MO	CO	DO	MO	CO	DO
Grab Tensile Strength	ASTM D-4632	2000	2000	2700	2500	2000	2000			
Grab Tensile Elongation	ASTM D-4632	5%	5%	5%	5%	5%	5%			
Tensile Strength	ASTM D-5241	450 lb		500 lb		500 lb				
Apparent Opening Size (2)	ASTM D-4751	U.S. Sieve 30 (0.60 mm)		U.S. Sieve 70 (0.21 mm)		U.S. Sieve 70 (0.21 mm)				
Permianity	ASTM-4491	0.05 sec <sup>-1</sup>		0.28 sec <sup>-1</sup>		1.1 sec <sup>-1</sup>				
Ultimate Resistance Retained of 500 hours	ASTM D-4535	70% strength		70% strength		70% strength				

PIPE OUTLET SEDIMENT TRAP ST-I, TRAP # 3	
DRAINAGE AREA - INITIAL	2.70 ACRES
DRAINAGE AREA - INTERIM	3.20 ACRES
DRAINAGE AREA - FINAL	2.10 ACRES
TOTAL STORAGE REQUIRED	10,800 CF
TOTAL STORAGE PROVIDED	11,350 CF
WET STORAGE REQUIRED	5,400 CF
WET STORAGE PROVIDED	5,686 CF
DRY STORAGE REQUIRED	5,400 CF
DRY STORAGE PROVIDED	5,664 CF
TRAP BOTTOM ELEVATION	346.0 FT
TRAP BOTTOM DIMENSIONS	10' 0" x 4' 0" FT x FT
WEIR CREST (DRY STORAGE) ELEVATION	347.5 FT
OUTLET PROTECTION - LENGTH	34.73 FT
CLEANOUT ELEVATION	346.7 FT
TOP OF EMBANKMENT ELEVATION	352.0 FT
SIDE SLOPE	2:1 H:V RATIO
EMBANKMENT TOP WIDTH	4' FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	CMP
RISER DIAMETER	33 IN
BARREL DIAMETER	24 IN
TRASH RACK DIAMETER	48 IN
TRASH RACK HEIGHT	25 IN
ANTI-SEEP COLLAR DIMENSIONS	6.0 x 6.0 FT
OUTLET PROTECTION - LENGTH	10' 0" FT
OUTLET PROTECTION - DEPTH	19" IN

Plant Species	Seeding Rate		Recommended Seeding Dates by Plant Hardiness Zone			
	lb/ac	lb/1000 sq ft	5b and 6a	6b	7a and 7b	8a and 8b
Annual Ryegrass (Lolium perenne)	40	1.0	Mar 15 to May 15, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10	Feb 1 to Apr 30, Aug 1 to Sep 10	Mar 1 to May 15, Aug 1 to Sep 10
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Perennial Fescue (Festuca perenne)	30	0.5	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31	Mar 1 to Jul 31

TYPE	NUMBER 5(1)	SIZE RANGE	ASTM		MIDSIZE WEIGHT(L3)
			d50	d100	
CLASS I	18	1/4-1/2 inch	2/100	1/100	N/A
CLASS II	24	3/8-1/2 inch	3/100	2/100	N/A
CLASS III	30	1/2-3/4 inch	4/100	3/100	N/A

**OWNER / DEVELOPER**  
T.M. 35 - P. 145 (PARCEL B-1)  
SIMPSON OAKS CRP, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P. 145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

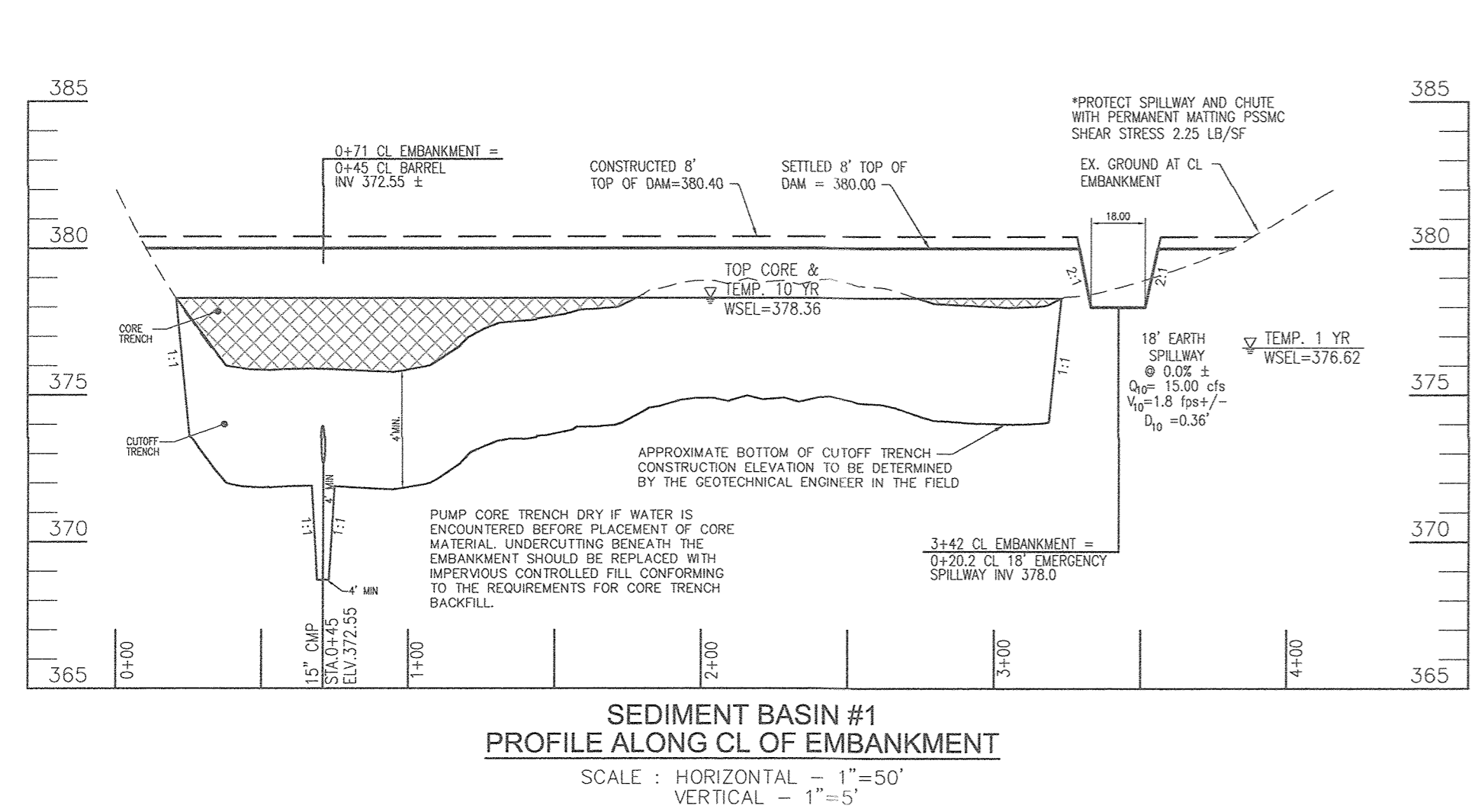
**FINAL ROAD CONSTRUCTION PLAN**  
**SOIL EROSION AND SEDIMENT CONTROL PLAN**  
**NOTES AND DETAILS**  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**DESIGN BY:** VE+TC  
**DRAWN BY:** VE+TC  
**CHECKED BY:** RHV  
**DATE:** APRIL 2019  
**SCALE:** AS SHOWN  
**W.O. NO.:** 15-55

**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. 16183, EXPIRATION DATE: 09-29-2020

**28** SHEET **74**



**SEDIMENT BASIN #1  
PROFILE ALONG CL OF EMBANKMENT**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**DEWATERING STRATEGY**

Dewatering refers to the act of removing and discharging water from excavated areas on construction sites or from sediment traps or basins on construction sites. Standards and specifications for dewatering practices follow:

These standards apply to removal and discharge of water from any excavated area or sediment trap or basin at any construction site. Given the unique conditions of any particular construction site, any or all of the practices may apply. Regardless of the applicability of the practices listed herein, operators are required to use acceptable procedures for maintenance and dewatering. In all cases, every effort shall be made to eliminate sediment pollution associated with dewatering.

Designers shall specify the preferred procedures for dewatering on plans. In particular, designers should identify procedures for dewatering sediment traps and basins prior to construction of the site and control facility on the site or prior to conversion of sediment control facilities to stormwater management facilities. Recommended procedures shall be consistent with these standards. Atypical site conditions may require innovative dewatering designs. Dewatering measures not referenced in this standard may be used with the consent of the approval authority.

- Approved Practices for Dewatering of Excavated Areas**
- Pumping of water to an existing sediment basin or trap in which the entire volume of water from the area to be dewatered can be contained without discharge to receiving waters.
  - Pumping of water to an existing sediment basin or trap such that the entire volume of water from the area to be dewatered can be managed without exceeding the design outflow from the sediment control structure.
  - Removable Pumping Station - Standards and specifications for Removable Pumping Station are on Detail 20A.
  - Use of a Pump Pit: Standards and specifications for a pump pit are on Detail 20B.
  - Sediment Trap: Standards and specifications for a sump pit are on Detail 21.

**Dewatering of Sediment Traps and Basins**

Designers shall specify on plans, and in sequences of construction included on plans, the practices for dewatering of traps and basins. Plan reviewers shall check to see that procedures for dewatering to be used are included on plans. In all cases, water removed from traps and basins shall be discharged so that it passes through a sediment control device prior to entering receiving waters.

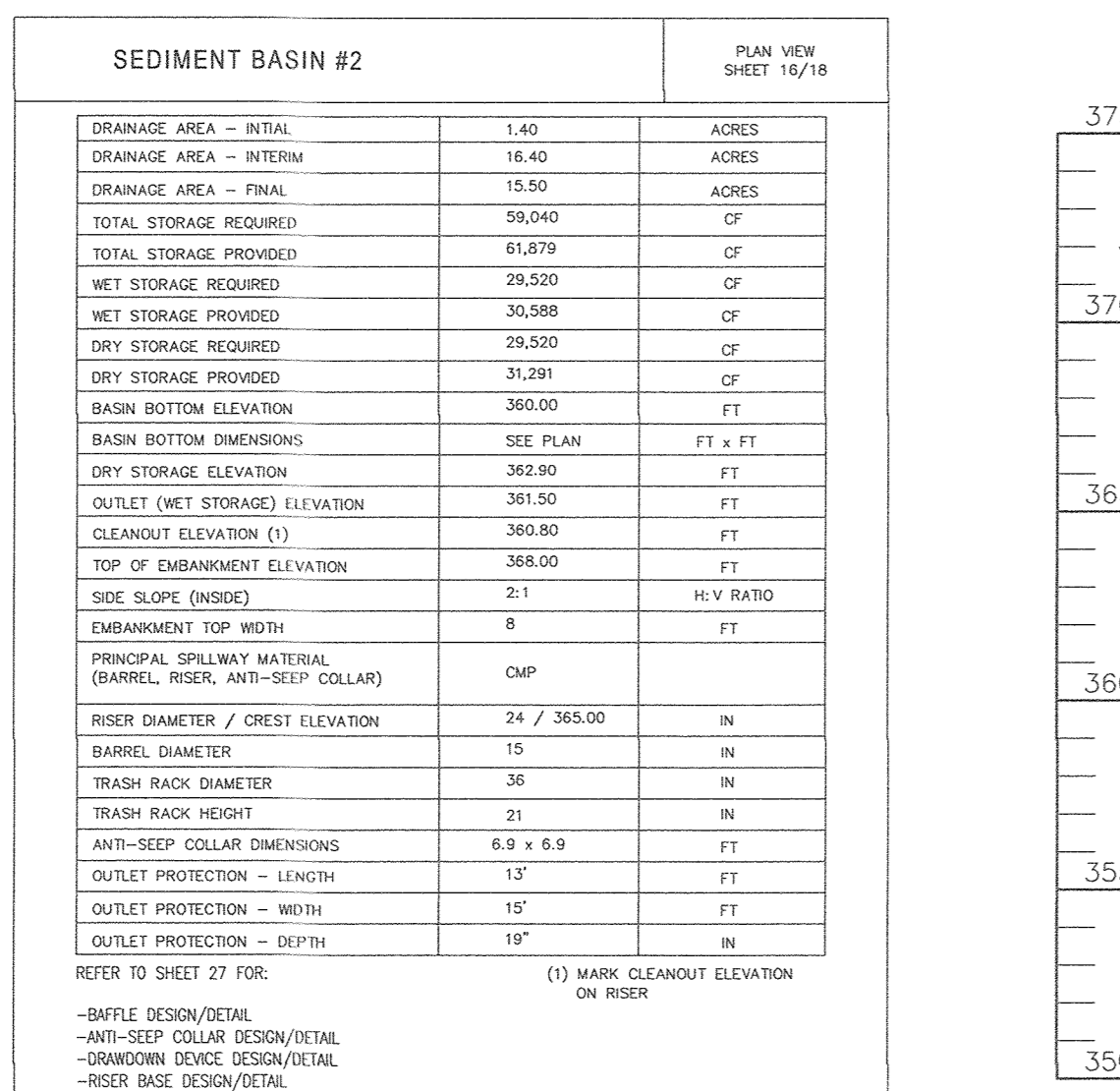
**Approved Practices for Dewatering of Traps and Basins**

- Removable pumping station.
- Use of a Pump Pit.
- Use of a floating suction hose to pump the cleaner water from the top of the pond. As the cleaner water is pumped the suction hose will lower and eventually encounter sediment laden water. When this happens the pumping operation will cease. Provisions shall be made to filter water.

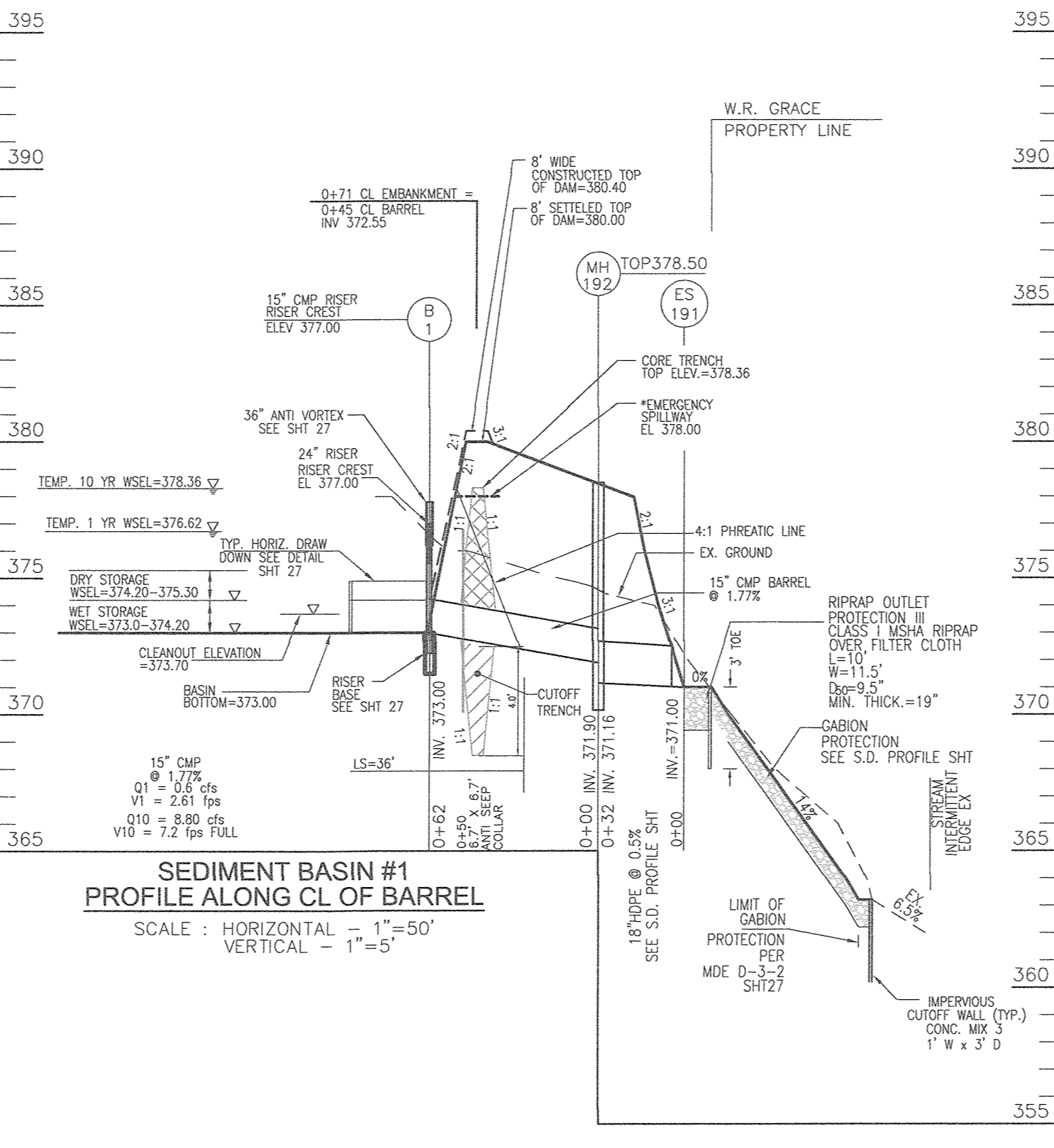
**BASIN MAINTENANCE**

Sediment and debris must be removed and the basin restored to its original dimensions when sediment accumulates to the control elevation (50% of the wet storage depth). Removed sediment must be deposited in an approved area in such a manner that it will not erode. The points of inflow and outflow as well as the interior of the basin must be cleared of any accumulated debris and kept free of erosion. The embankments must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Any trees, brush, other woody vegetation growing on the embankment or near the principal spillway must be removed. The line, grade, and cross section must be maintained. Water tight connections must be maintained.

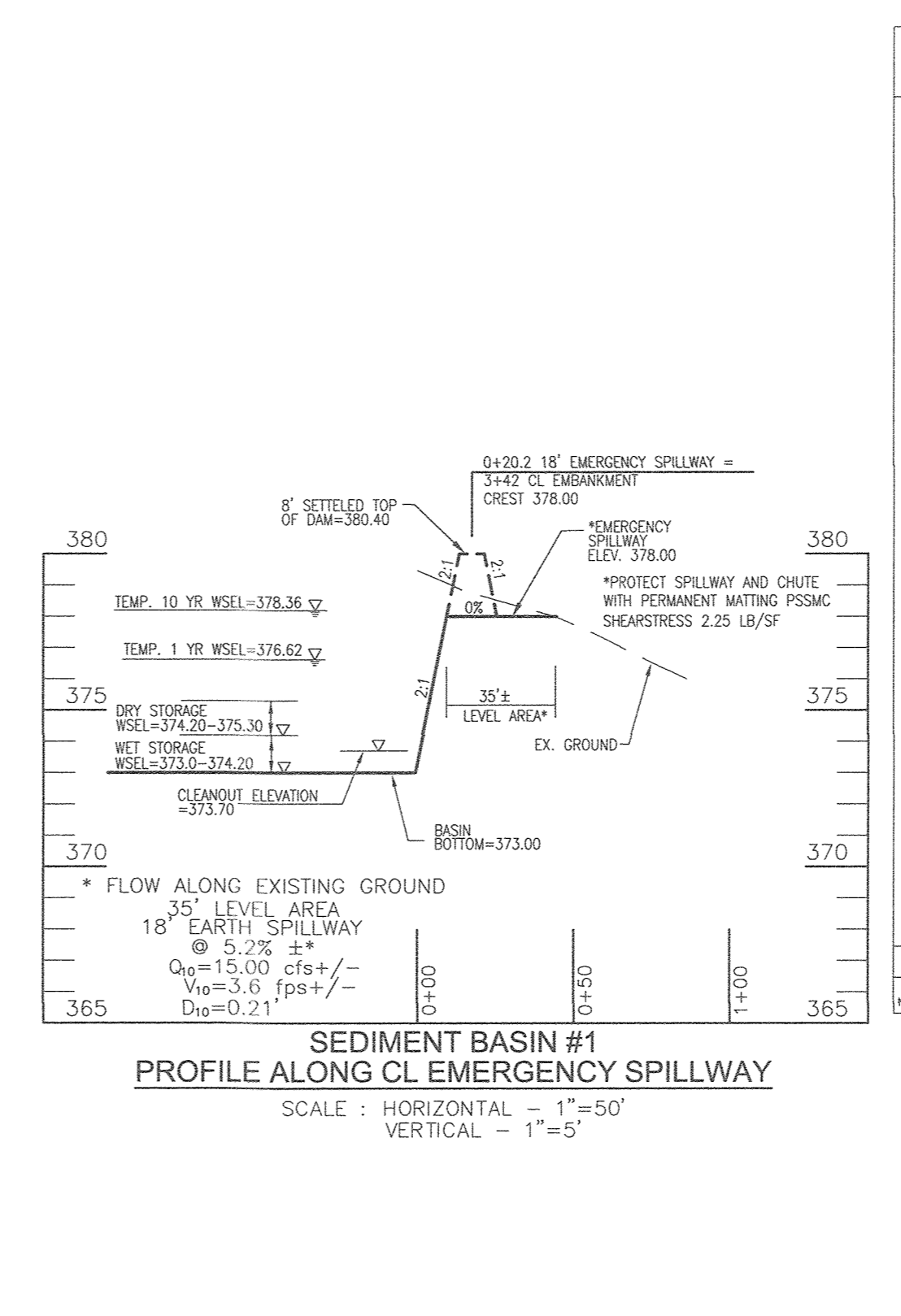
If the dry storage volume does not drain within 10 hours, the generator around the drain-down device must be replaced.



**SEDIMENT BASIN #2  
PROFILE ALONG CL OF EMBANKMENT**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



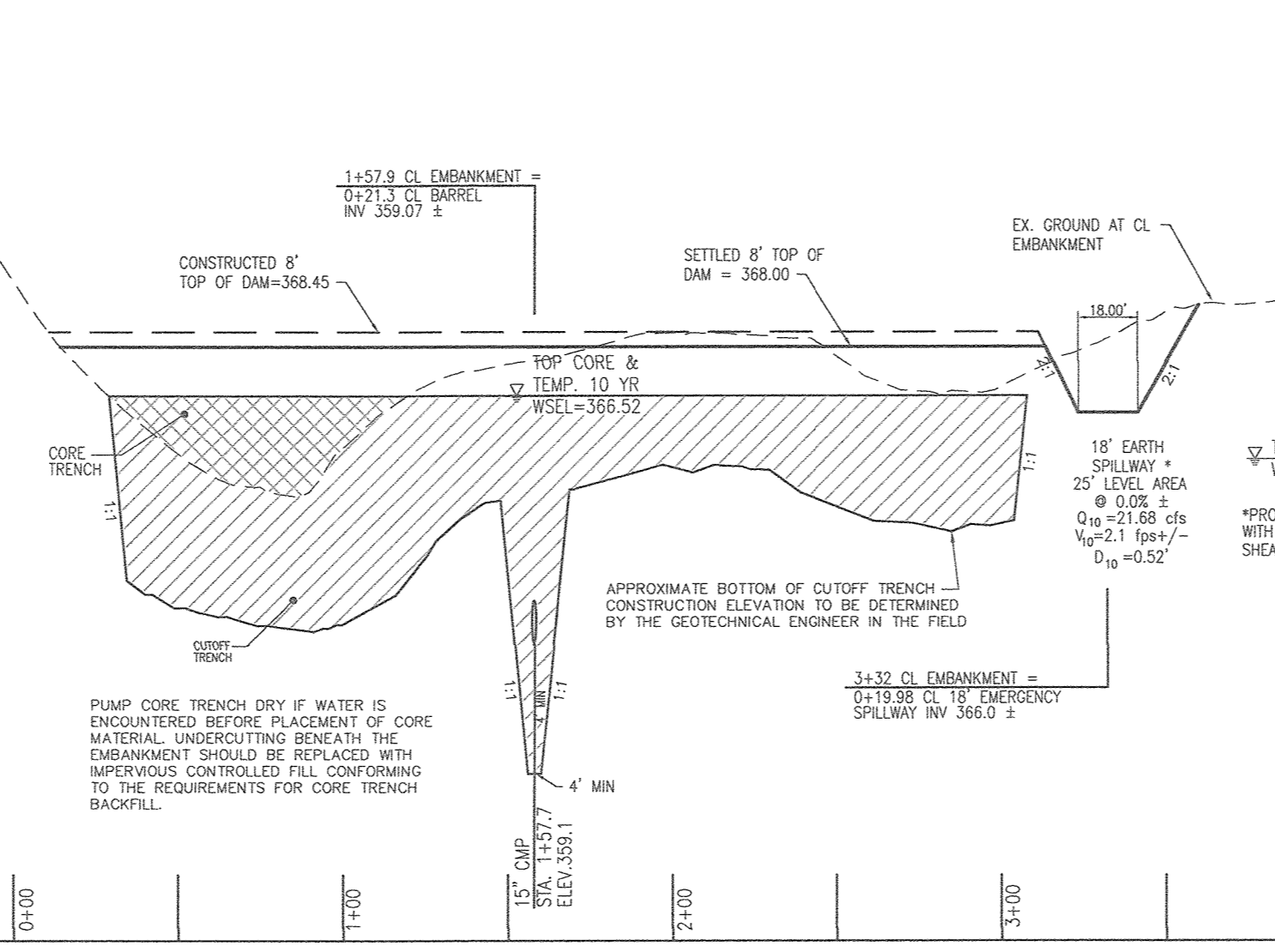
**SEDIMENT BASIN #1  
PROFILE ALONG CL OF BARREL**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



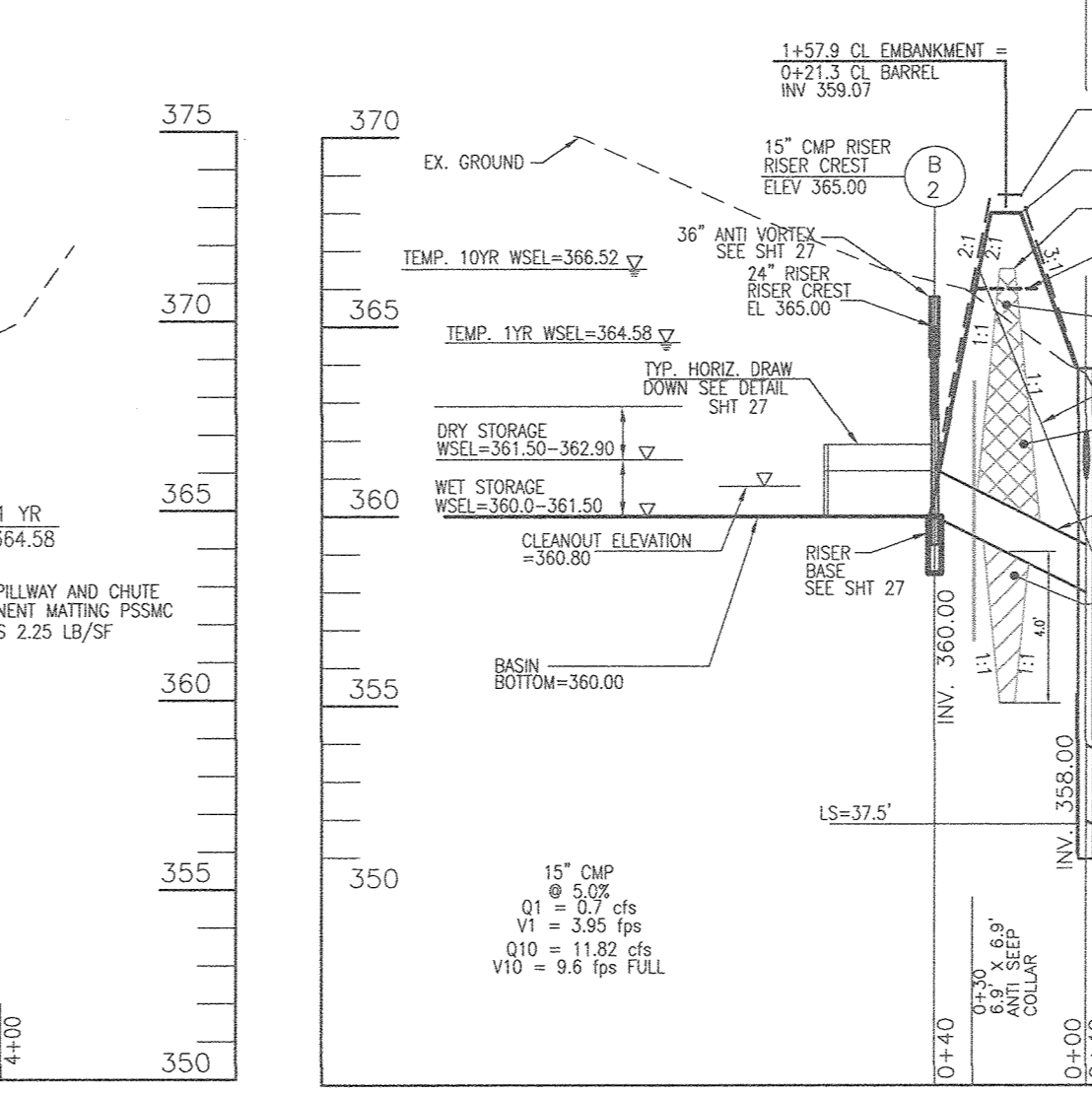
**SEDIMENT BASIN #1  
PROFILE ALONG CL EMERGENCY SPILLWAY**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

SEDIMENT BASIN #1		PLAN VIEW SHEET 15
DRAINAGE AREA - INITIAL	4.30	ACRES
DRAINAGE AREA - INTERIM	13.00	ACRES
DRAINAGE AREA - FINAL	9.30	ACRES
TOTAL STORAGE REQUIRED	46.80	CF
TOTAL STORAGE PROVIDED	47.516	CF
WET STORAGE REQUIRED	23.400	CF
WET STORAGE PROVIDED	23.534	CF
DRY STORAGE REQUIRED	23.400	CF
DRY STORAGE PROVIDED	23.982	CF
BASIN BOTTOM DIMENSIONS	373.00	FT x FT
DRY STORAGE ELEVATION	374.20	FT
CLEANOUT ELEVATION (1)	374.70	FT
TOP OF EMBANKMENT ELEVATION	380.00	FT
EMBANKMENT TOP WIDTH	21	H:V RATIO
EMBANKMENT TOP WIDTH	8	FT
PRINCIPAL SPILLWAY MATERIAL (BARREL, RISER, ANTI-SEEP COLLAR)	24	IN
RISER DIAMETER / CREST ELEVATION	24 / 377.00	IN
BARREL DIAMETER	15	IN
TRASH RACK DIAMETER	36	IN
TRASH RACK HEIGHT	21	IN
ANTI-SEEP COLLAR DIMENSIONS	6.7 x 6.7	FT
OUTLET PROTECTION - LENGTH	10'	FT
OUTLET PROTECTION - WIDTH	15'	FT
OUTLET PROTECTION - DEPTH	19'	FT

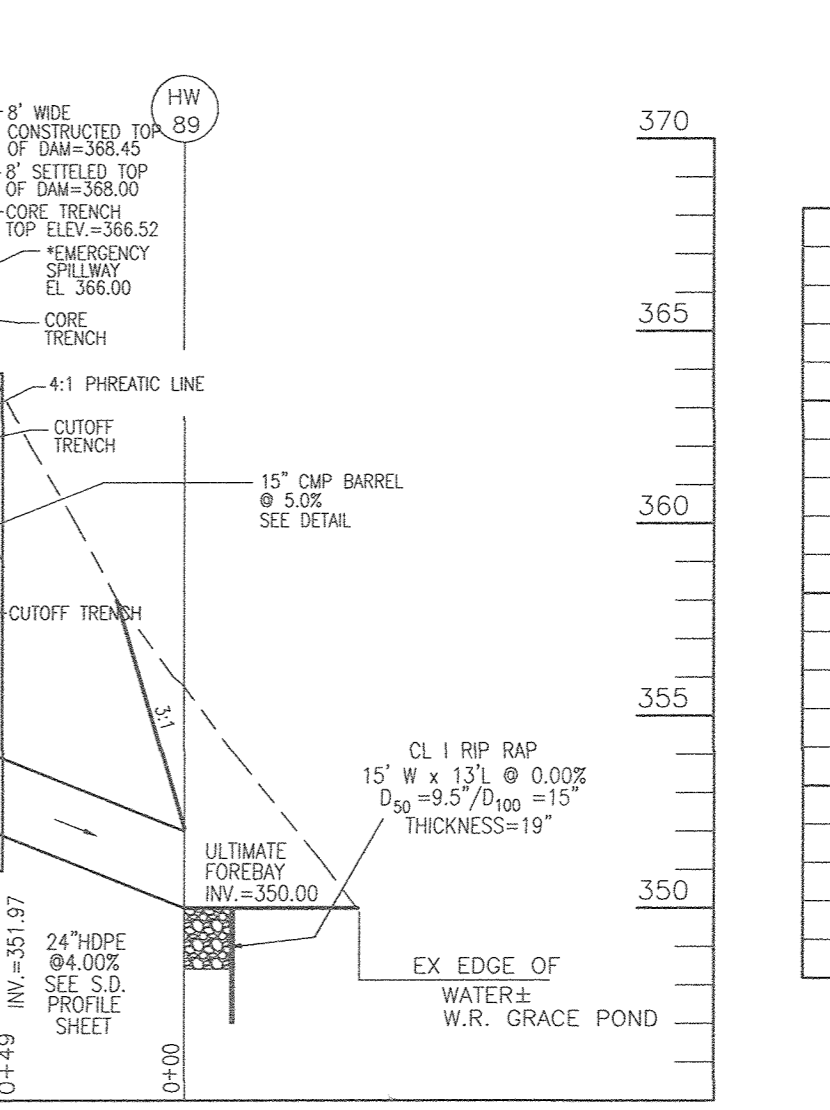
- CONSTRUCTION SPECIFICATIONS**
- INSTALL SEDIMENT CONTROL PRACTICES NECESSARY TO CONSTRUCT BASIN. CLEAR AND GRUB TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBSTRUCTIONAL MATERIAL FROM THE AREAS WHERE THE EMBANKMENT IS TO BE PLACED. DO NOT CLEAR THE POOL AREA UNTIL COMPLETION OF THE EMBANKMENT. UNLESS THE POOL AREA IS TO BE USED FOR BORROW, SALVAGE TOPSOIL FOR LATER USE.
  - EXCAVATE CUT-OFF TRENCH ALONG CENTERLINE OF PROPOSED EMBANKMENT TO A MINIMUM DEPTH OF 4 FEET AND A MINIMUM 4 FEET WIDE ENOUGH TO PERMIT OPERATION OF EXCAVATION AND COMPACTION EQUIPMENT. CONSTRUCT SIDE SLOPES 1:1 OR FLATTER. CUT-OFF TRENCH MUST BE CONTINUOUS AND EXTEND THE ENTIRE LENGTH OF EMBANKMENT. COMPACTION REQUIREMENTS ARE THE SAME AS THOSE FOR THE EMBANKMENT. DEWATER THE TRENCH DURING THE BACKFILLING COMPACTION OPERATIONS, USING AN APPROVED PRACTICE.
  - CONSTRUCT EMBANKMENT OF CLEAN SOIL FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBSTRUCTIONAL MATERIAL. FILL MATERIAL FOR IMPERVIOUS CORE AND CUT-OFF TRENCH MUST CONFORM TO UNIFIED SOIL CLASSIFICATION CO, SC, CH, OR CL AND MUST HAVE AT LEAST 30 PERCENT PASSING THE #200 SIEVE. USE FILL MATERIAL CONTAINING SUFFICIENT MOISTURE SO THAT THE SOIL CAN BE FORMED BY HAND INTO A BALL WITHOUT CRUMBING. IF WATER CAN BE SQUEEZED OUT OF THE BALL, IT IS TOO WET FOR PROPER COMPACTION. PLACE FILL MATERIAL IN SIX-INCH TO EIGHT INCH THICK CONTINUOUS LIFTS OVER THE ENTIRE LENGTH OF THE FILL. OBTAIN COMPACTION BY PASSING CONSTRUCTION EQUIPMENT OR COMPACTOR OVER THE FILL SO THAT THE ENTIRE SURFACE OF EACH LAYER OF FILL IS TRAVERSED AT LEAST FOUR TIMES. CONSTRUCT THE EMBANKMENT TO AN ELEVATION A MINIMUM OF 10 PERCENT HIGHER THAN THE DESIGN HEIGHT TO ALLOW FOR SETTLEMENT.
  - INSTALL PRINCIPAL SPILLWAY PRIOR TO, OR CONCURRENTLY WITH, FILL PLACEMENT. DO NOT EXCAVATE EMBANKMENT FOR PLACEMENT OF SPILLWAY. ALL PIPE CONNECTIONS, INCLUDING ANTI-SEEP COLLARS MUST BE COMPLETELY WATERTIGHT. INSTALL FILTER DAPHRAGM WHEN SPECIFIED ON PLAN. BARREL CONNECTION TO RISER MUST BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ATTACH BARREL STUB TO RISER AT THE SAME PERCENT (SLOPE) OF GRADE AS THE BARREL. FOR RISER, RIBRIP ASSEMBLY, POUR RISER WITH BARREL IN PLACE OR SET PRE-CAST RISER AND INSTALL PROTECTION COLLAR FOR WATERTIGHT CONNECTION. PLACE FILL MATERIAL AROUND THE PIPE TO A DEPTH OF 1.5 TIMES THE PIPE DIAMETER (MINIMUM). SECURELY INSTALL ANTI-SEEP DEVICE AND TRASH RACK AS SHOWN ON PLAN.
  - INSTALL THE EMERGENCY SPILLWAY IN UNDISTURBED NATURAL GROUND. CONSTRUCT SPILLWAY WITHIN A TOLERANCE OF ± 0.2 FEET.
  - STABILIZE EMBANKMENT AND ASSOCIATED DISTURBED AREAS WITHIN THREE (3) DAYS OF COMPLETION WITH SEED, MULCH AND PSSIC. MONITOR EMBANKMENT AND MAINTAIN EROSION FREE DURING THE LIFE OF THE BASIN.
  - INSTALL FENCING AND SIGNAGE IN ACCORDANCE WITH THE APPROVED PLAN. REMOVE SEDIMENT WHEN ACCUMULATED MATERIAL HAS REACHED 25 PERCENT OF THE TOTAL STORAGE DEPTH. RESTORE BASIN TO ORIGINAL DESIGN VOLUME. PLACE REMOVED SEDIMENTS IN A CONTROLLED AREA AND STABILIZE. DO NOT DEPOSIT SEDIMENT DOWNSTREAM OF THE EMBANKMENT, ADJACENT TO A STREAM OR FLOODPLAIN.
  - WHEN THE CONTRIBUTING DRAINAGE AREA IS STABLE, THE BASIN CAN BE REMOVED IN ACCORDANCE WITH THE APPROVED SEDIMENT CONTROL PLAN. A SEDIMENT BASIN DESIGNED, BUILT, AND CERTIFIED AS A STORMWATER MANAGEMENT STRUCTURE, MAY BE CONVERTED WHEN THE CONTRIBUTORY DRAINAGE AREA IS STABLE. PROPERLY DEWATER BASIN, MODIFY OUTLET STRUCTURE, PERFORM ADDITIONAL GRADING, AND PROVIDE REQUIRED STORAGE VOLUME IN ACCORDANCE WITH APPROVED STORMWATER MANAGEMENT PLANS.



**SEDIMENT BASIN #2  
PROFILE ALONG CL OF EMBANKMENT**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



**SEDIMENT BASIN #2  
PROFILE ALONG CL OF BARREL**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'



**SEDIMENT BASIN #2  
PROFILE ALONG CL EMERGENCY SPILLWAY**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL, BY THE HOWARD SOIL CONSERVATION DISTRICT.

HOWARD S.C.D. DATE: 5/8/19

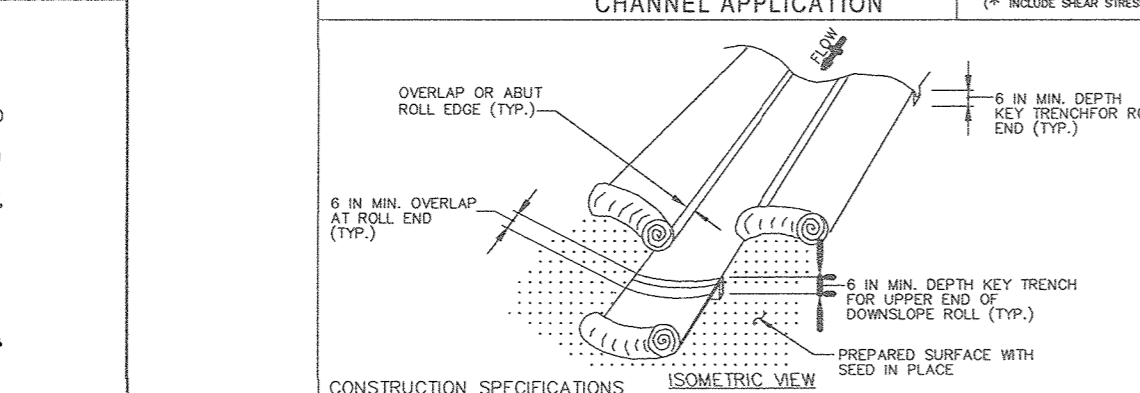
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. MARYLAND DEPARTMENT OF ENVIRONMENT AND WATER MANAGEMENT ADMINISTRATION.

**OWNER/DEVELOPER CERTIFICATION:**

I/WE HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN, INCLUDING REPORTING AND MAINTENANCE CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

Scott D. Pank  
OWNER/DEVELOPER SIGNATURE

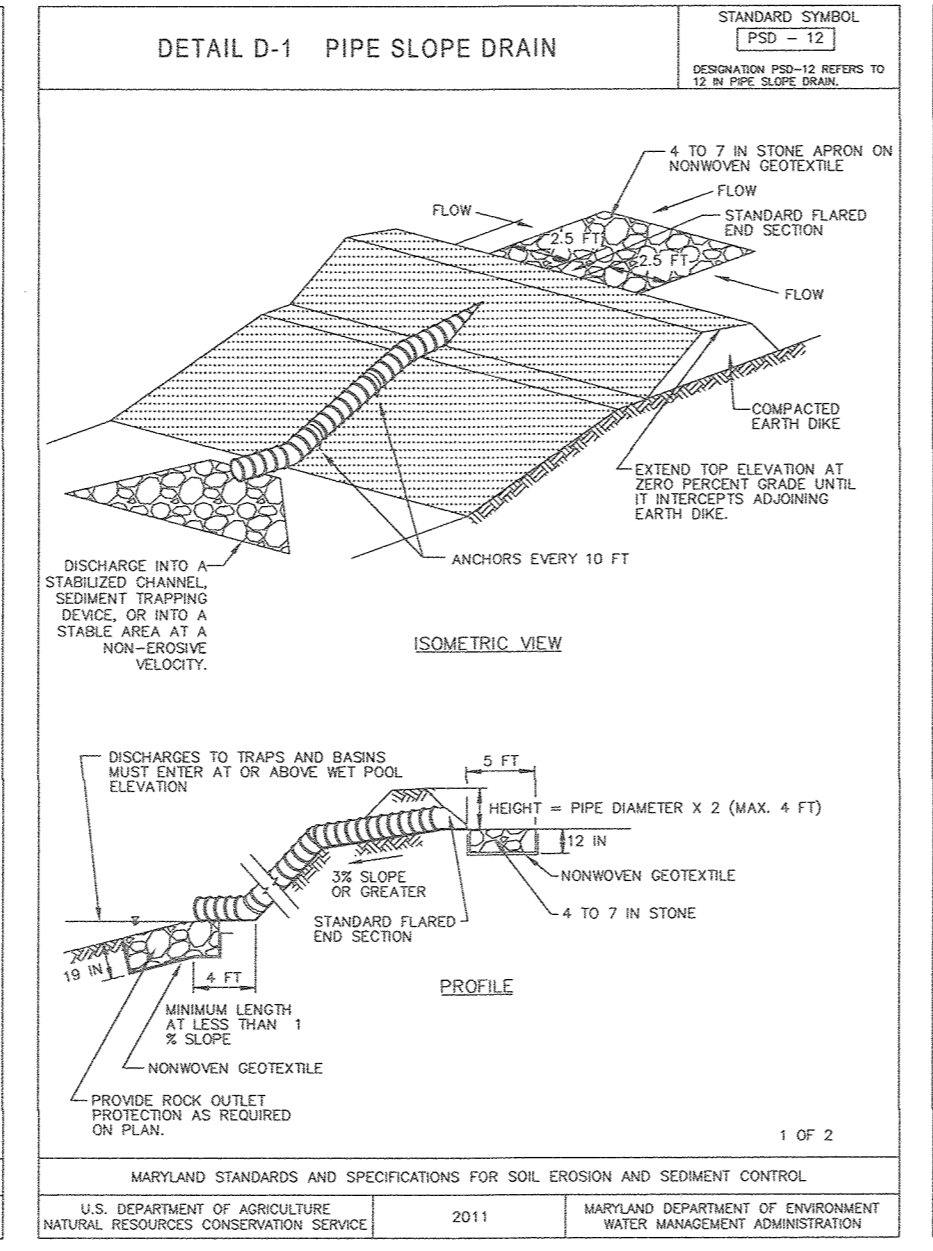
Scott D. Pank, P.E., SIMPSON OAKS CRP3, LLC  
PRINTED NAME & TITLE



**CONSTRUCTION SPECIFICATIONS**

- USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
- USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (NON-TOXIC AND NON-HARMFUL TO VEGETATION AND NON-IRRITANT TO THE SKIN). IF PRESENT, NETTING MUST BE SECURED TO THE MAT WITH A MAXIMUM MESH OPENING OF 3/8 INCH. MATTING MUST BE SECURED TO THE MAT WITH A MAXIMUM MESH OPENING OF 3/8 INCH. MATTING MUST BE SECURED TO THE MAT WITH A MAXIMUM MESH OPENING OF 3/8 INCH.
- SECURE MATTING USING STEEL STAPLES, WOOD STAPLES, OR BIODEGRADABLE EQUIVALENT STAPLES. STEEL STAPLES MUST BE 1/4 INCH DIA. AND 1 1/2 INCH LONG. WOOD STAPLES MUST BE 1/4 INCH DIA. AND 1 1/2 INCH LONG. BIODEGRADABLE EQUIVALENT STAPLES MUST BE 1/4 INCH DIA. AND 1 1/2 INCH LONG.
- PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDING PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
- UNROLL MATTING IN DIRECTION OF WATER FLOW, CENTERING THE FIRST ROLL ON THE CHANNEL CENTERLINE. WORK FROM CENTER OF CHANNEL OUTWARD WHEN PLACING ROLLS. LAY MAT SMOOTHLY AND FIRMLY ON THE SEEDING SURFACE. AND STRETCHING THE MATTING.
- KEY-IN UPSTREAM END OF EACH MAT ROLL BY DIGGING A 6 INCH (MINIMUM) TRENCH AT THE UPSTREAM END OF THE MATTING, PLACING THE ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMING TO SECURE THE MAT END.
- OVERLAP OR ABUT THE ROLL ENDS PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY AT LEAST 6 INCHES. STAPLE STAPLES TO THE MATTING AT THE OVERLAP POINTS. STAPLES MUST BE PLACED AT LEAST 12 INCHES APART. STAPLES MUST BE PLACED AT LEAST 12 INCHES APART.
- ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION ON PLAN.

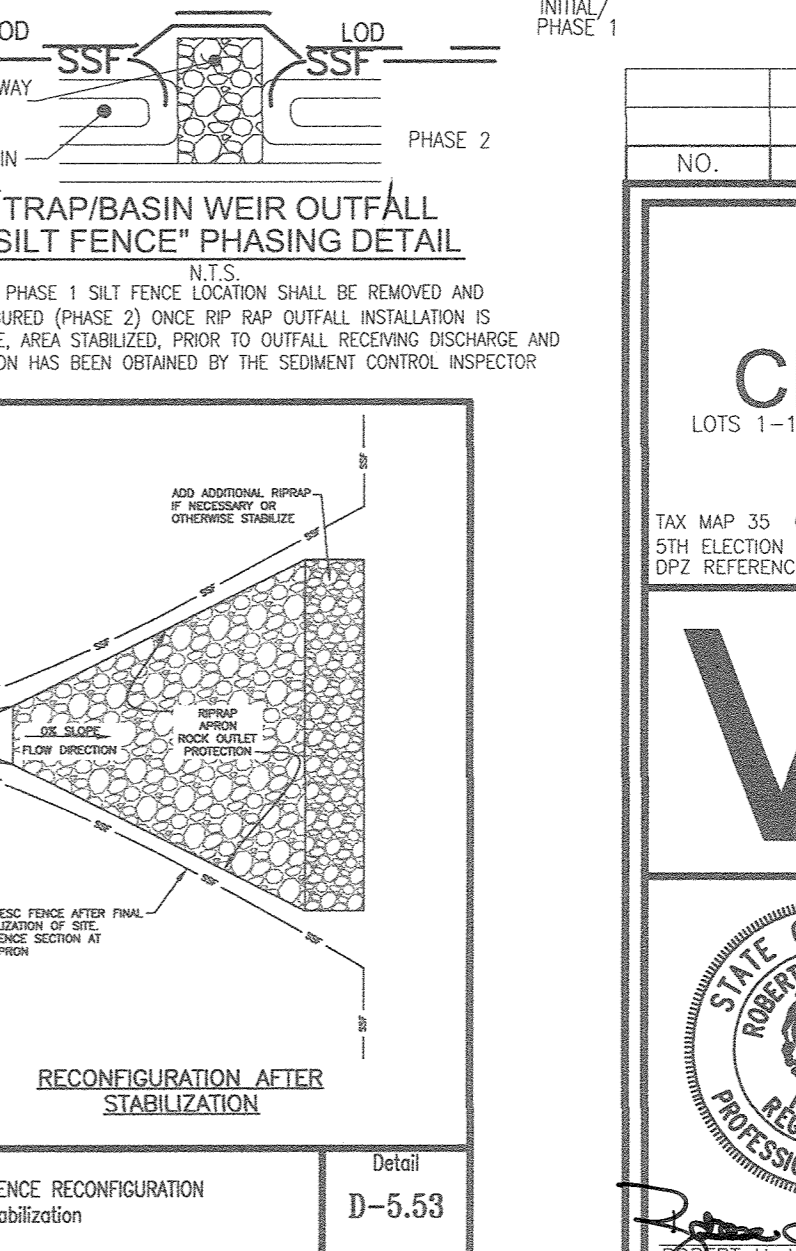
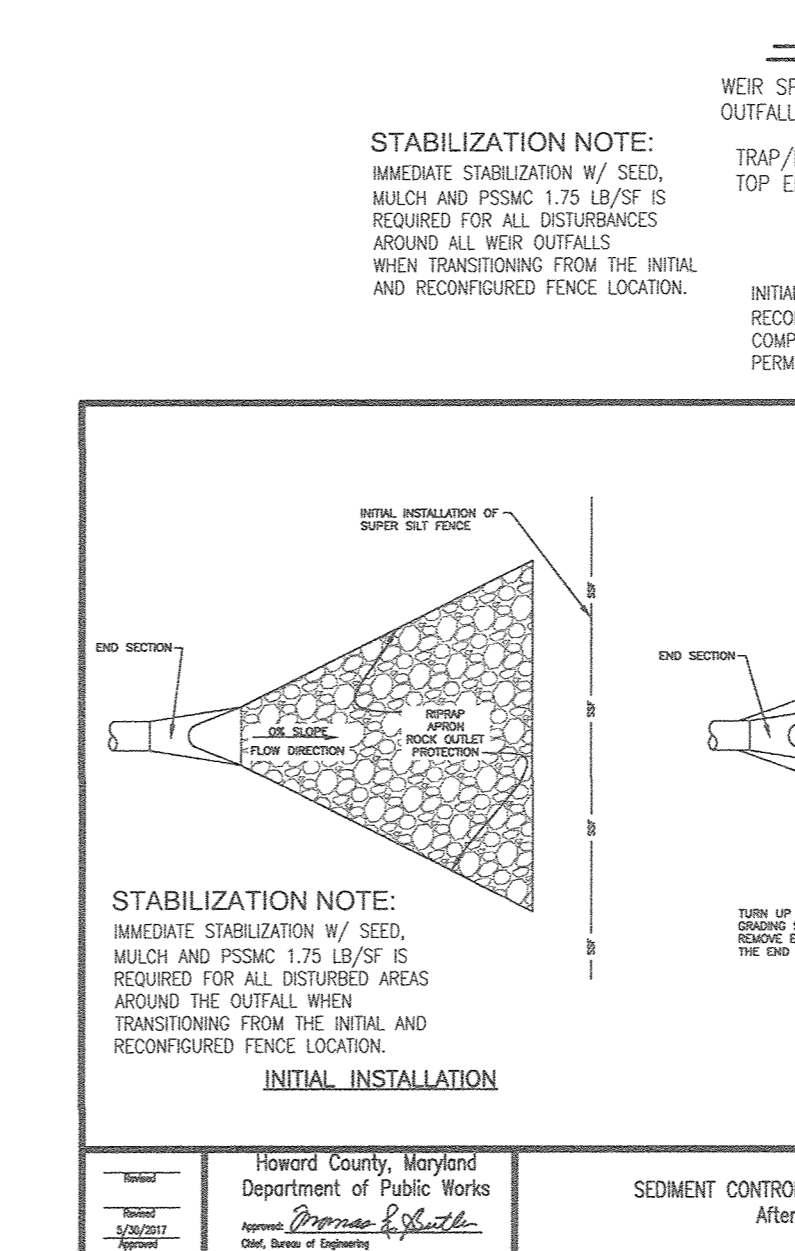
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. MARYLAND DEPARTMENT OF ENVIRONMENT AND WATER MANAGEMENT ADMINISTRATION.



**CONSTRUCTION SPECIFICATIONS**

- THE HEIGHT OF THE EARTH ONE MUST BE AT LEAST 2 TIMES THE PIPE DIAMETER MEASURED FROM THE INSET OF THE PIPE. EXTEND THE TOP ELEVATION OF ONE AT 2000 PERCENT GRADE UNTIL IT INTERSECTS THE TOP OF THE EARTH ONE.
- FLUMBLE PIPE IS PREFERRED. HOLLOWER CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. ALL CONNECTIONS MUST BE WATERTIGHT.
- ATTACH A FLARED END SECTION TO THE INLET END OF PIPE WITH A WATERTIGHT CONNECTION AT THE INLET OF THE PIPE SLOPE DRAIN. INSTALL A 4 TO 7 INCH STONE OR EQUIVALENT REVEALED CONCRETE PLACED 12 INCHES IN DEPTH ON NONWOVEN GEOTEXTILE AND EXTEND OUT 5 FEET FROM THE INLET IN ALL DIRECTIONS.
- PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALL SIDES OF ALL RIPRAP.
- SECURELY ANCHOR THE PIPE SLOPE DRAIN (PSD) TO THE SLOPE. SPACE THE ANCHORS EVERY 10 FEET.
- HAND TAMM THE SOIL AROUND AND UNDER THE PIPE AND END SECTION IN A INCH LIFTS TO THE TOP OF THE EARTH ONE.
- UPON COMPLETING INSTALLATION OF THE PSD, STABILIZE ASSOCIATED DISTURBANCES WITH SEED, MULCH, AND TACK.
- INSTALL OUTLET PROTECTION AS SPECIFIED ON APPROVED PLAN.
- KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND PORTING CHANNEL. REMOVE ACCUMULATED SEDIMENT AND DEBRIS.

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



**OWNER / DEVELOPER**  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-0098  
(410) 531-4000

**FINAL ROAD CONSTRUCTION PLAN  
AND SEDIMENT CONTROL PLAN - NOTES AND DETAILS**

**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
PLATS 25334-2-25337

TAX MAP 35 GRID 21  
8TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERS & SURVEYORS, INC. PLANNERS**  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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: 09-27-2023

ROBERT H. VOGEL, PE No. 16193

29 SHEET OF 74

**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EX. ELECTRIC CONDUIT

- EXISTING TREELINE (FIELD LOCATED)
- EXISTING STREAM
- EXISTING STREAM BUFFER
- EXISTING WETLAND BUFFER
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY

- EX. ZONING LINE
- PROP. 5' SIDEWALK
- 8' BIKWAY
- PROP. 6' NEIGHBORHOOD PATHWAY
- PROPOSED CURB
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL

- PUBLIC DRAINAGE AND UTILITY EASEMENT
- PRIVATE DRAINAGE AND UTILITY EASEMENT
- MICRO BIORETENTION AREA
- FOREST CONSERVATION AREA (REFORESTATION)
- FOREST CONSERVATION AREA (RETENTION)

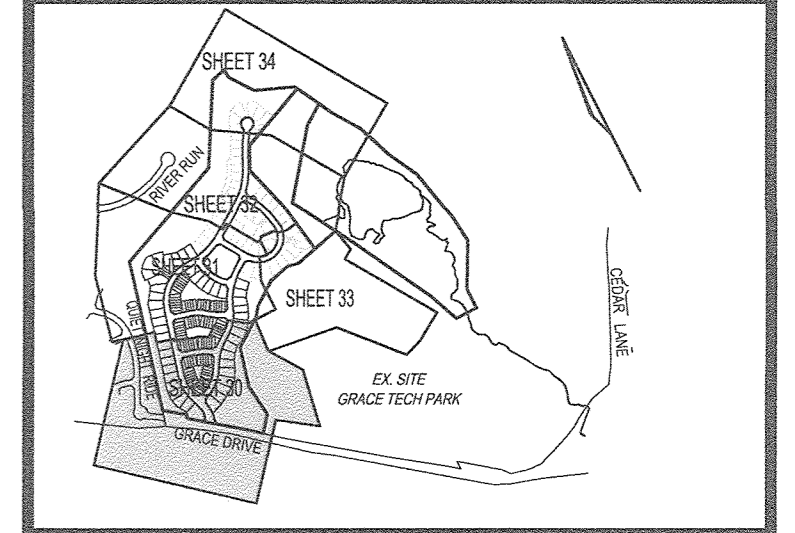
- AREA 'C' FACTOR
- DA #
- ZONING % IMPERVIOUS
- DRAINAGE AREA DIVIDE

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	PERCENT INCLUSIONS	K FACTOR	PERCENT IMPERVIOUS	CRITERIA
Bla	BALD SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	NO	0.37	NO	NO
Co	ODOROUS & HATBORO SILT LOAM, 0-3% SLOPES	C	NO	NO	0.37	NO	NO
GcB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	NO	NO
GcD	GLENELG-HIRSH LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO
GmB	GLENELG SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	NO	0.43	NO	YES
GmC	GLENELG SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	NO	YES
GcB	GLENELG-HIRSH LAND-EDWARDS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES
MbR	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO
MbC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO
MbD	MANOR LOAM, 15-20% SLOPES	B	NO	NO	0.28	NO	YES
MbF	MANOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 NOTE: 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

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONDUCTED ON DECEMBER 29, 2014, AVAILABLE ON-LINE AT: <http://websoilsurvey.nrcs.usda.gov/nw/index.html>  
 2. HYDRIC INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT: <http://soils.usda.gov/hydro/hydro.html>, CONDUCTED ON DECEMBER 29, 2014.

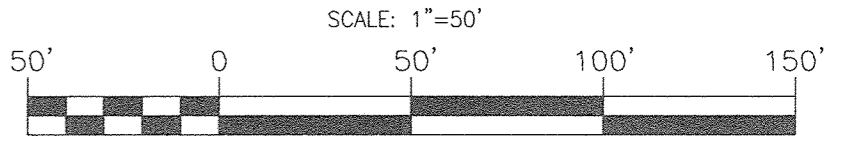


**KEY MAP**  
NOT TO SCALE

- AREA 'C' FACTOR
- DA #
- ZONING % IMPERVIOUS

**NOTE:**  
REFER TO SHEET 43 FOR A TABLE WHICH IDENTIFIES EACH STORM DRAIN SUBAREA, AREA IN ACRES, 'C' FACTOR AND PERCENT IMPERVIOUSNESS.

**STORM DRAIN DRAINAGE AREA MAP**



**OWNER / DEVELOPER**  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

**OWNER**  
T.M. 35 - P.145 (PARCEL C) & T.M. 35 - P.412 (PARCEL A)  
W.R. GRACE & CO.  
7500 GRACE DR.  
COLUMBIA, MD 21044-4098  
(410) 531-4000



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.22.19

**NOTE**  
THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OUTFALL OCCURRING ALONG GRACE DRIVE A "NECESSARY DISTURBANCE" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

**FINAL ROAD CONSTRUCTION PLAN**  
**STORM DRAIN DRAINAGE AREA MAP**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

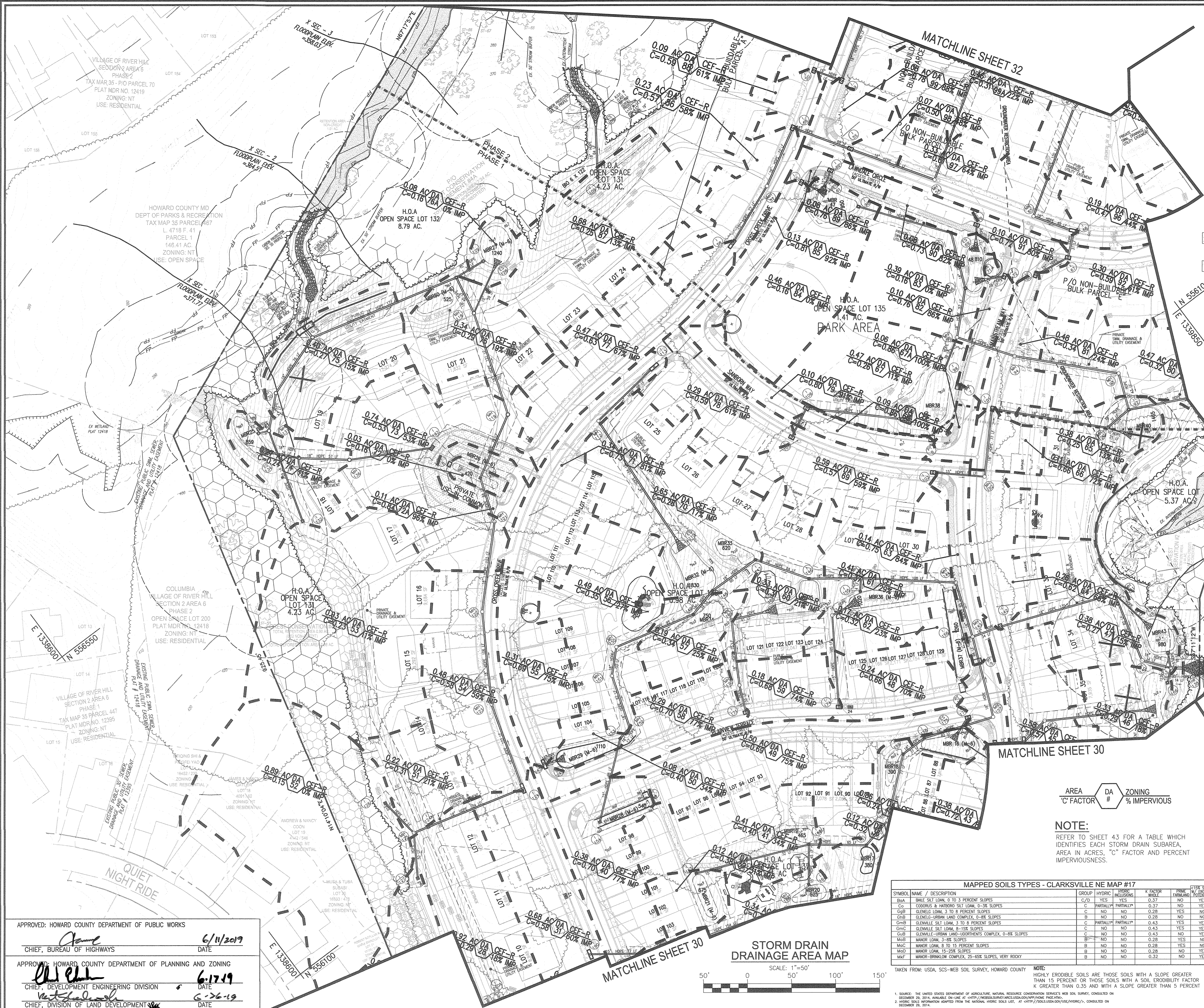
ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-30-2020

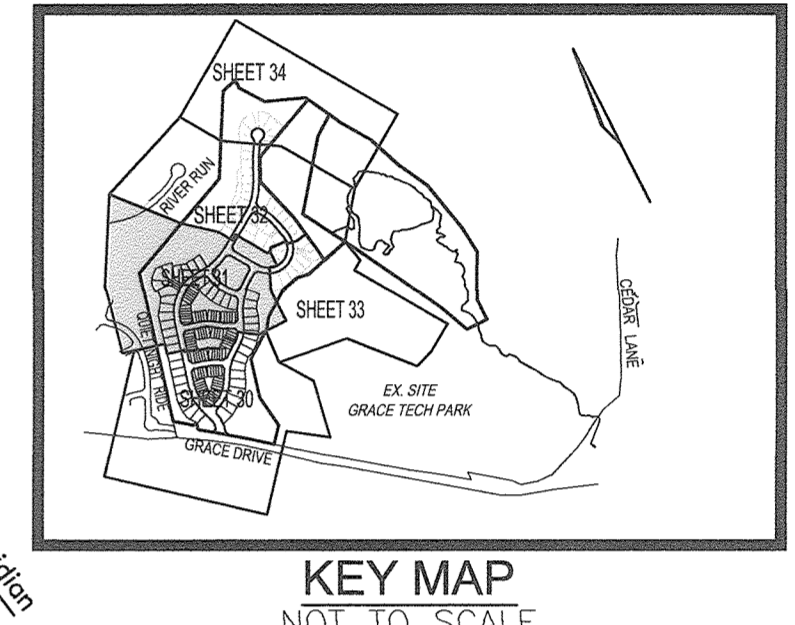
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

**30 SHEET OF 74**



**LEGEND:**

	EXISTING CONTOUR		EXISTING STREAM
	EXISTING SPOT ELEVATION		EXISTING STREAM BUFFER
	EXISTING CURB AND GUTTER		EXISTING WETLAND
	EXISTING UTILITY POLE		EXISTING WETLAND BUFFER
	EXISTING LIGHT POLE		EXISTING FENCE
	EXISTING MAILBOX		PROPERTY LINE
	EXISTING SIGN		RIGHT-OF-WAY LINE
	EXISTING SANITARY MANHOLE		SOILS BOUNDARY
	EXISTING SANITARY LINE		PROP. 6' NEIGHBORHOOD PATHWAY
	EXISTING FIRE HYDRANT		EXISTING FLOOD PLAN
	EXISTING WATER LINE		PROPOSED CURB
	EXISTING STORM DRAIN		EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
	EX. ZONING LINE		
	PROP. 5' SIDEWALK		
	FOREST CONSERVATION AREA (REFORESTATION)		
	FOREST CONSERVATION AREA (RETENTION)		
	EXISTING MONITORING WELL		
	PUBLIC DRAINAGE AND UTILITY EASEMENT		
	PRIVATE DRAINAGE AND UTILITY EASEMENT		
	AREA C FACTOR		ZONING % IMPERVIOUS
	DRAINAGE AREA DIVIDE		



**OWNER / DEVELOPER**  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER**  
 T.M. 35 - P.145 (PARCEL C)  
 & T.M. 35 - P.412 (PARCEL A)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 410-531-4000

**OWNER / DEVELOPER**  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER**  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 410-531-4000

AREA C FACTOR DA # ZONING % IMPERVIOUS

**NOTE:**  
 REFER TO SHEET 43 FOR A TABLE WHICH IDENTIFIES EACH STORM DRAIN SUBAREA, AREA IN ACRES, "C" FACTOR AND PERCENT IMPERVIOUSNESS.

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

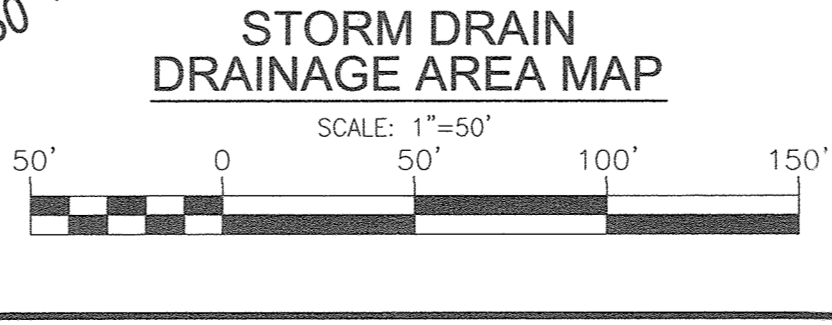
SYMBOL	NAME / DESCRIPTION	GROUP	HYDROIC	PERCENT INCLUSIONS	K FACTOR	PERCENT	PERCENT	PERCENT	PERCENT
Bmk	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	0.37	NO	YES	NO	NO	NO
Co	COONROS & HATBORO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY*	0.37	NO	YES	NO	NO
GgB	GLENGLE LOAM, 3 TO 8 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
GmB	GLENGLE-HIRSH LAND COMPLEX, 0-4% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
GmB	GLENGLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY*	0.43	YES	YES	YES	YES
GmC	GLENGLE SILT LOAM, 8-10% SLOPES	C	NO	NO	0.43	YES	YES	YES	YES
GmB	GLENGLE-HIRSH LAND-TOORHENTS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO	NO	NO
MoB	MAJOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MaC	MAJOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MaB	MAJOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
MxP	MAJOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROUGH	B	NO	NO	0.32	NO	YES	NO	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 NOTE: 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

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19



NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**STORM DRAIN DRAINAGE AREA MAP**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TRENCH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35, GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHN  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

31 SHEET OF 74

MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	PERC	K FACTOR	PERC	PERC	PERC
BHA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	NO	0.37	NO	NO	NO
Co	COODRUS & HARBORO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	NO	NO
GrB	GLENNON LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO
GmB	GLENNON-HIRSH LOAM COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO
GmC	GLENNON SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES
GmD	GLENNON SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	NO	NO	NO
GmE	GLENNON-HIRSH LOAM-TOROHEN'S COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO	NO
MoB	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO
MoC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO
MoD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	NO	NO
MoF	MANOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	NO	NO

NOTE: 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

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONDUCTED ON DECEMBER 28, 2014. AVAILABLE ON-LINE AT: <http://websoilsurvey.nrcs.usda.gov/npp/home.page.html>

2. THESE SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRO SOILS LIST AT: <http://soils.nrcs.usda.gov/hydro/>, CONDUCTED ON DECEMBER 28, 2014.

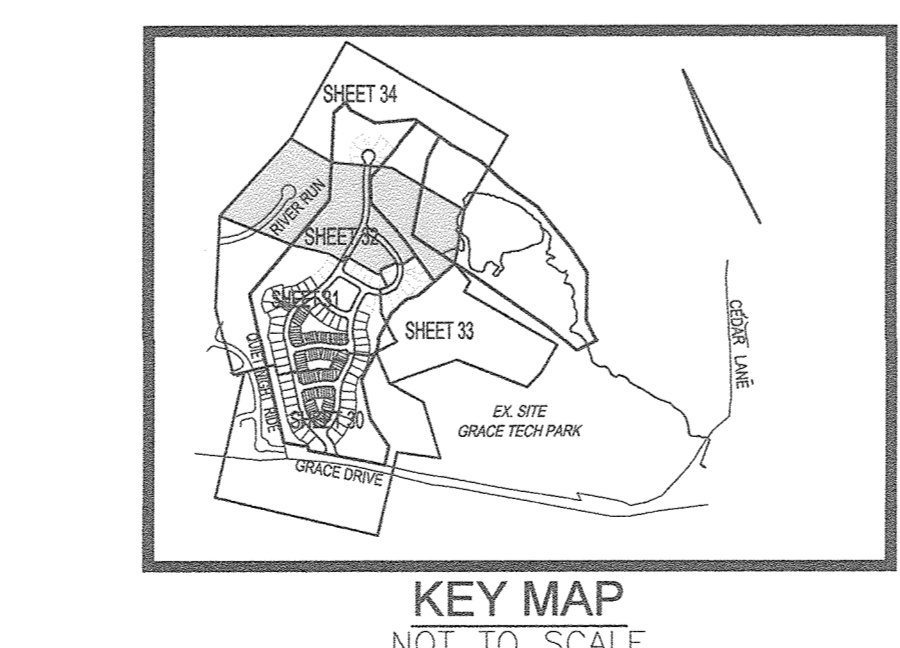
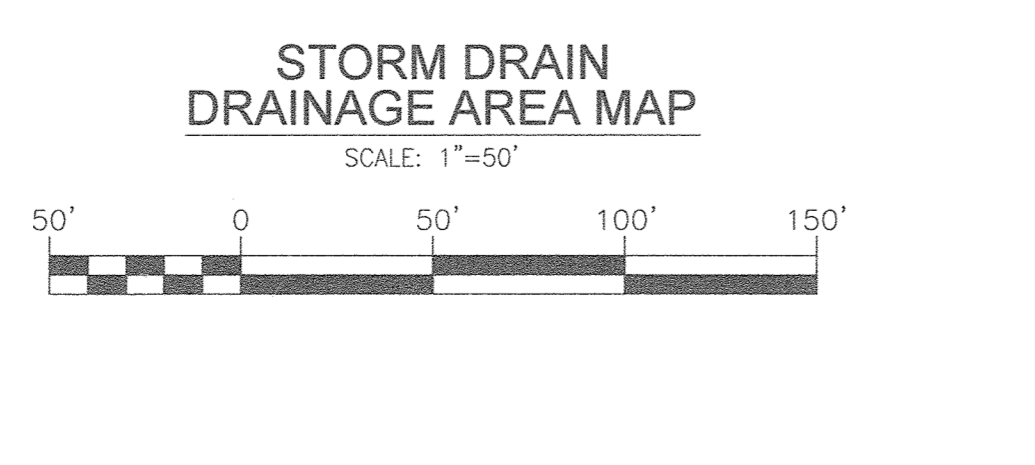


NOTE:  
REFER TO SHEET 43 FOR A TABLE WHICH IDENTIFIES EACH STORM DRAIN SUBAREA, AREA IN ACRES, "C" FACTOR AND PERCENT IMPERVIOUSNESS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19



LEGEND:

EXISTING CONTOUR	EXISTING TREELINE (FIELD LOCATED)
PROPOSED CONTOUR	EXISTING STERAM
EXISTING SPOT ELEVATION	EXISTING STERAM BUFFER
EXISTING CURB AND GUTTER	EXISTING WETLAND
EXISTING UTILITY POLE	EXISTING WETLAND BUFFER
EXISTING LIGHT POLE	EXISTING FENCE
EXISTING MAILBOX	PROPERTY LINE
EXISTING SIGN	RIGHT-OF-WAY LINE
EXISTING SANITARY MANHOLE	SOILS BOUNDARY
EXISTING SANITARY LINE	PROPOSED CURB
EXISTING CLEANOUT	5" ENVIRONMENTAL TRAIL
EXISTING FIRE HYDRANT	AREA "C" FACTOR
EXISTING WATER LINE	DA #
EX. ELECTRIC DRAIN	ZONING % IMPERVIOUS
EX. ELECTRIC CONDUIT	DRAINAGE AREA DIVIDE
EX. ZONING LINE	EX. MONITORING WELL
EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE	PUBLIC DRAINAGE AND UTILITY EASEMENT
PROP. 5' SIDEWALK	PUBLIC SWM, DRAINAGE & UTILITY EASEMENT
8" ASPHALT PATH	PRIVATE DRAINAGE AND UTILITY EASEMENT
PROP. 6' NEIGHBORHOOD PATHWAY	PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
FOREST CONSERVATION AREA (REFORESTATION)	FOREST CONSERVATION AREA (RETENTION)
FOREST CONSERVATION AREA (RETENTION)	EXISTING FLOOD PLAN
FP	

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9909

OWNER  
 T.M. 35 - P.145 (PARCEL C) & T.M. 35 - P.412 (PARCEL A)  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN DRAINAGE AREA MAP  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

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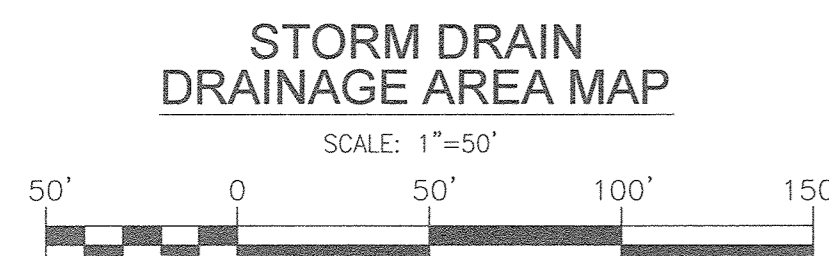
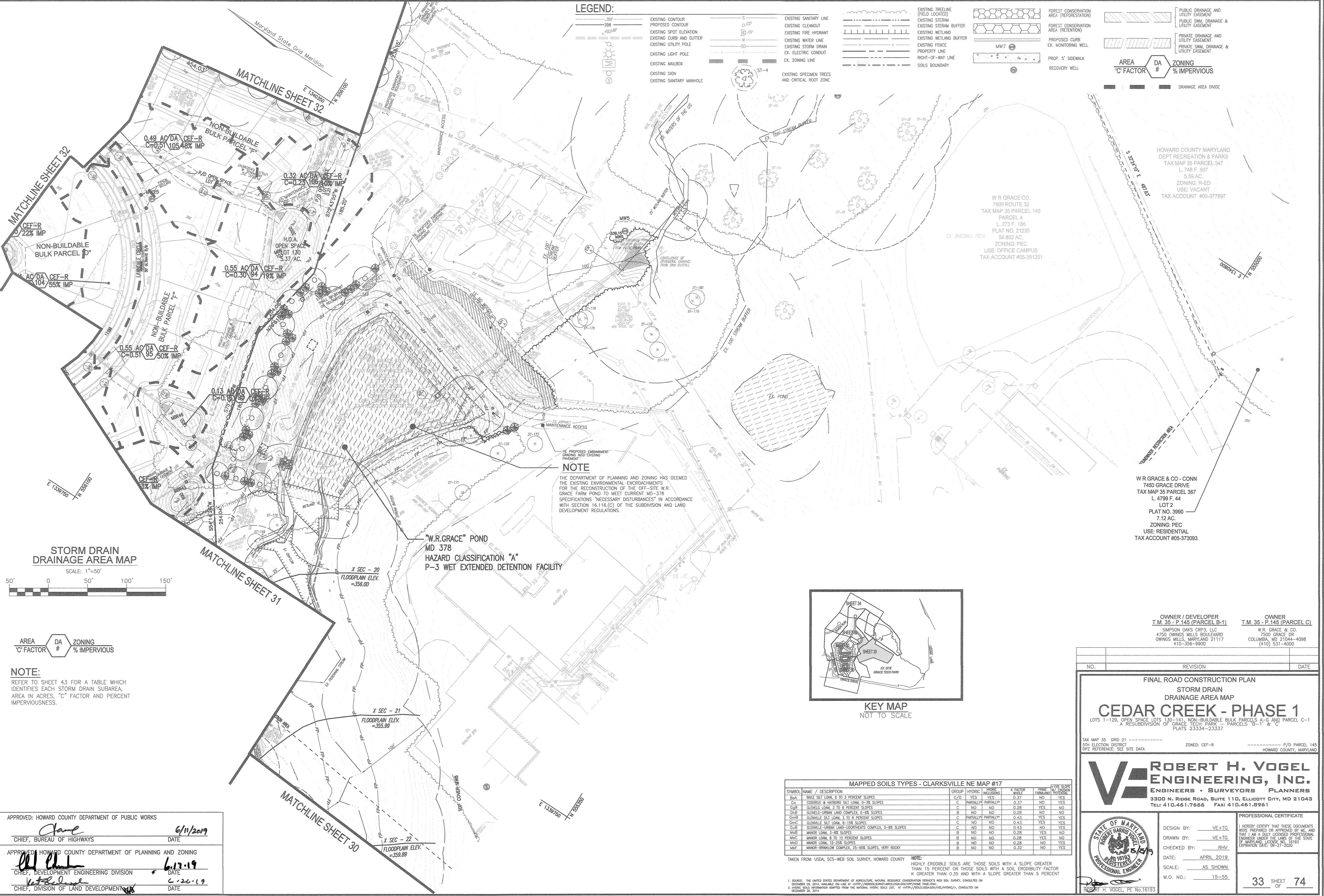
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

32 SHEET OF 74



**LEGEND:**

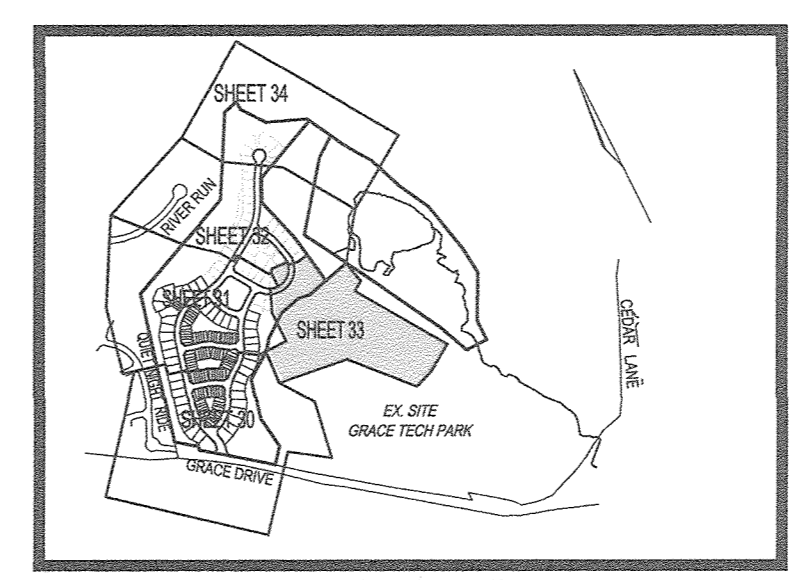
EXISTING CONTOUR	EXISTING SANITARY LINE	EXISTING TRENCH (FIELD LOCATED)	FOREST CONSERVATION AREA (REFORESTATION)	PUBLIC DRAINAGE AND UTILITY EASEMENT
PROPOSED CONTOUR	EXISTING CLEANOUT	EXISTING STERAM BUFFER	FOREST CONSERVATION AREA (RETENTION)	PUBLIC SWM, DRAINAGE & UTILITY EASEMENT
EXISTING SPOT ELEVATION	EXISTING FIRE HYDRANT	EXISTING WETLAND BUFFER	PROPOSED CURB	PRIVATE DRAINAGE AND UTILITY EASEMENT
EXISTING CURS AND GUTTER	EXISTING WATER LINE	EXISTING WETLAND BUFFER	EX. MONITORING WELL	PRIVATE SWM, DRAINAGE & UTILITY EASEMENT
EXISTING UTILITY POLE	EXISTING STORM DRAIN	EXISTING FENCE	PROP. 5' SIDEWALK	
EXISTING LIGHT POLE	EX. ELECTRIC CONDUIT	PROPERTY LINE	RECOVERY WELL	
EXISTING MAILBOX	EX. ZONING LINE	RIGHT-OF-WAY LINE		
EXISTING SIGN	EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE	SOILS BOUNDARY		
EXISTING SANITARY MANHOLE				



AREA 'C' FACTOR	DA #	ZONING % IMPERVIOUS
--------------------	---------	------------------------

**NOTE:**  
REFER TO SHEET 43 FOR A TABLE WHICH IDENTIFIES EACH STORM DRAIN SUBAREA, AREA IN ACRES, "C" FACTOR AND PERCENT IMPERVIOUSNESS.

**NOTE**  
THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENVIRONMENTAL ENCROACHMENTS FOR THE RECONSTRUCTION OF THE OFF-SITE W.R. GRACE FARM POND TO MEET CURRENT MD-378 SPECIFICATIONS "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.



**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	TERRIC INCLUSIONS	K FACTOR	PERCENT FAVORABLE	CRIB SCORE	W/ FAVORABLE
Bka	BARE SILT LOAM, 0 TO 3 PERCENT SLOPES	G/D	YES	YES	0.37	NO	YES	
Co	COARSE & MEDIUM SILT LOAM, 0-8% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES	
Gsb	GLENNVILLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	
Gsb	GLENNVILLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	
Gmb	GLENNVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	
Gmc	GLENNVILLE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	
Gub	GLENNVILLE-URBAN LAND-URBANTHENS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES	
Msb	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	
Msc	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	
Msd	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES	
Mst	MANOR-BRINKLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES	

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
NOTE: 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

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Del* 6.17.19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Del* 6.26.19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

HOWARD COUNTY MARYLAND  
 DEPT RECREATION & PARKS  
 TAX MAP 35 PARCEL 347  
 L. 748 F. 507  
 5.59 AC.  
 ZONING: R-ED  
 USE: VACANT  
 TAX ACCOUNT #05-377897

W R GRACE CO.  
 7500 ROUTE 32  
 TAX MAP 35 PARCEL 145  
 PARCEL A  
 L. 273 F. 186  
 PLAT NO. 21235  
 54,802 AC.  
 ZONING: PEC  
 USE: OFFICE CAMPUS  
 TAX ACCOUNT #05-351251

W R GRACE & CO - CONN  
 7450 GRACE DRIVE  
 TAX MAP 35 PARCEL 367  
 L. 4799 F. 44  
 LOT 2  
 PLAT NO. 3990  
 7.12 AC.  
 ZONING: PEC  
 USE: RESIDENTIAL  
 TAX ACCOUNT #05-373093

OWNER / DEVELOPER  
 T.M. 35 - P. 145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P. 145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE
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FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN  
 DRAINAGE AREA MAP  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA  
 ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE

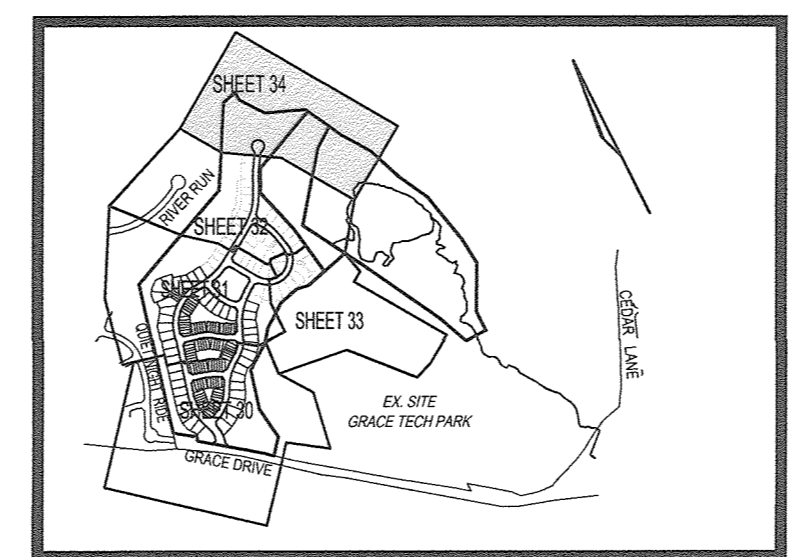
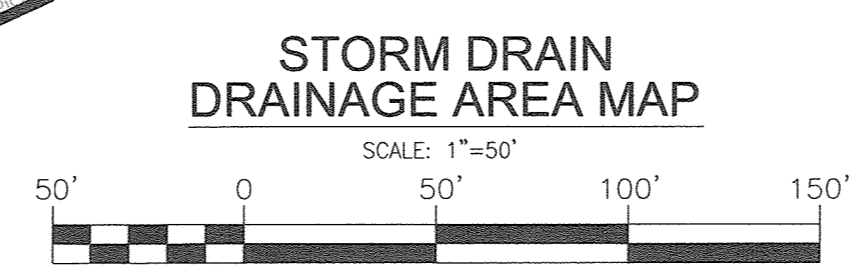
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: R.H.V.  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A BUILT LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193 EXPIRATION DATE: 09-27-2020

33 SHEET OF 74



**NOTE**  
 THE DEPARTMENT OF PLANNING AND ZONING HAS DENIED THE ENVIRONMENTAL DISTURBANCES REQUIRED FOR THE CONNECTION TO PUBLIC SEWER "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.



**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDROIC	PERCENT	ERODIBLE	PERCENT	PERCENT	PERCENT	PERCENT
SoA	SHALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	0.37	NO	YES	NO	NO	NO
SoB	CLAY SILT LOAM, 0 TO 3 PERCENT SLOPES	C	PARTIALLY	0.37	NO	NO	NO	NO	NO
SoC	CLAY SILT LOAM, 3 TO 8 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoD	CLAY SILT LOAM, 8 TO 15 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoE	CLAY SILT LOAM, 15 TO 25 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoF	CLAY SILT LOAM, 25 TO 35 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoG	CLAY SILT LOAM, 35 TO 45 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoH	CLAY SILT LOAM, 45 TO 55 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoI	CLAY SILT LOAM, 55 TO 65 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoJ	CLAY SILT LOAM, 65 TO 75 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoK	CLAY SILT LOAM, 75 TO 85 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoL	CLAY SILT LOAM, 85 TO 95 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO
SoM	CLAY SILT LOAM, 95 TO 100 PERCENT SLOPES	C	NO	0.28	YES	NO	NO	NO	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
**NOTE:** HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL STABILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.26.19

MATCHLINE SHEET 32

**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EX. ELECTRIC CONDUIT
- EX. ZONING LINE
- PROP. 5' SIDEWALK
- FOREST CONSERVATION AREA (REFORESTATION)
- FOREST CONSERVATION AREA (RETENTION)
- EX. MONITORING WELL
- PUBLIC DRAINAGE AND UTILITY EASEMENT
- PRIVATE DRAINAGE AND UTILITY EASEMENT
- EXISTING TREELINE (FIELD LOCATED)
- EXISTING STERAM
- EXISTING STERAM BUFFER
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- EXISTING FLOOD PLAIN
- PROPOSED CURB
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- DRAINAGE AREA DIVIDE
- EX. 100 YR FLOODPLAIN, DRAINAGE, SEWER, AND UTILITY EASEMENT
- AREA 'C' FACTOR
- DA # ZONING % IMPERVIOUS

**NOTE:**  
 REFER TO SHEET 43 FOR A TABLE WHICH IDENTIFIES EACH STORM DRAIN SUBAREA, AREA IN ACRES, "C" FACTOR AND PERCENT IMPERVIOUSNESS.

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**STORM DRAIN DRAINAGE AREA MAP**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

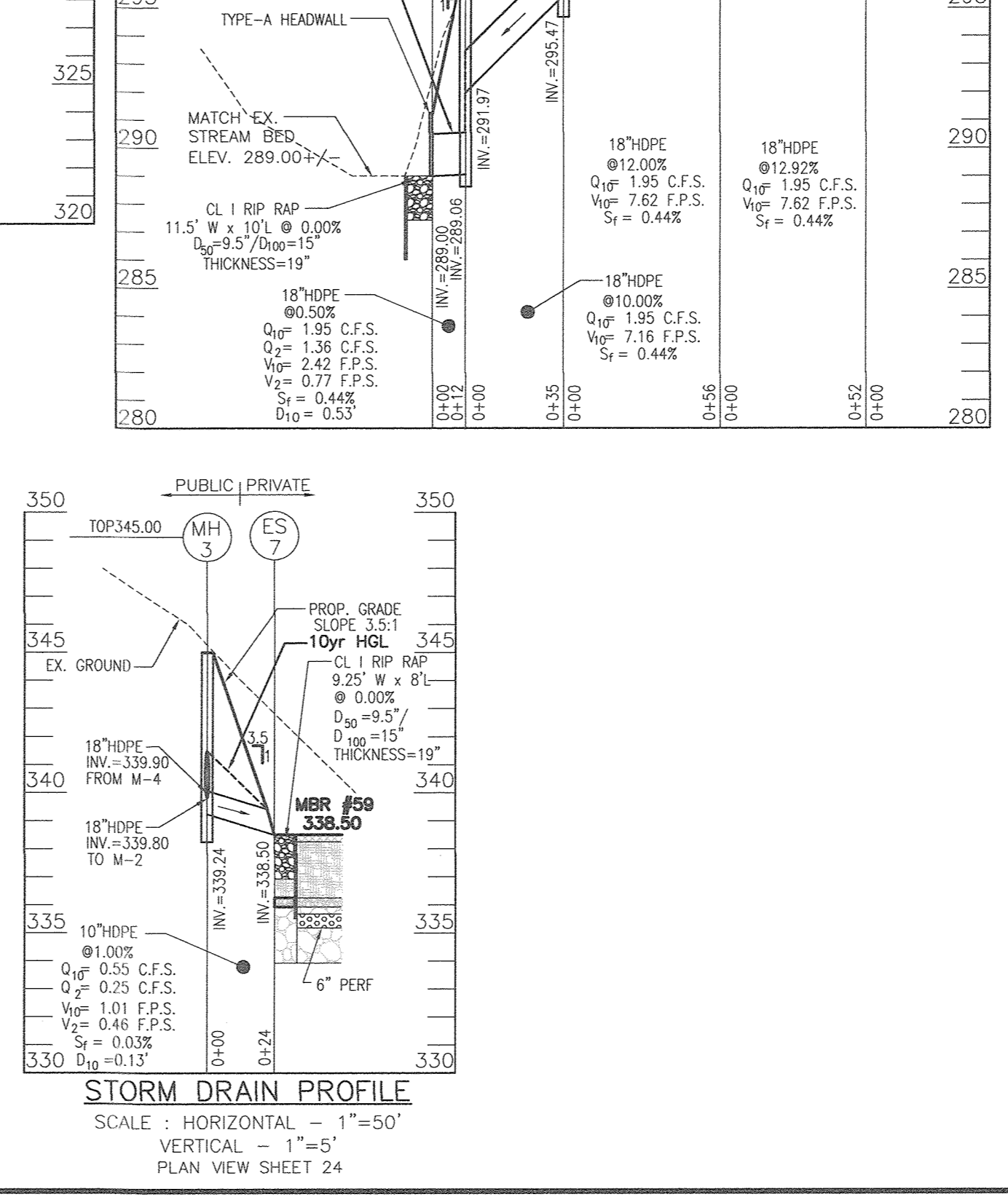
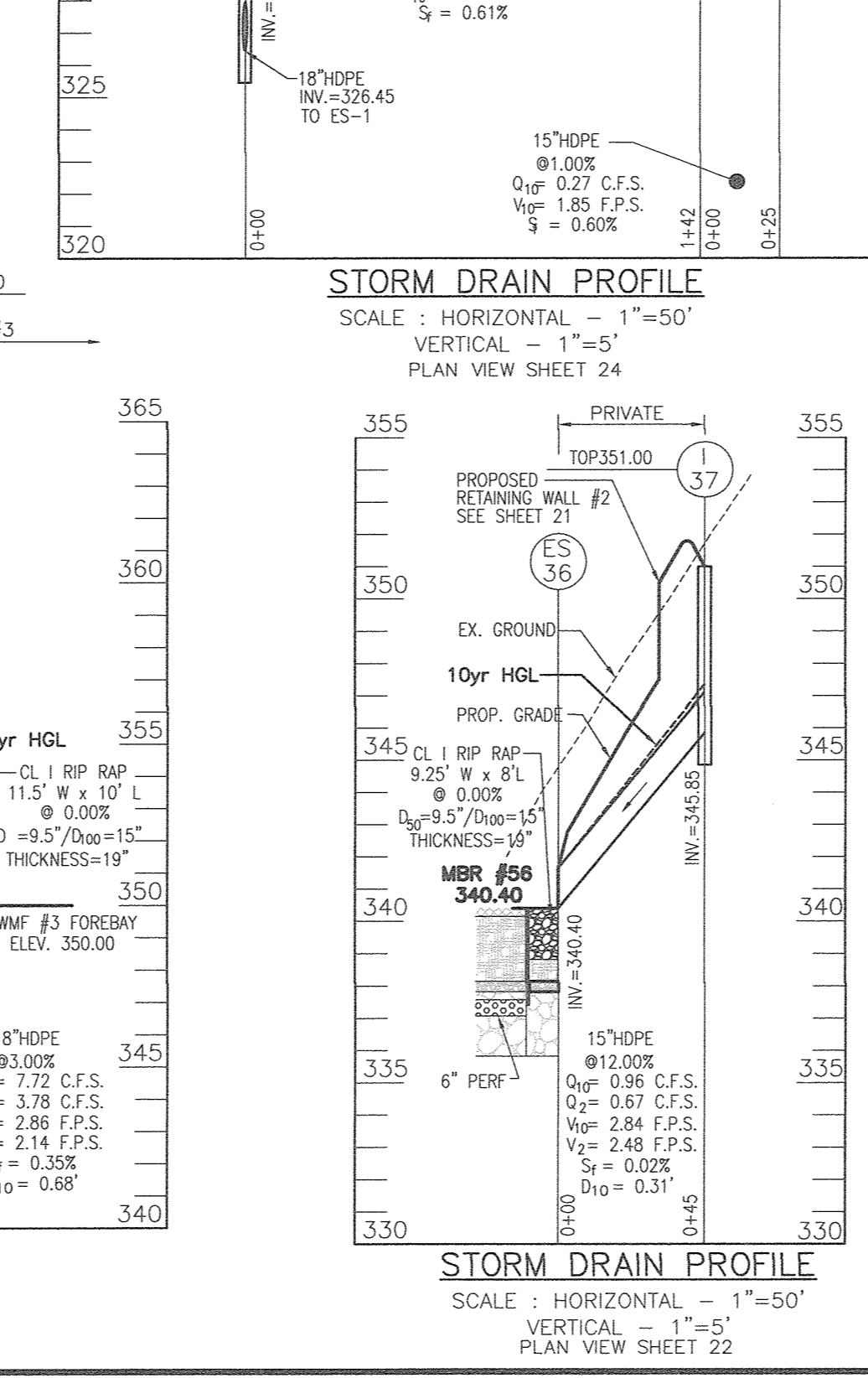
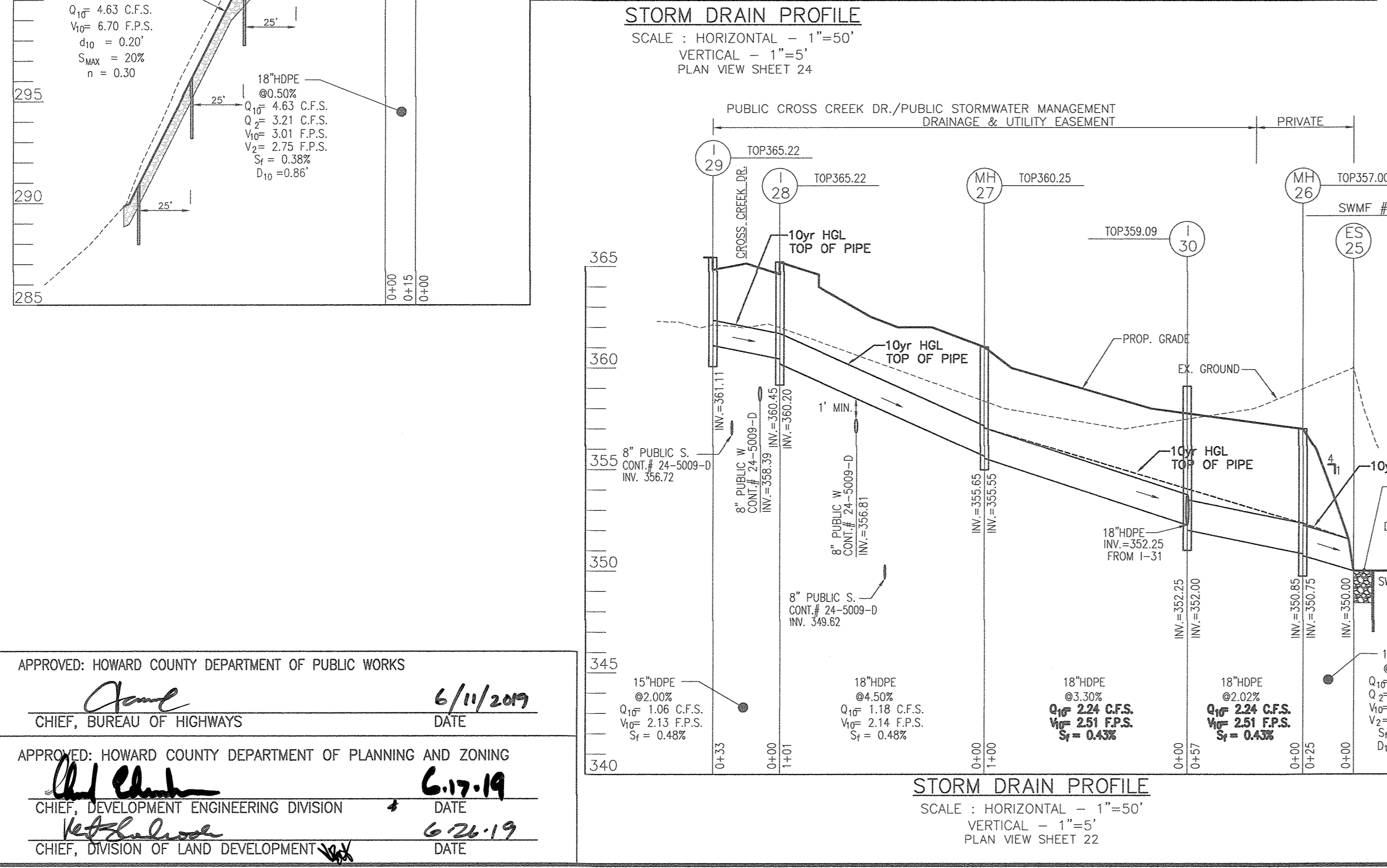
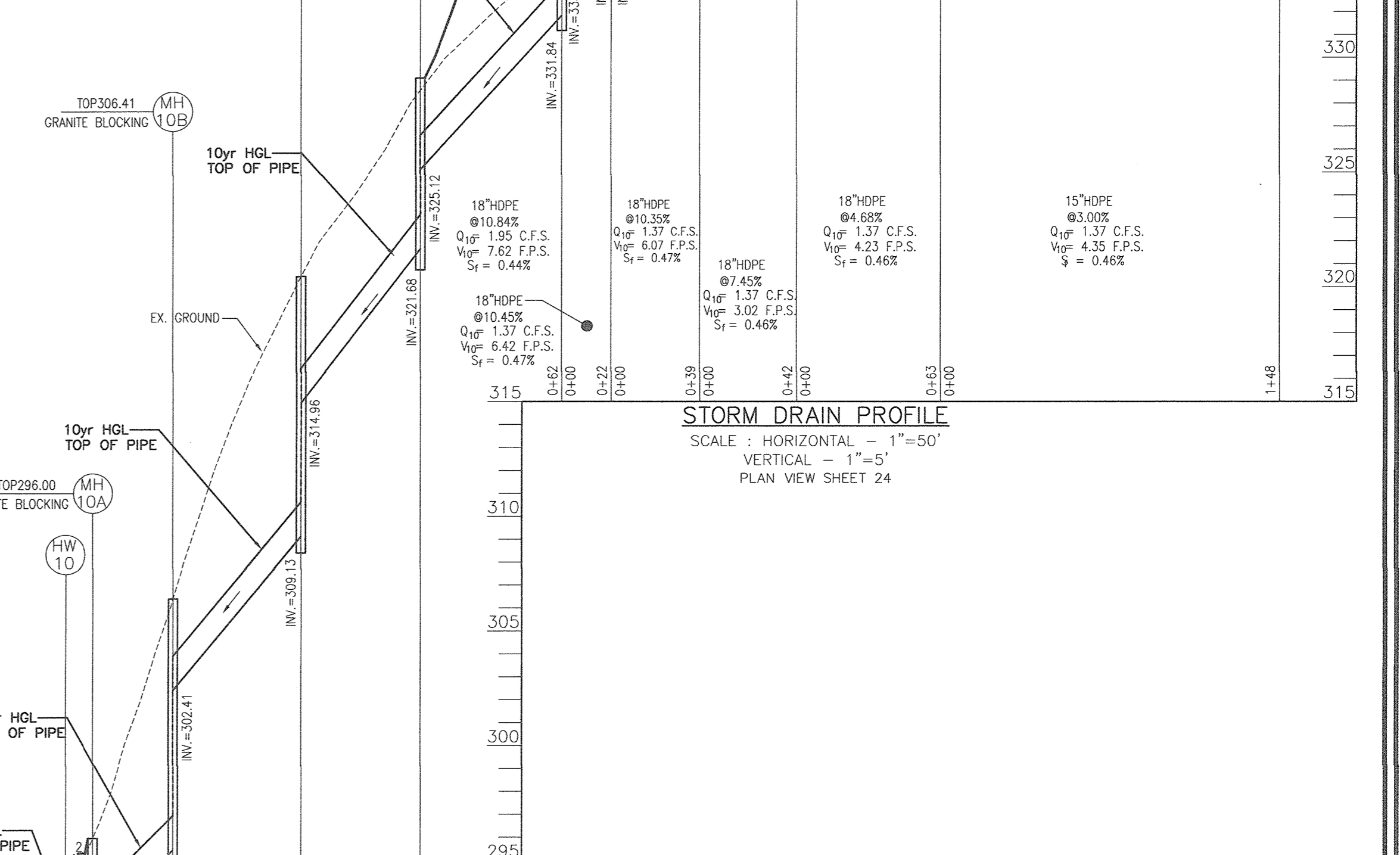
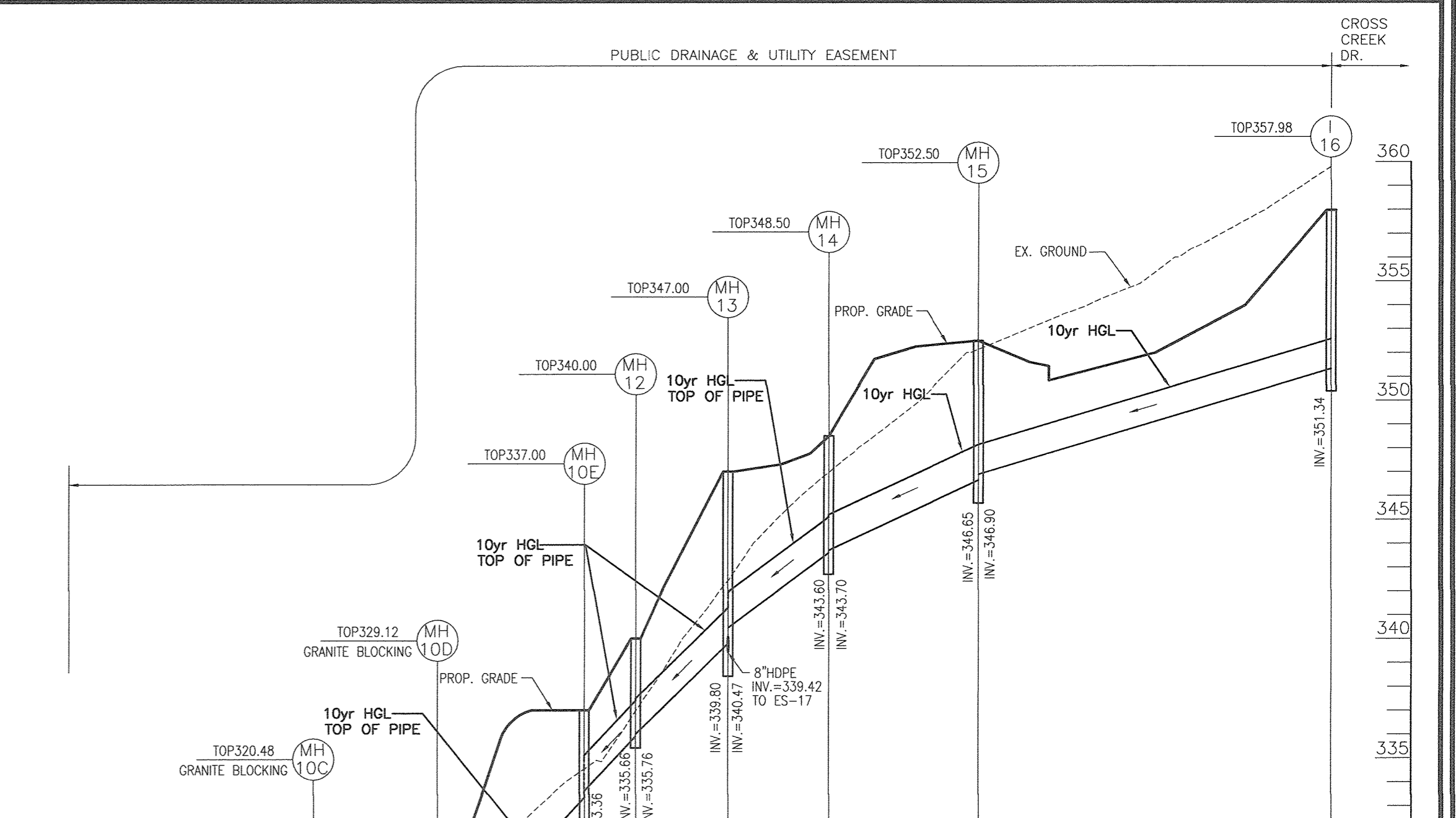
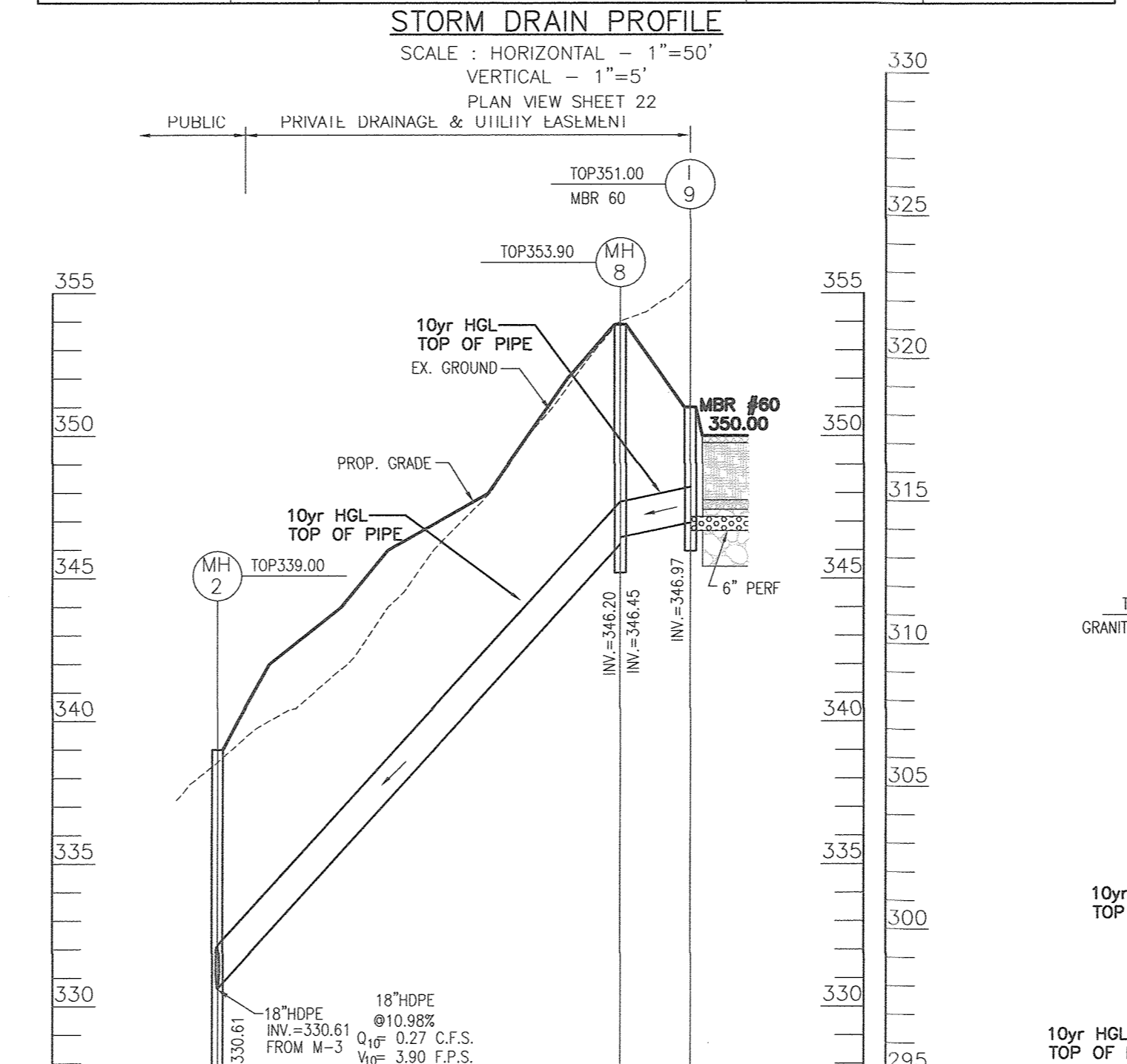
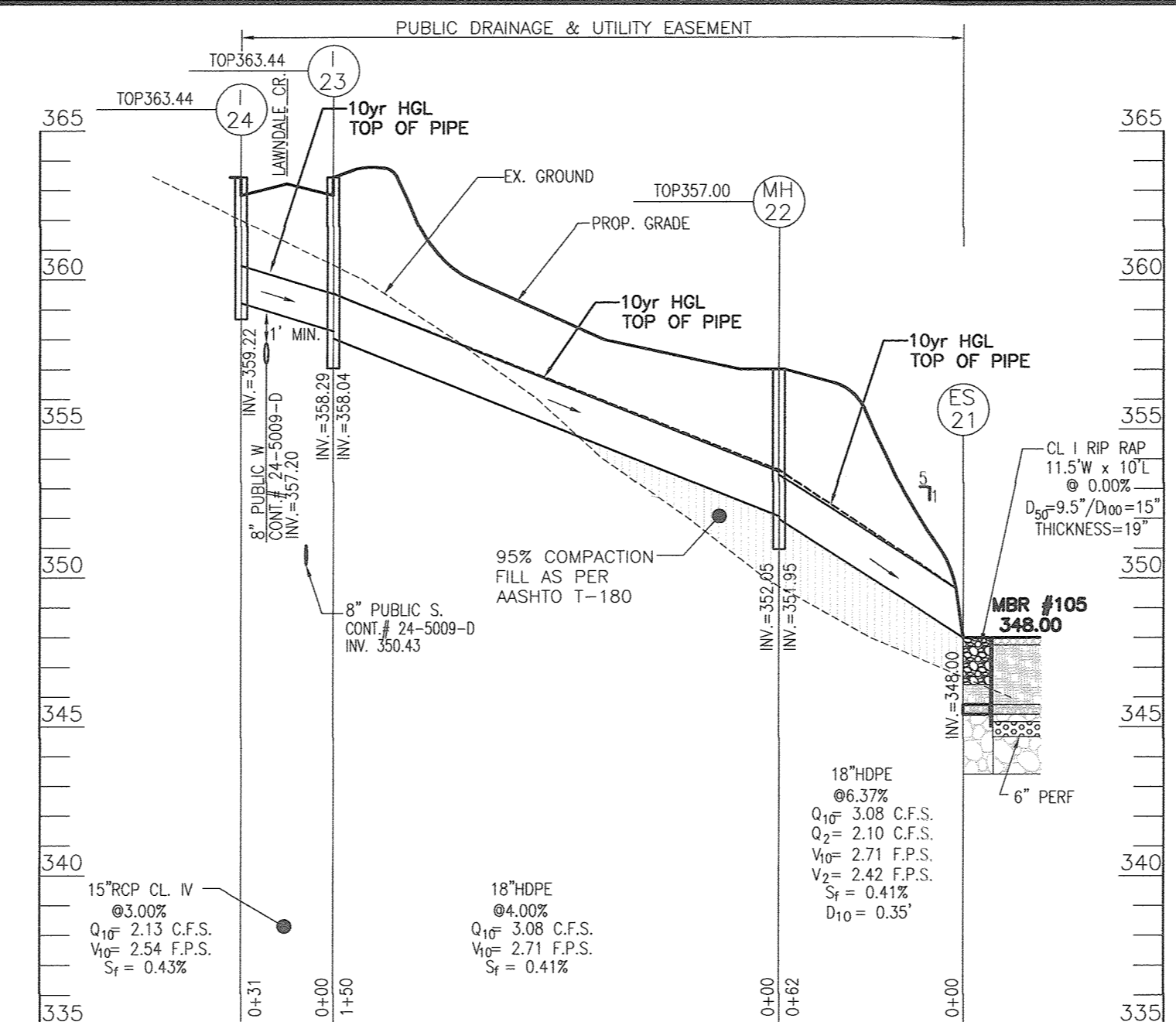
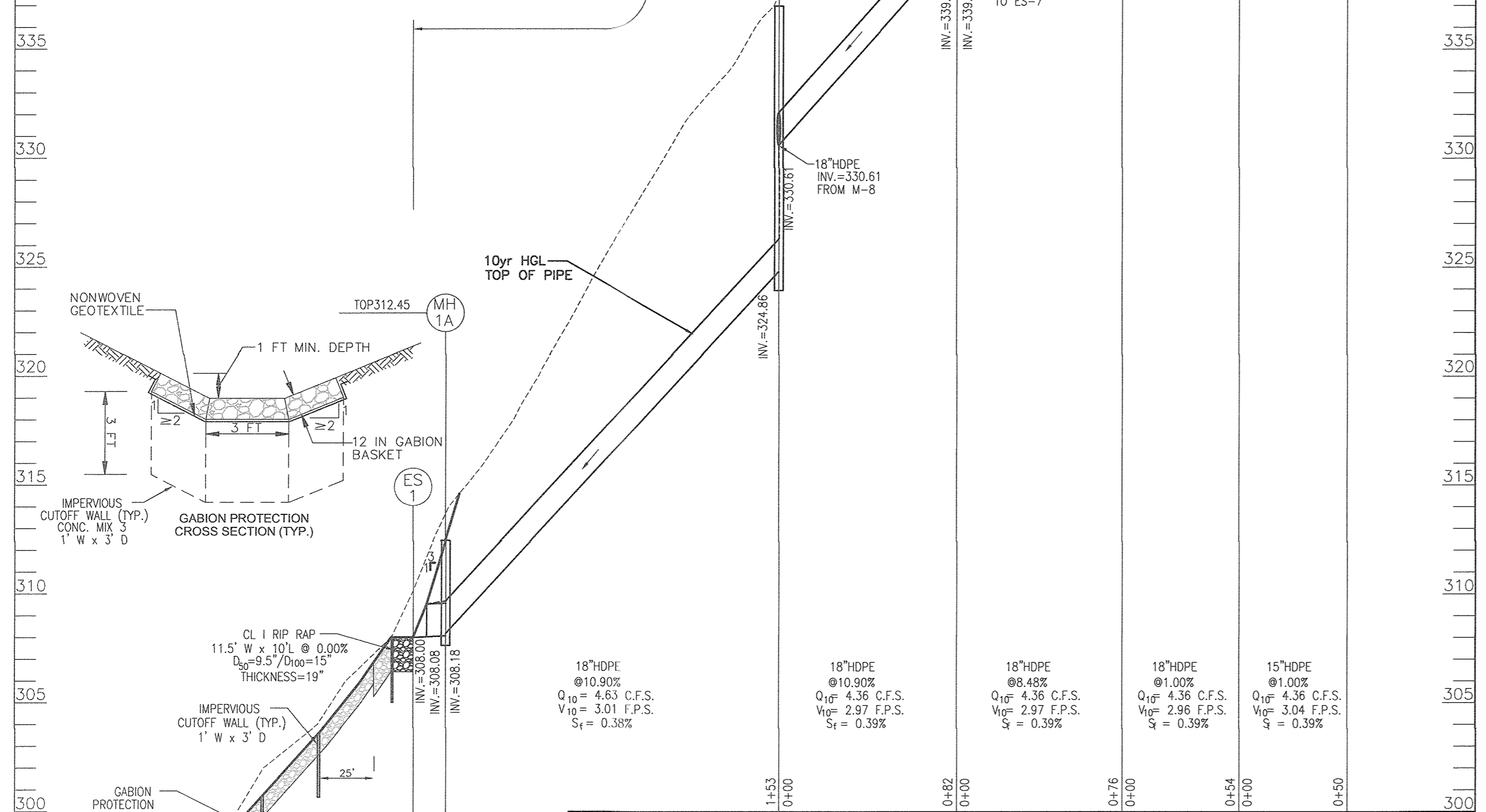
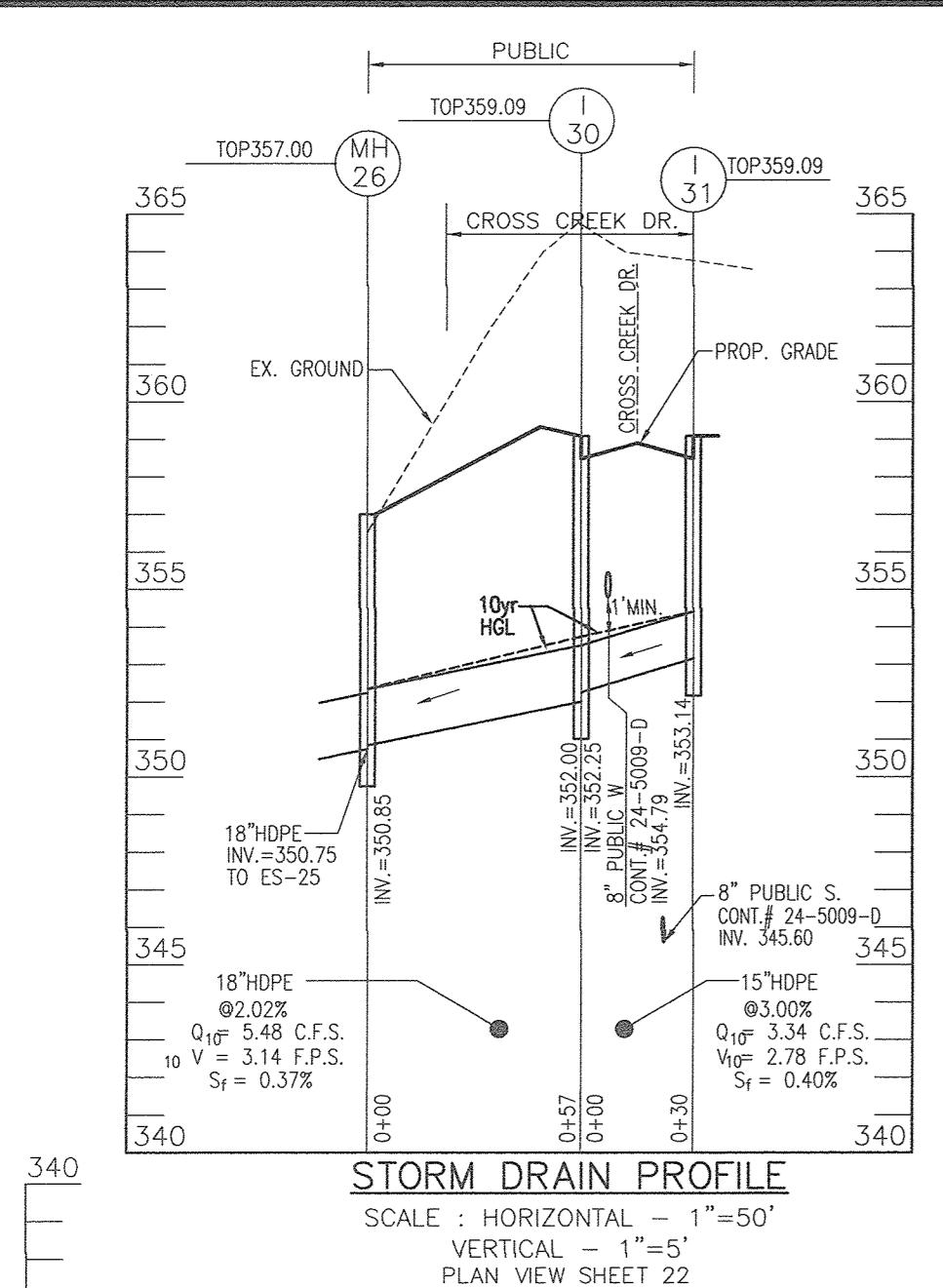
**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8951

PROFESSIONAL CERTIFICATE

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHW  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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. 18193 EXPIRATION DATE: 08-27-2020

34 SHEET OF 74



NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)

OWNER  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
314 ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

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: 09-30-2020

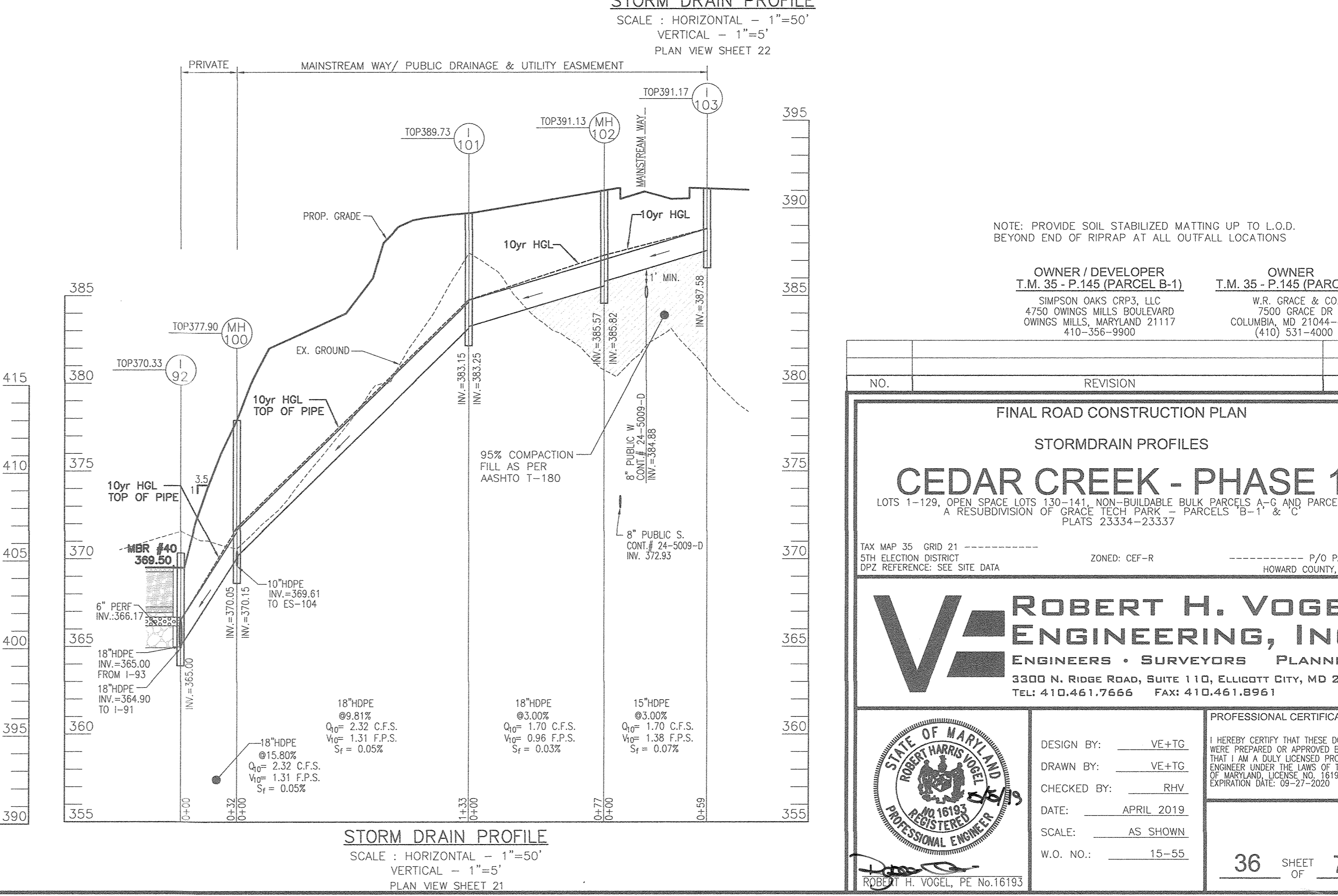
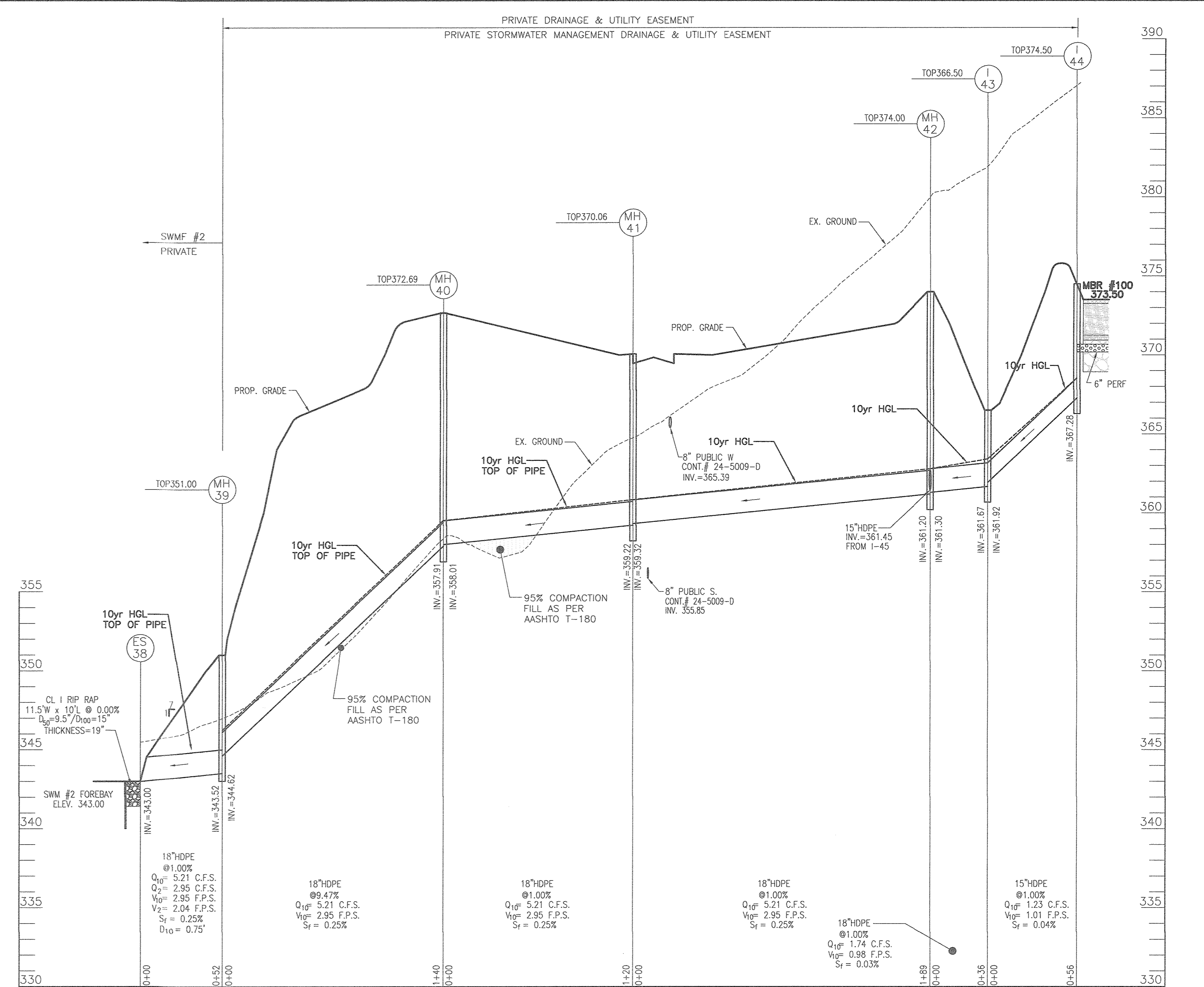
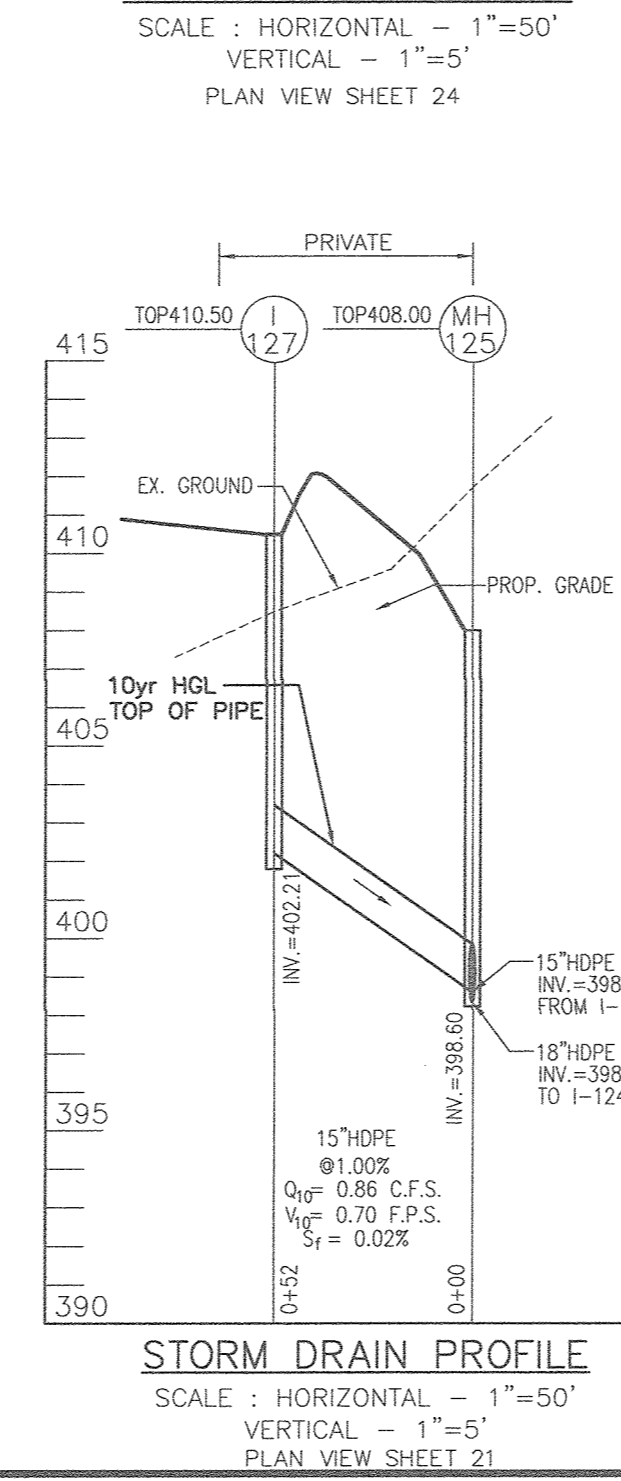
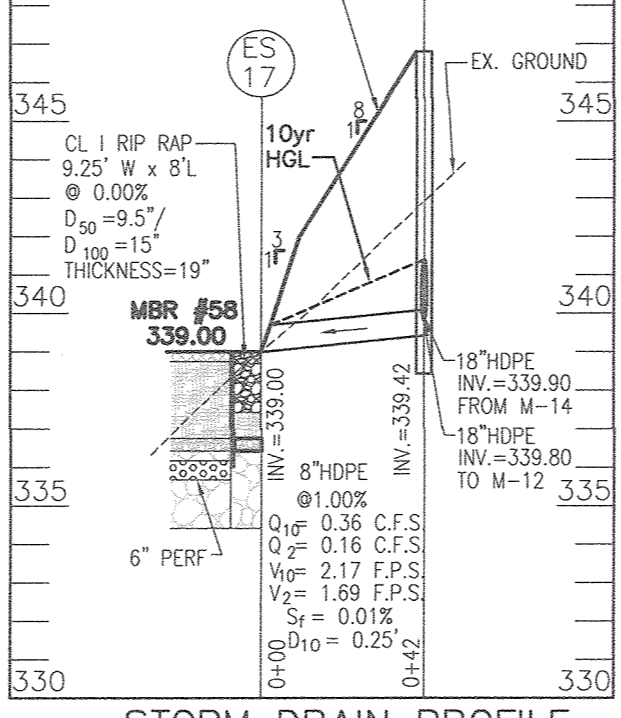
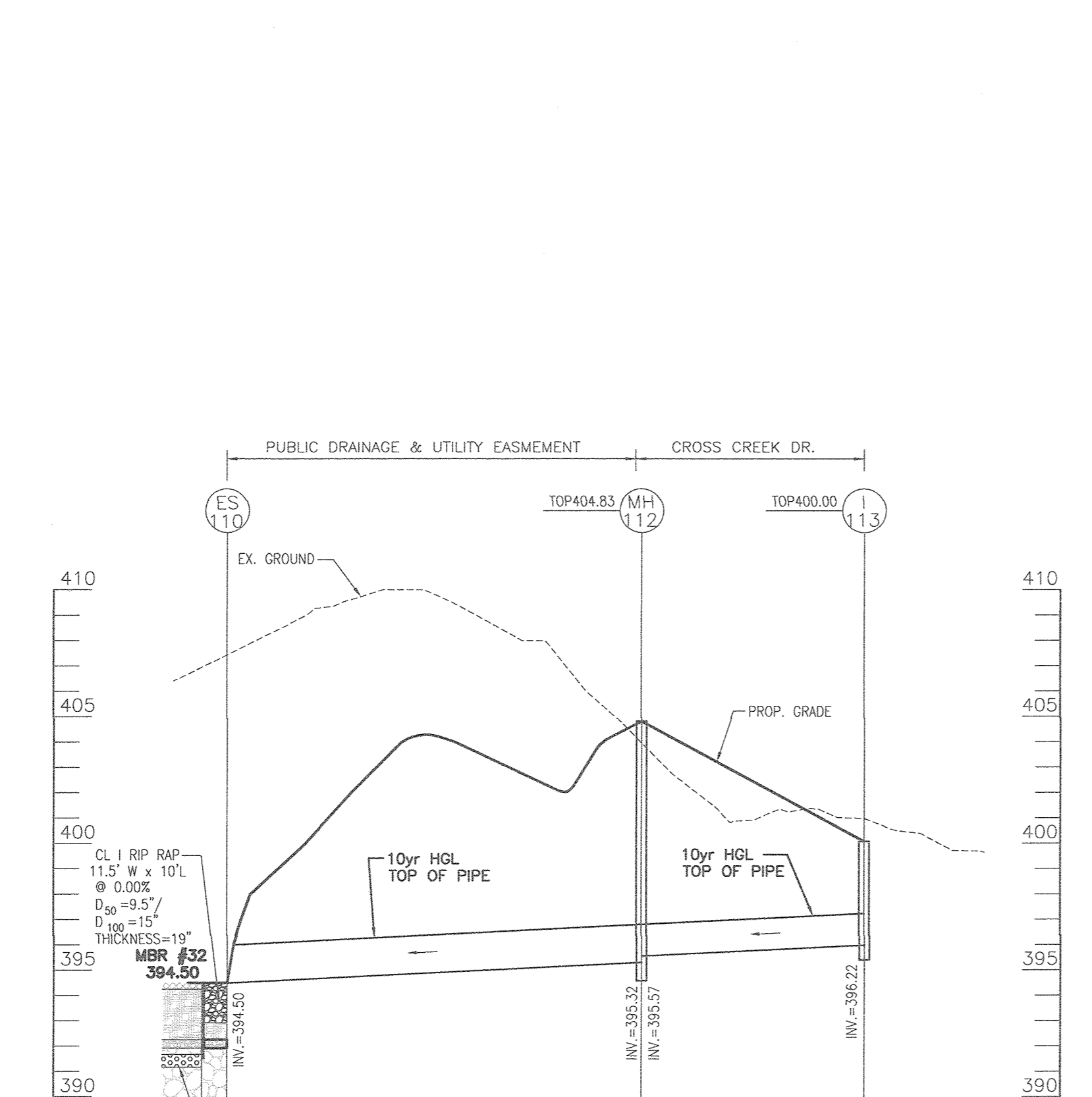
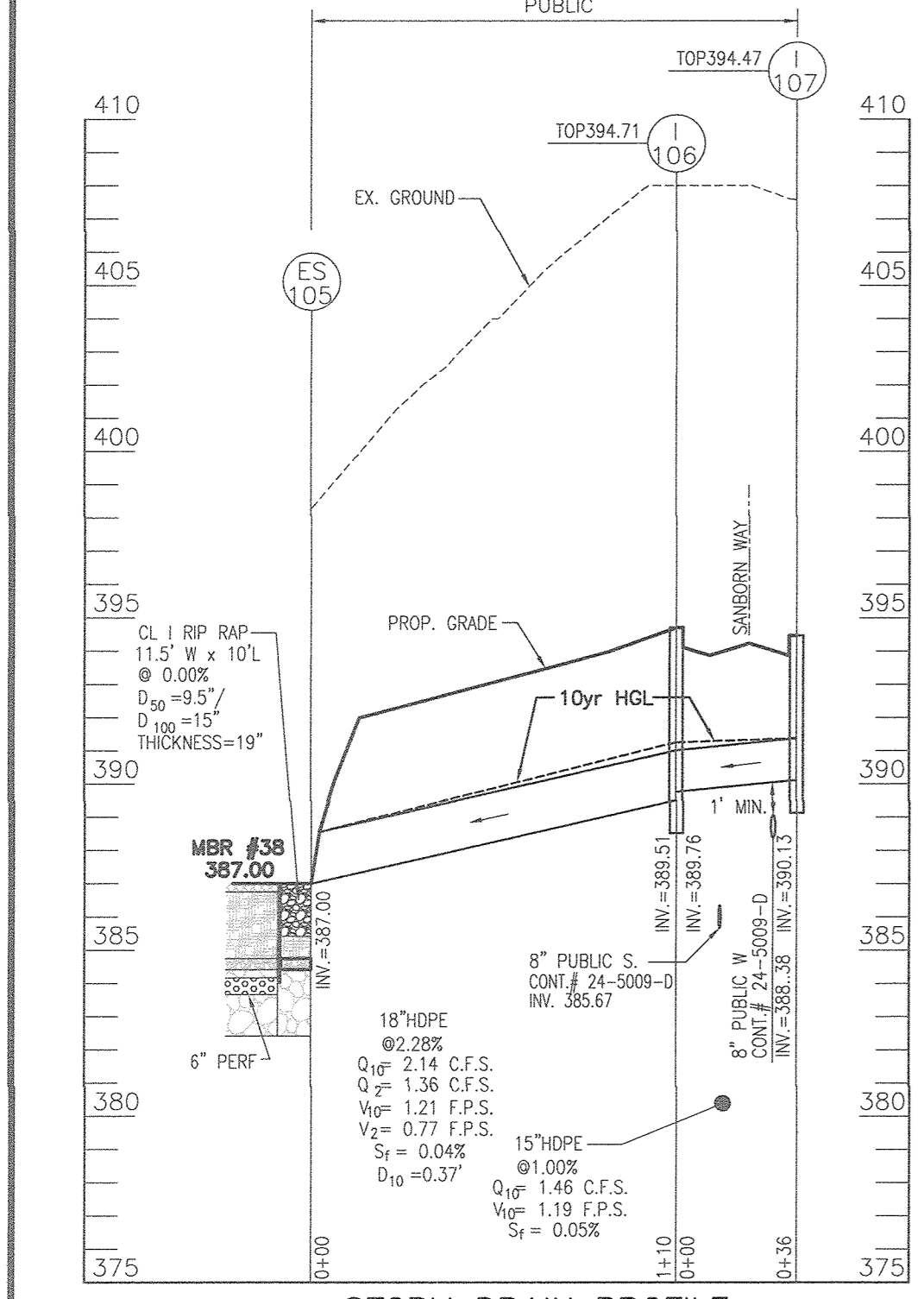
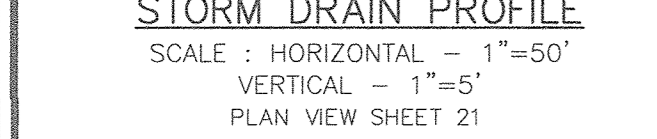
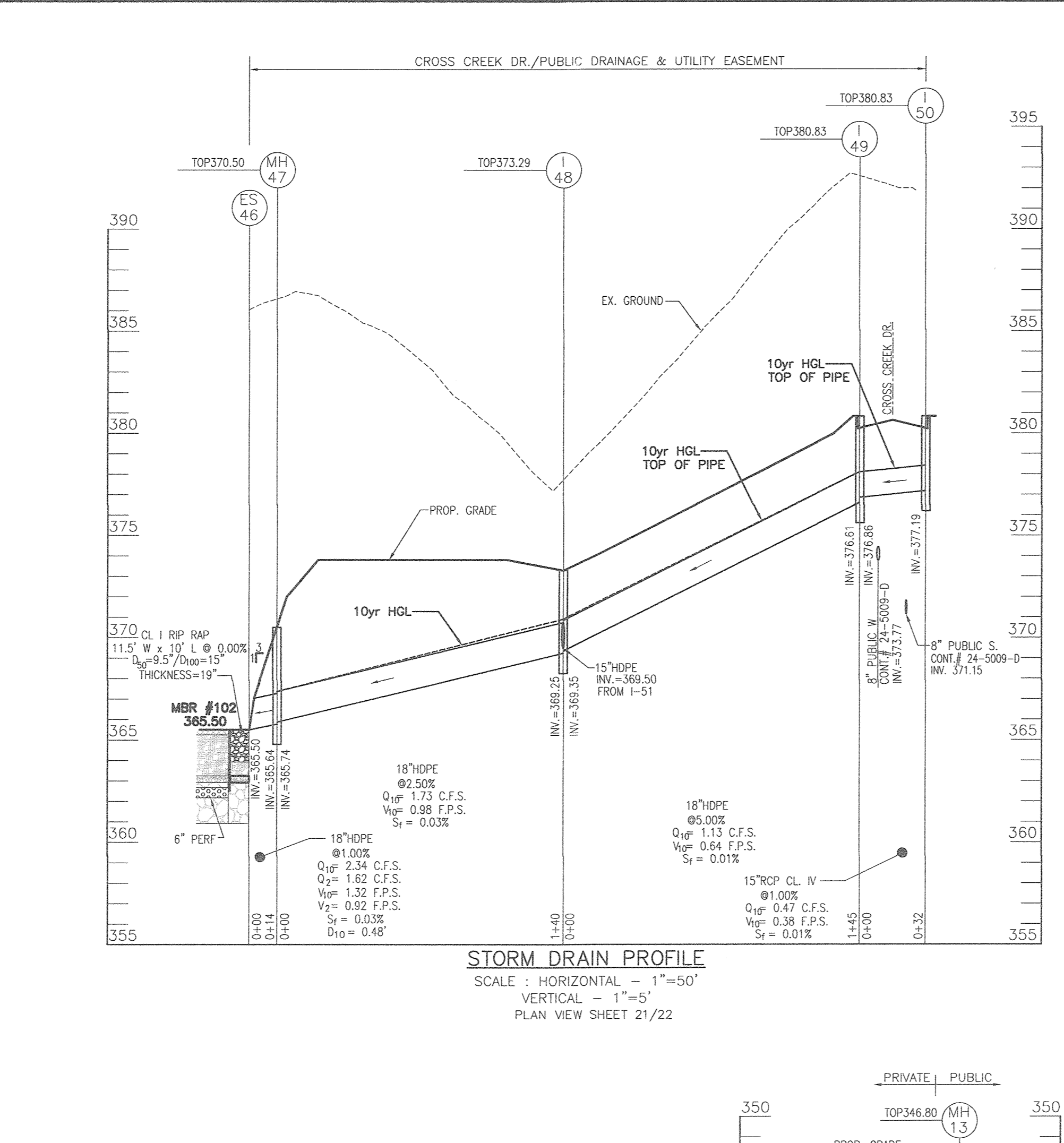
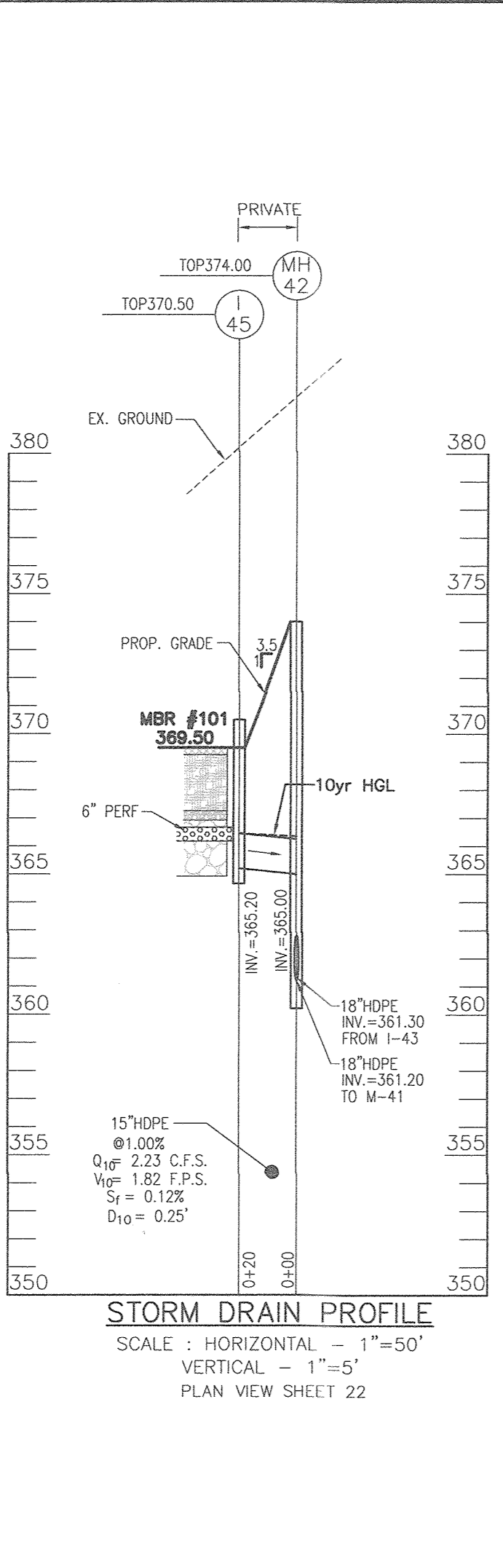
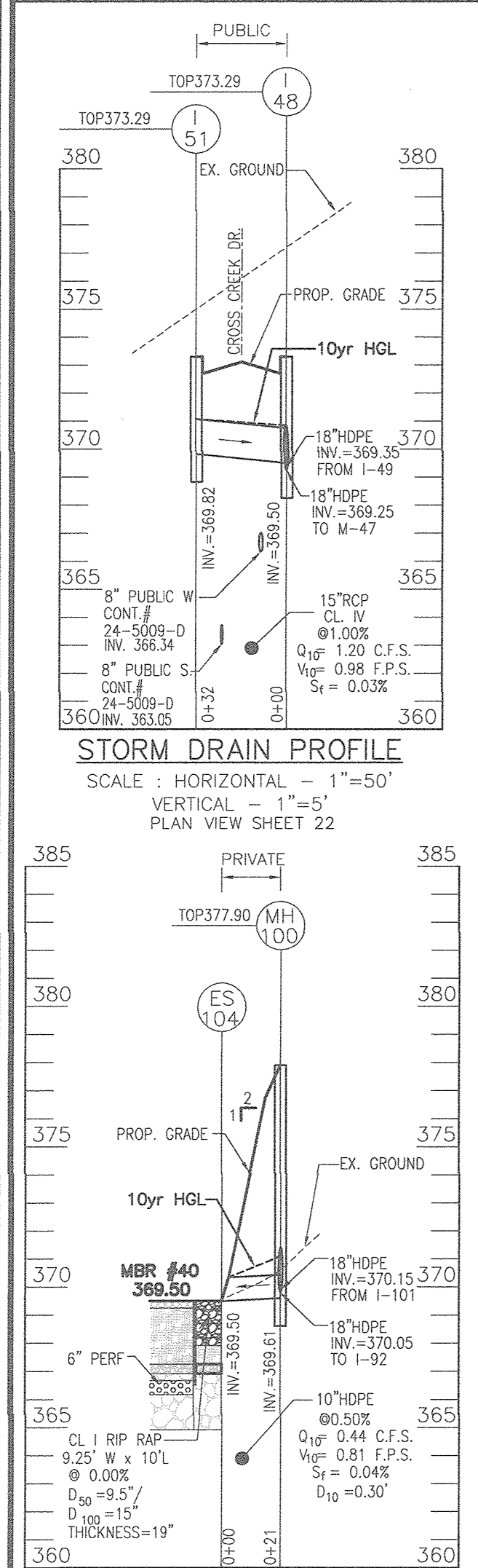
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DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

35 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.20.19



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.26.19

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS.

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

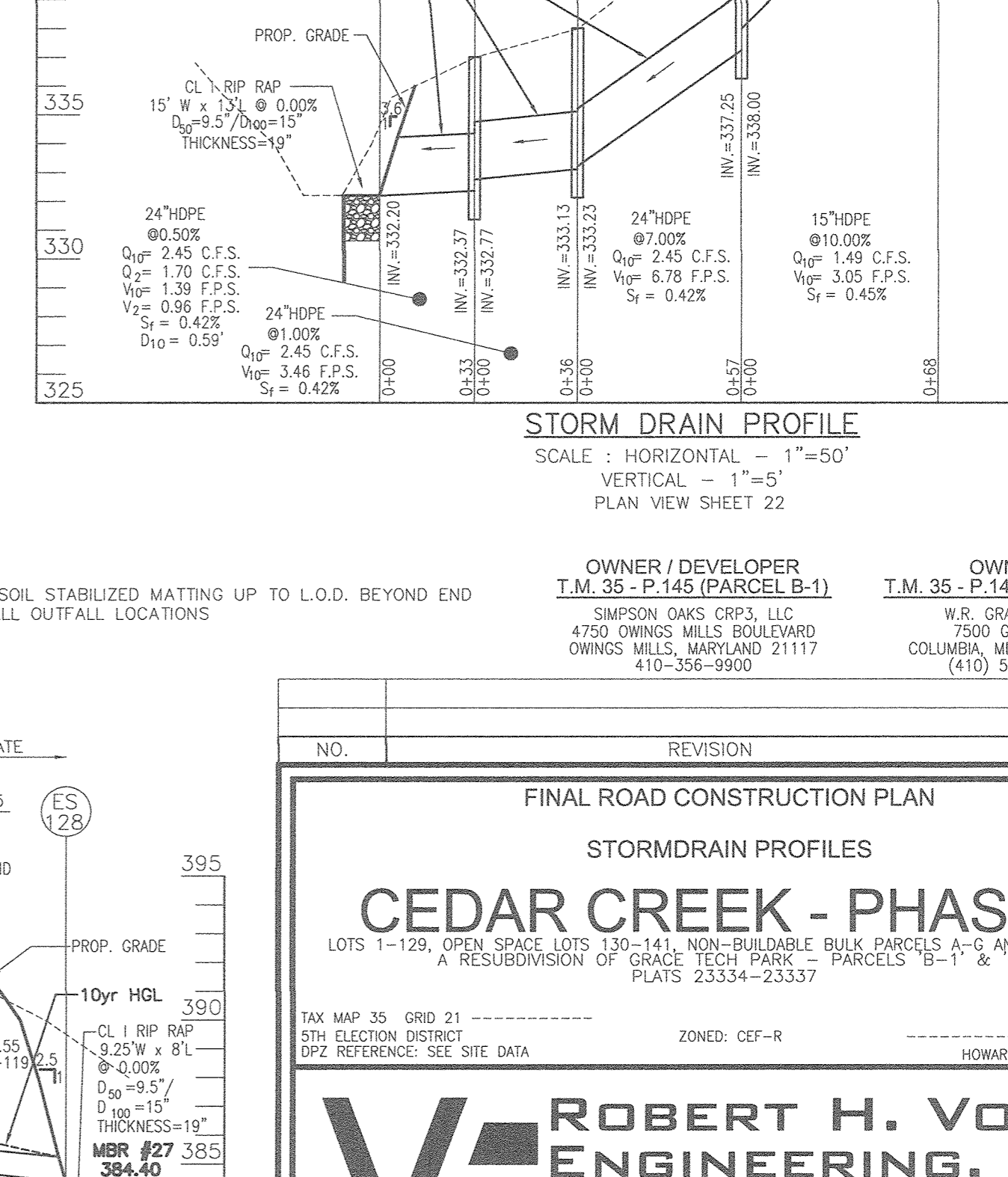
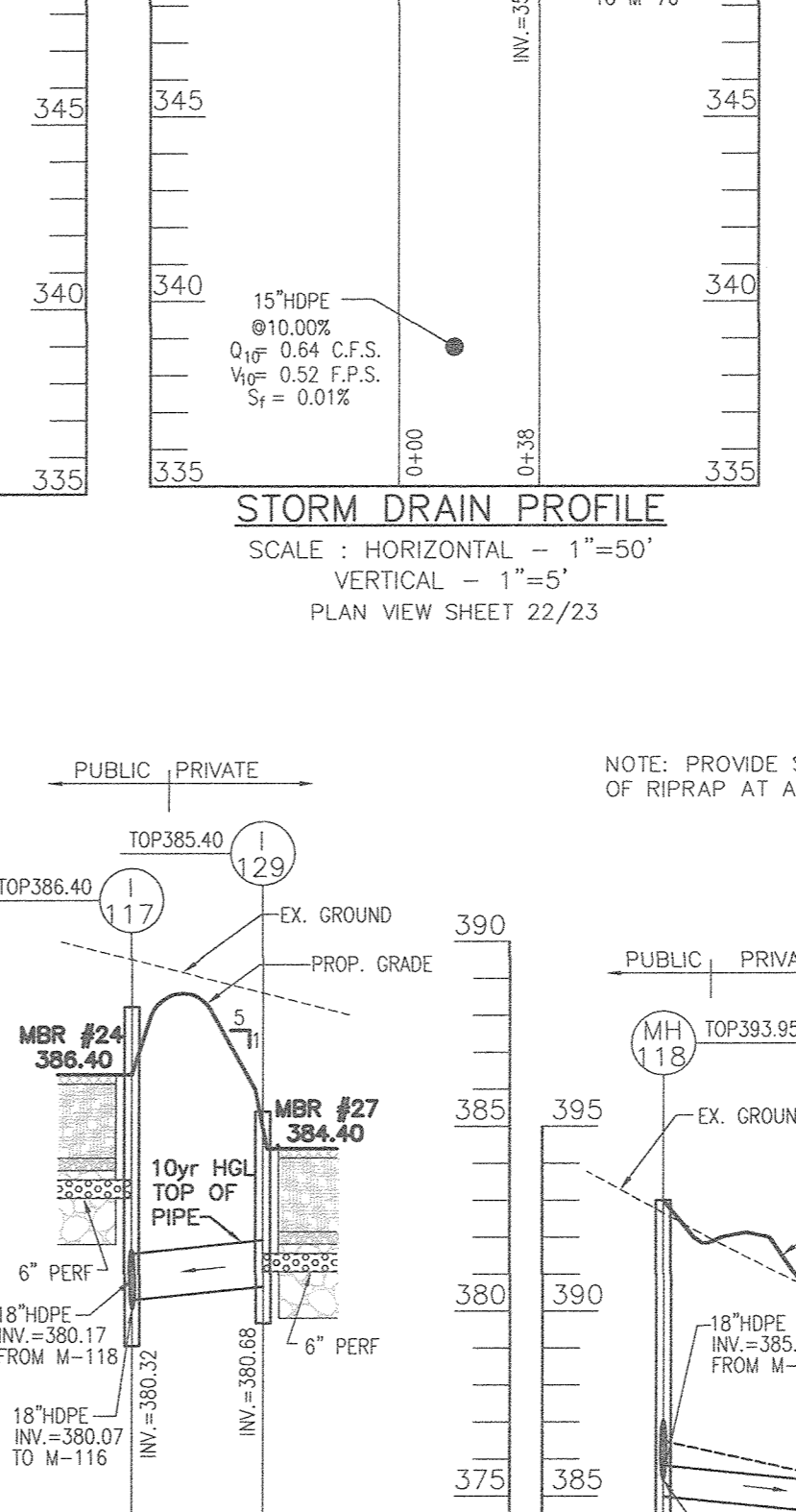
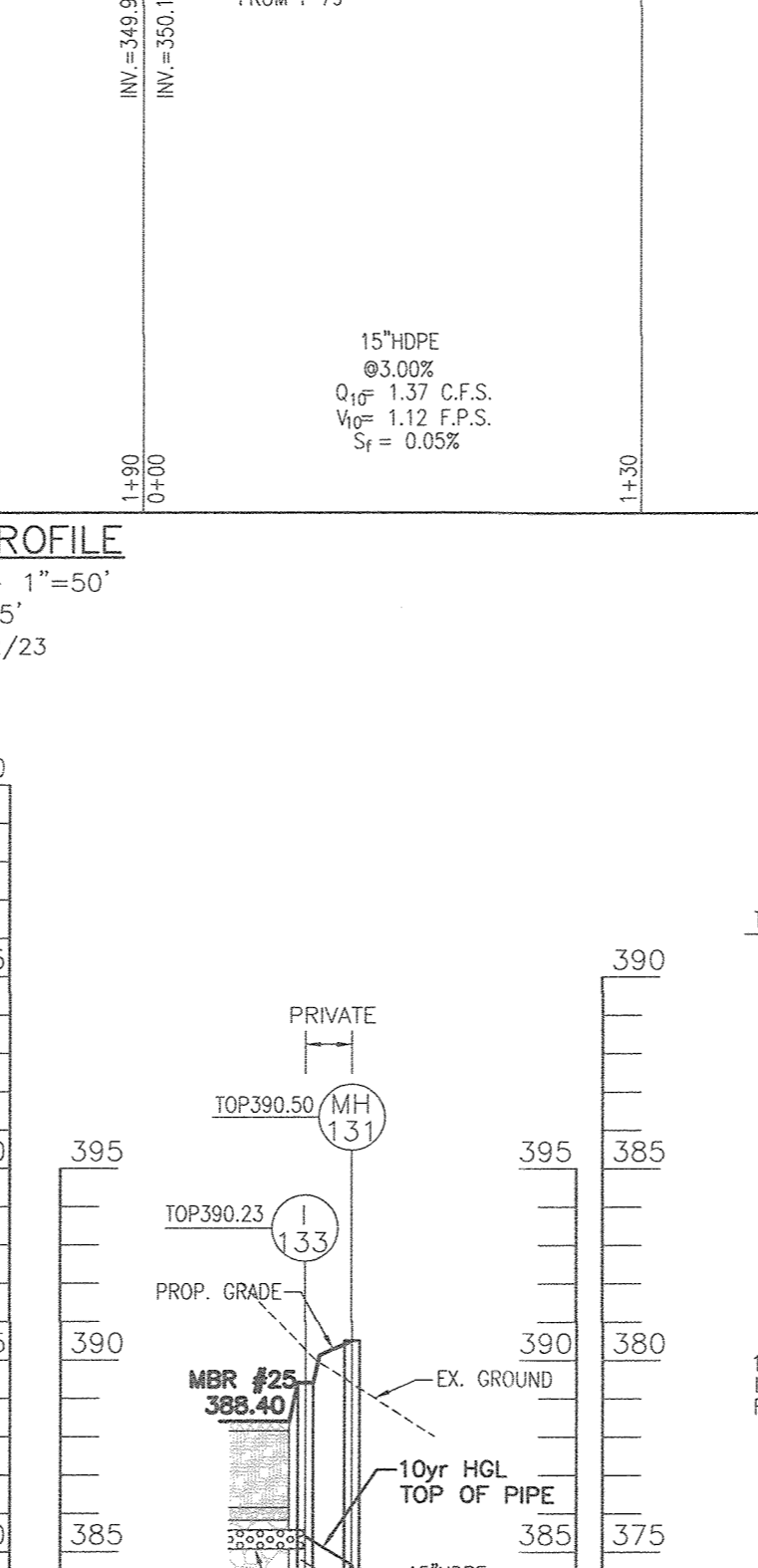
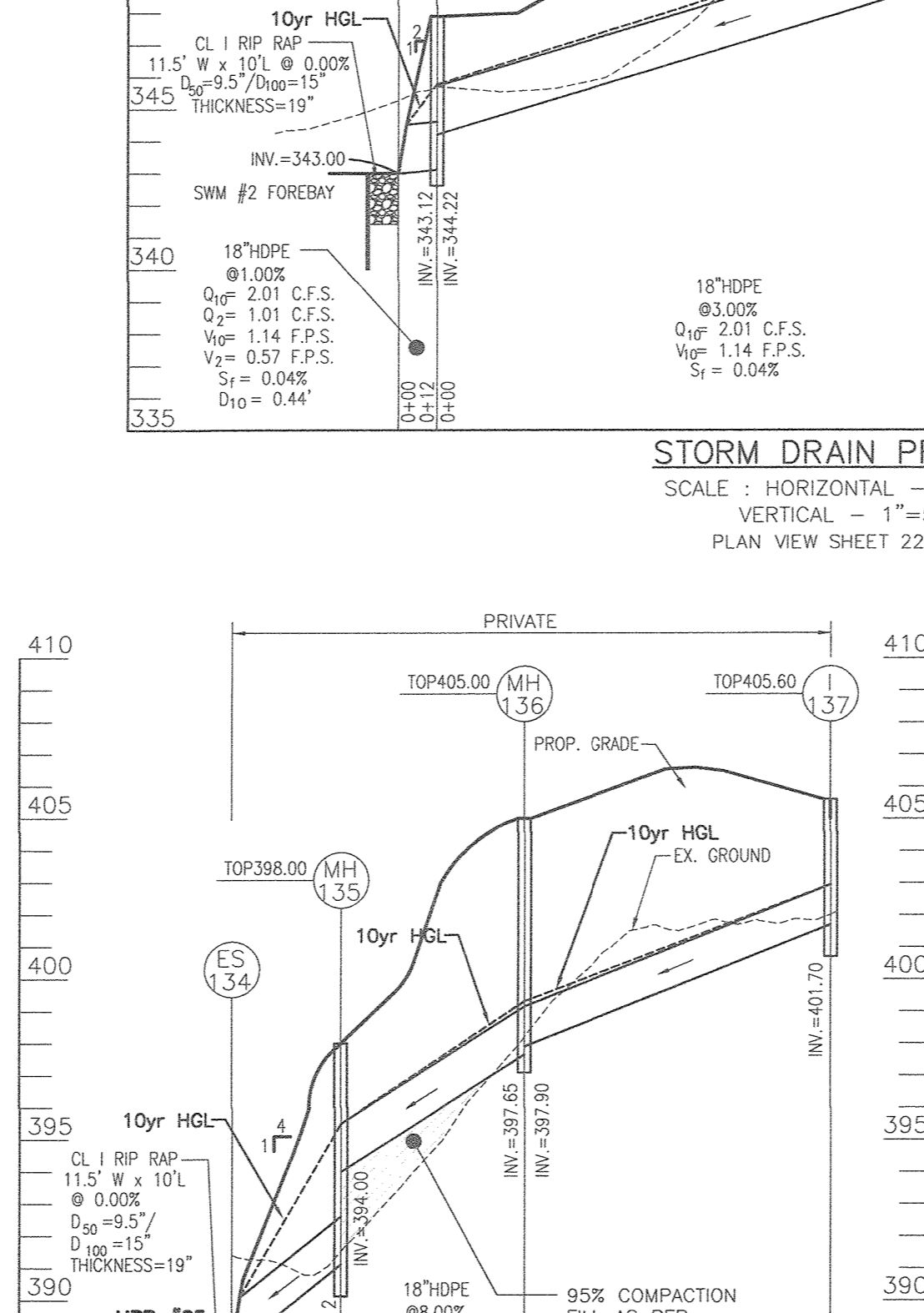
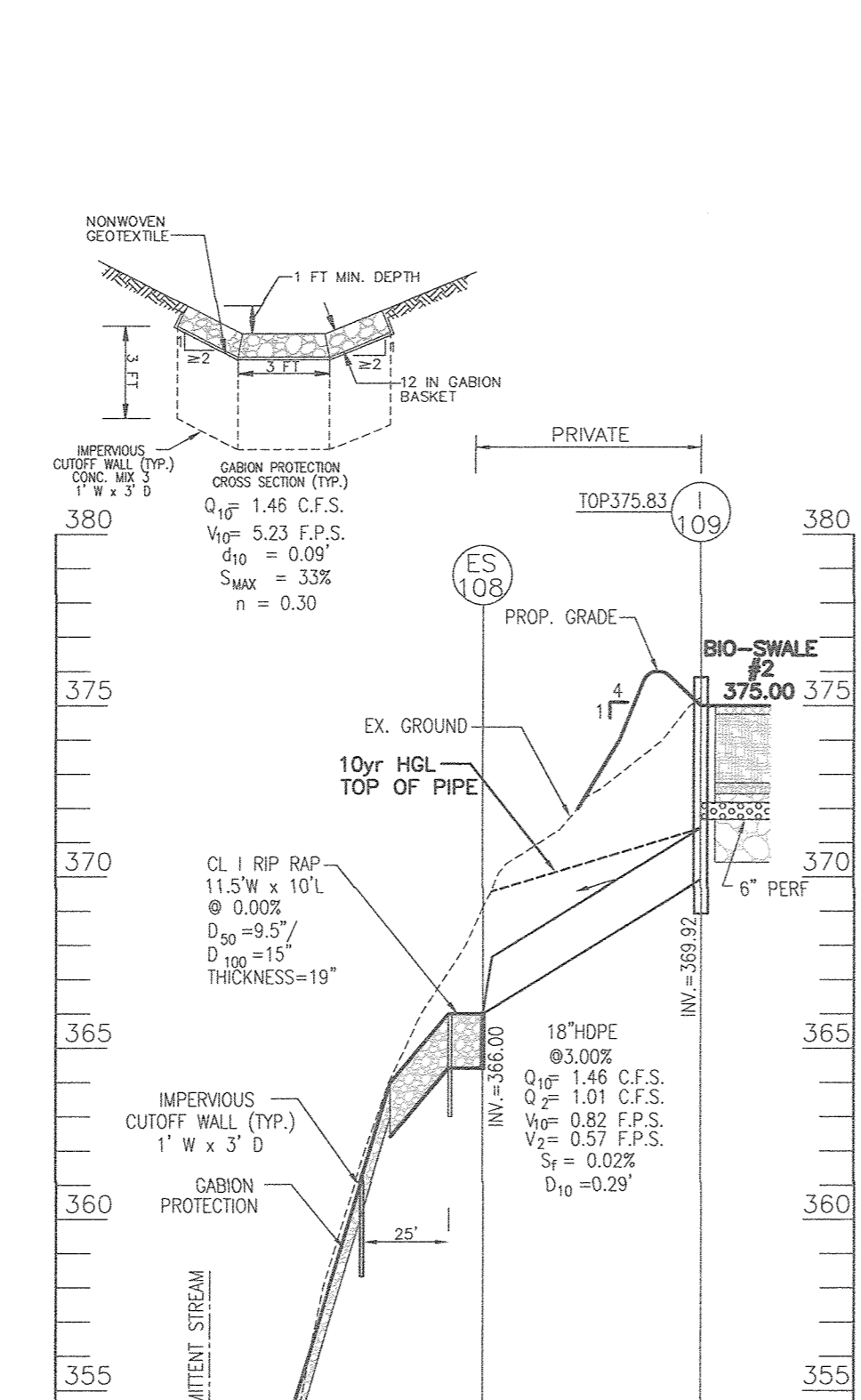
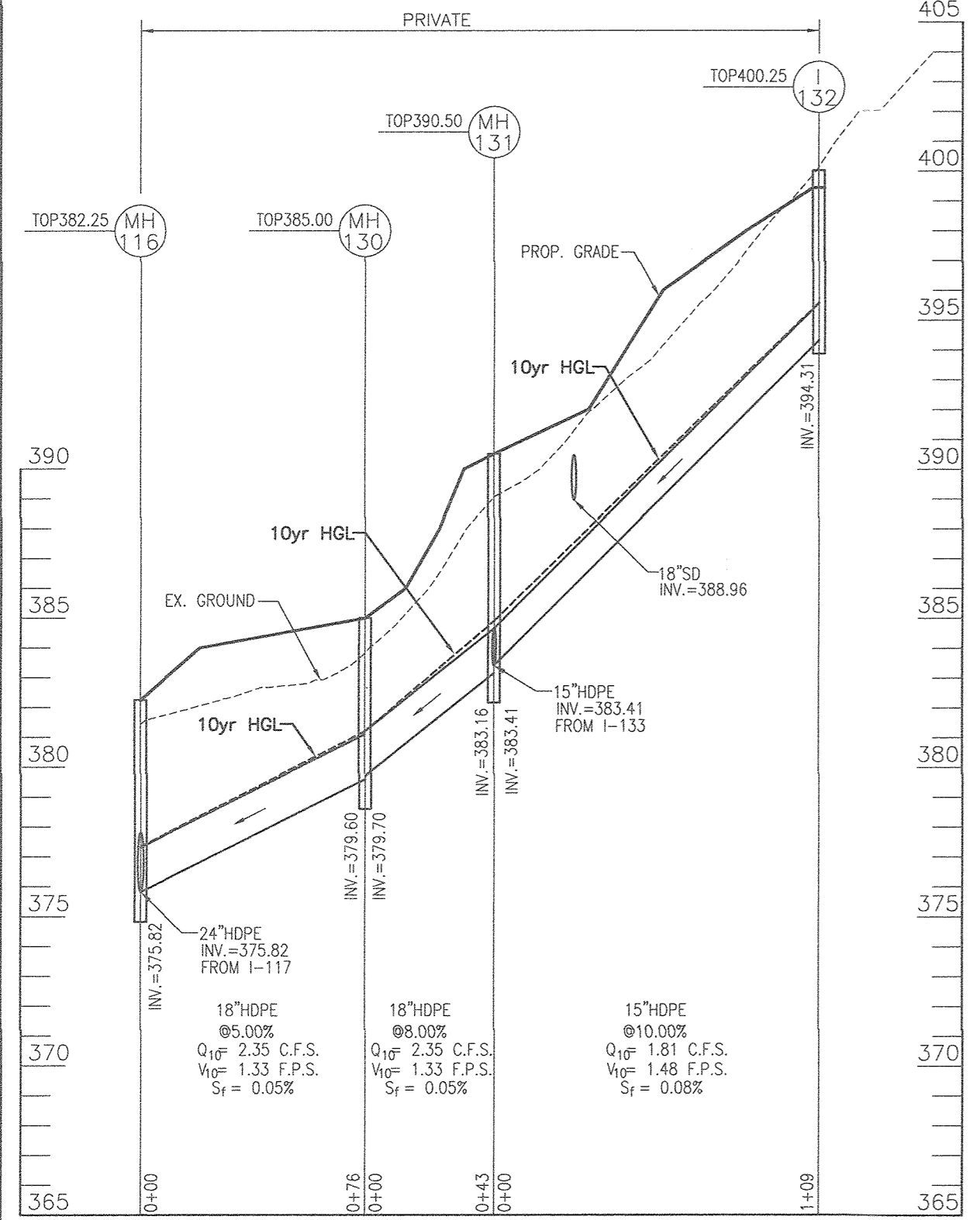
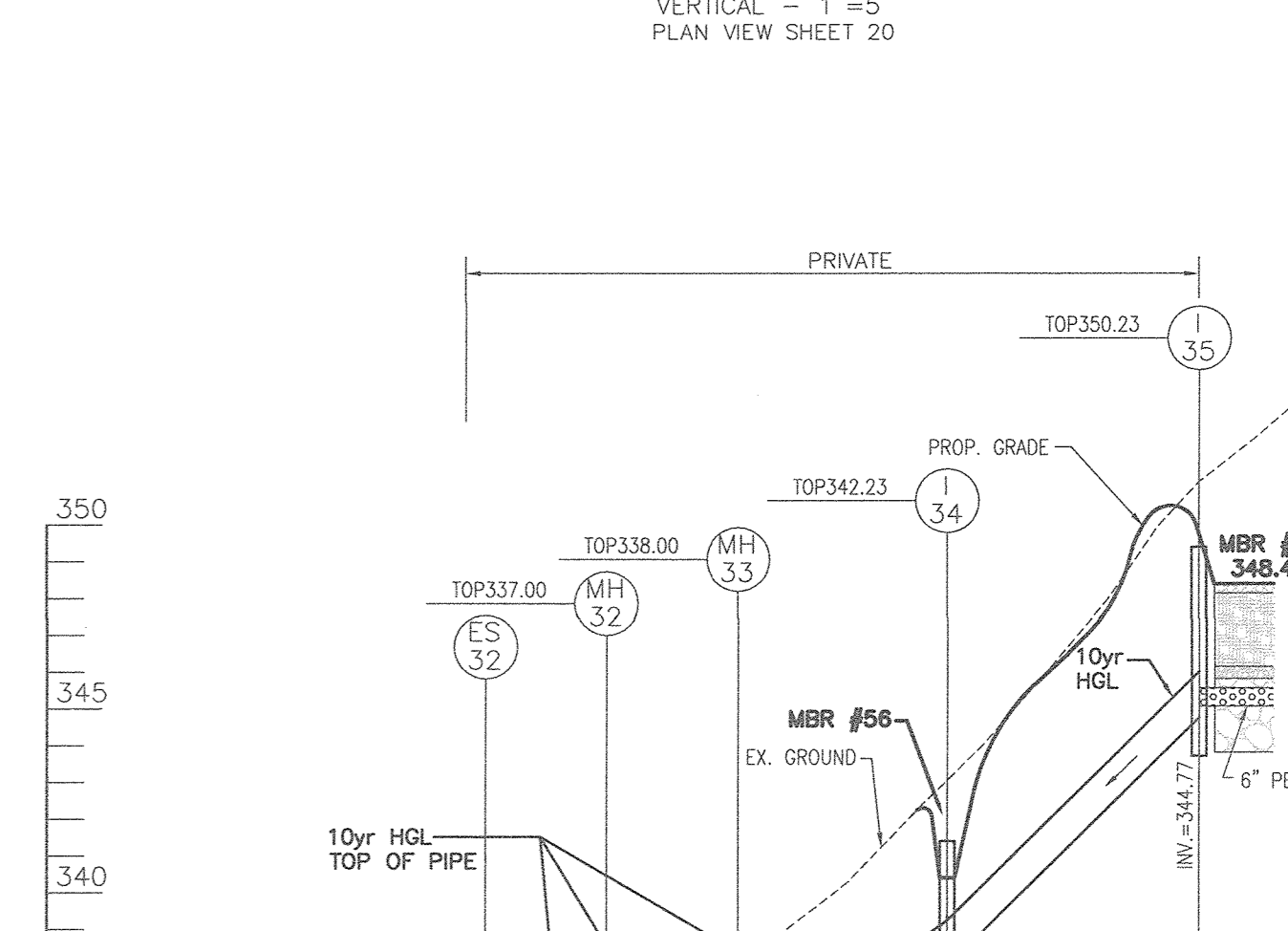
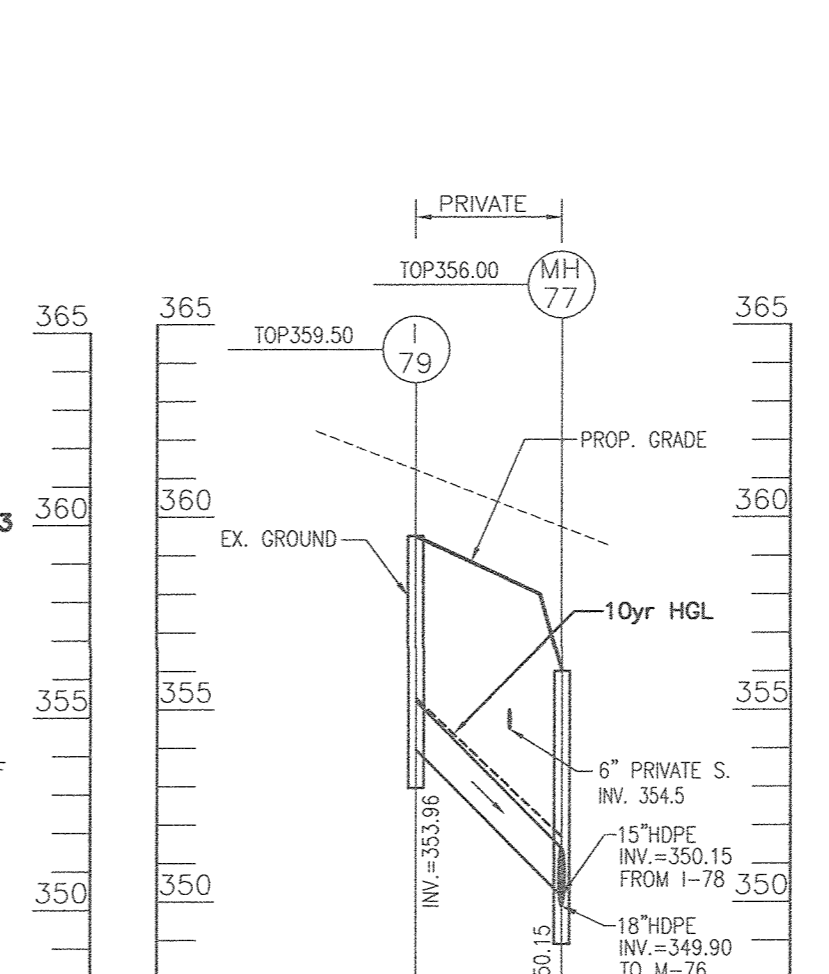
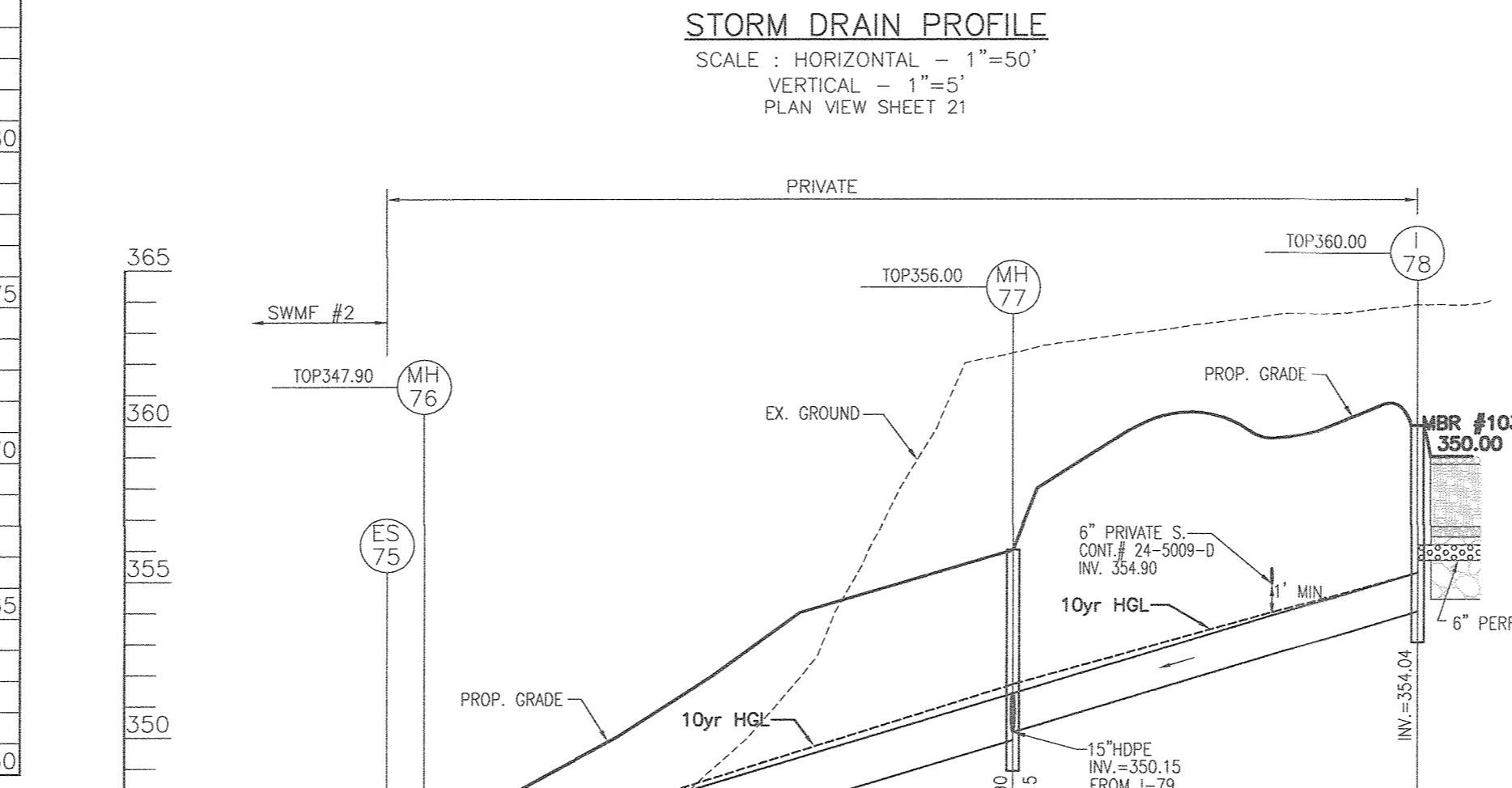
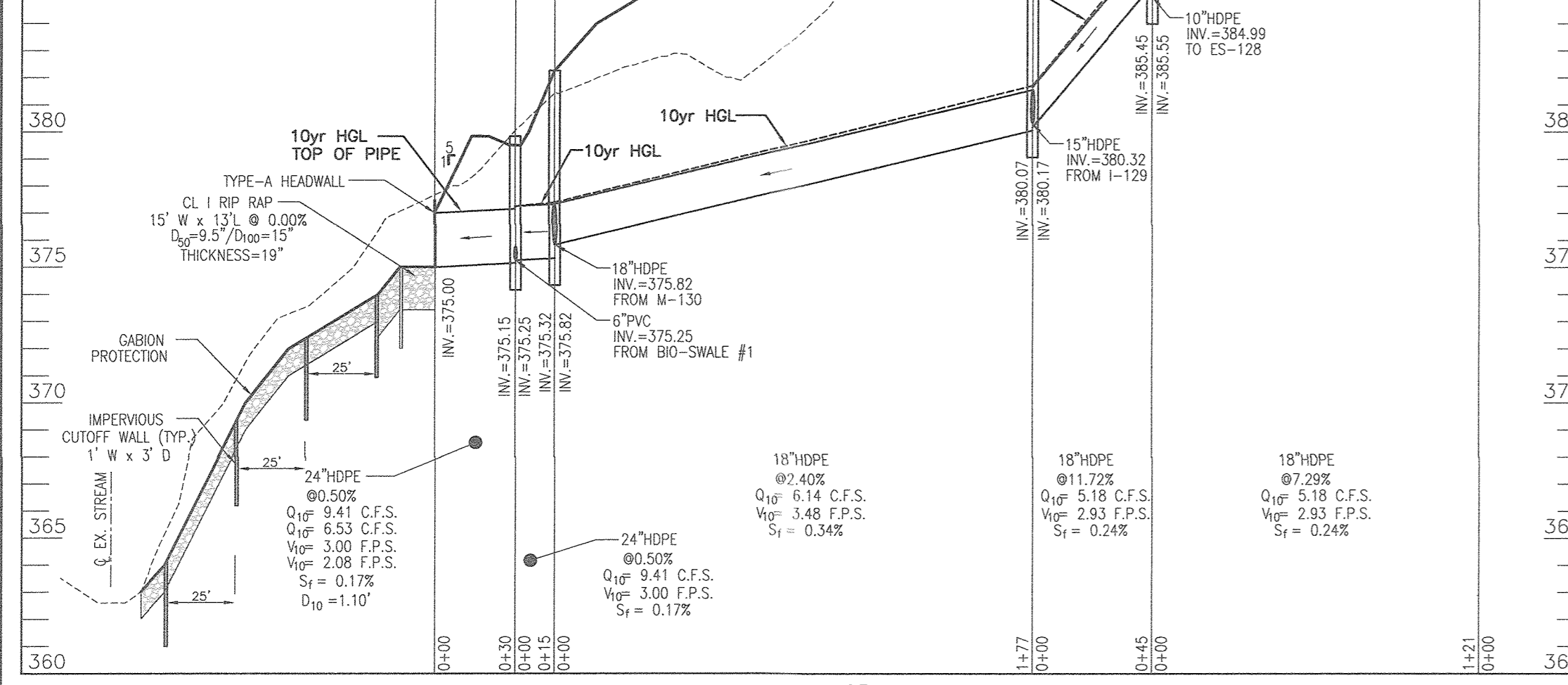
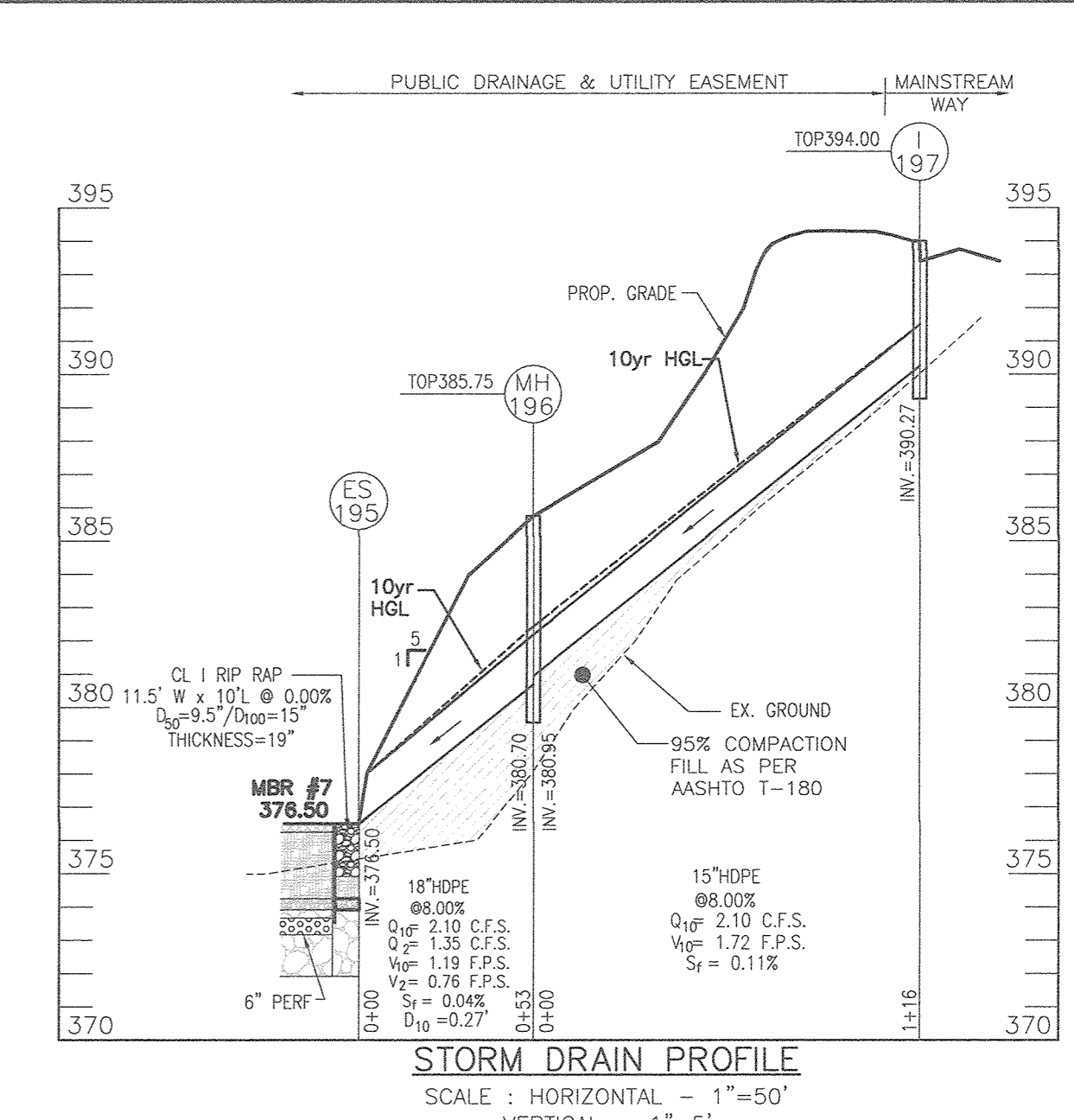
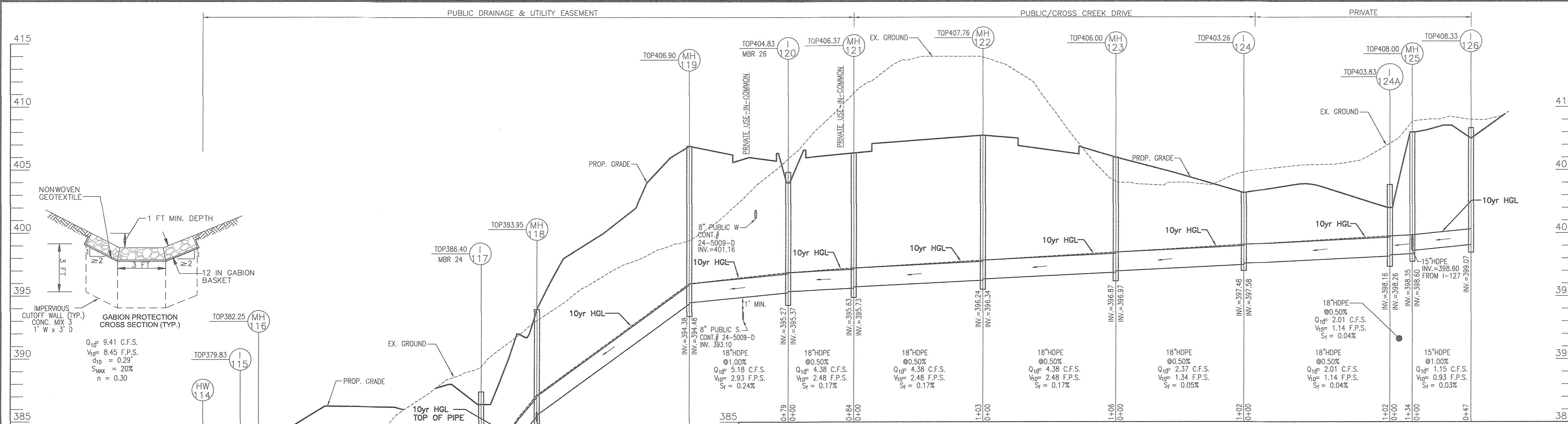
ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

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: 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: R+V  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

36 SHEET OF 74



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS

OWNER / DEVELOPER: T.M. 35 - P. 145 (PARCEL B-1)  
 SIMPSON OAKS CORP., LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

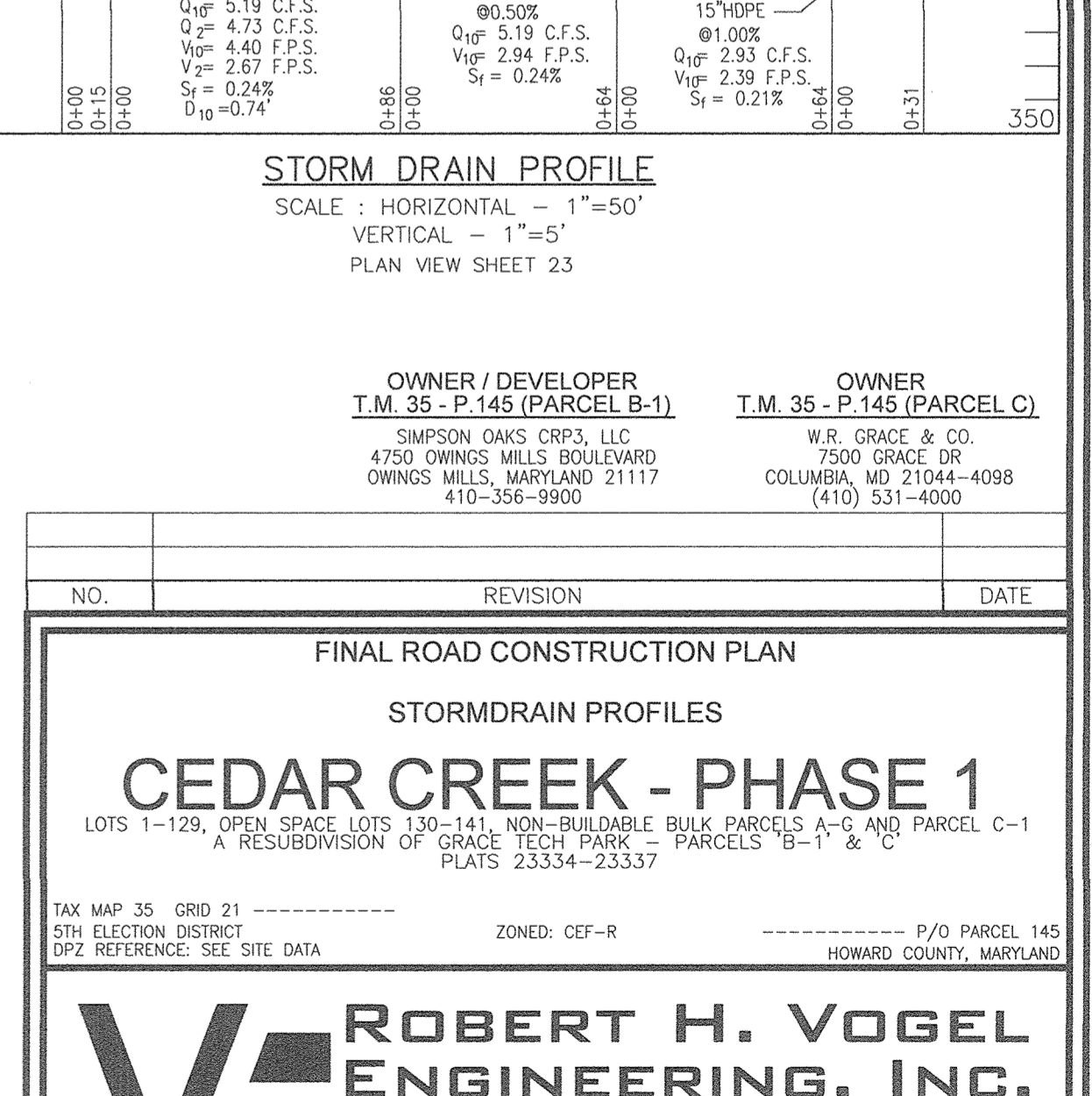
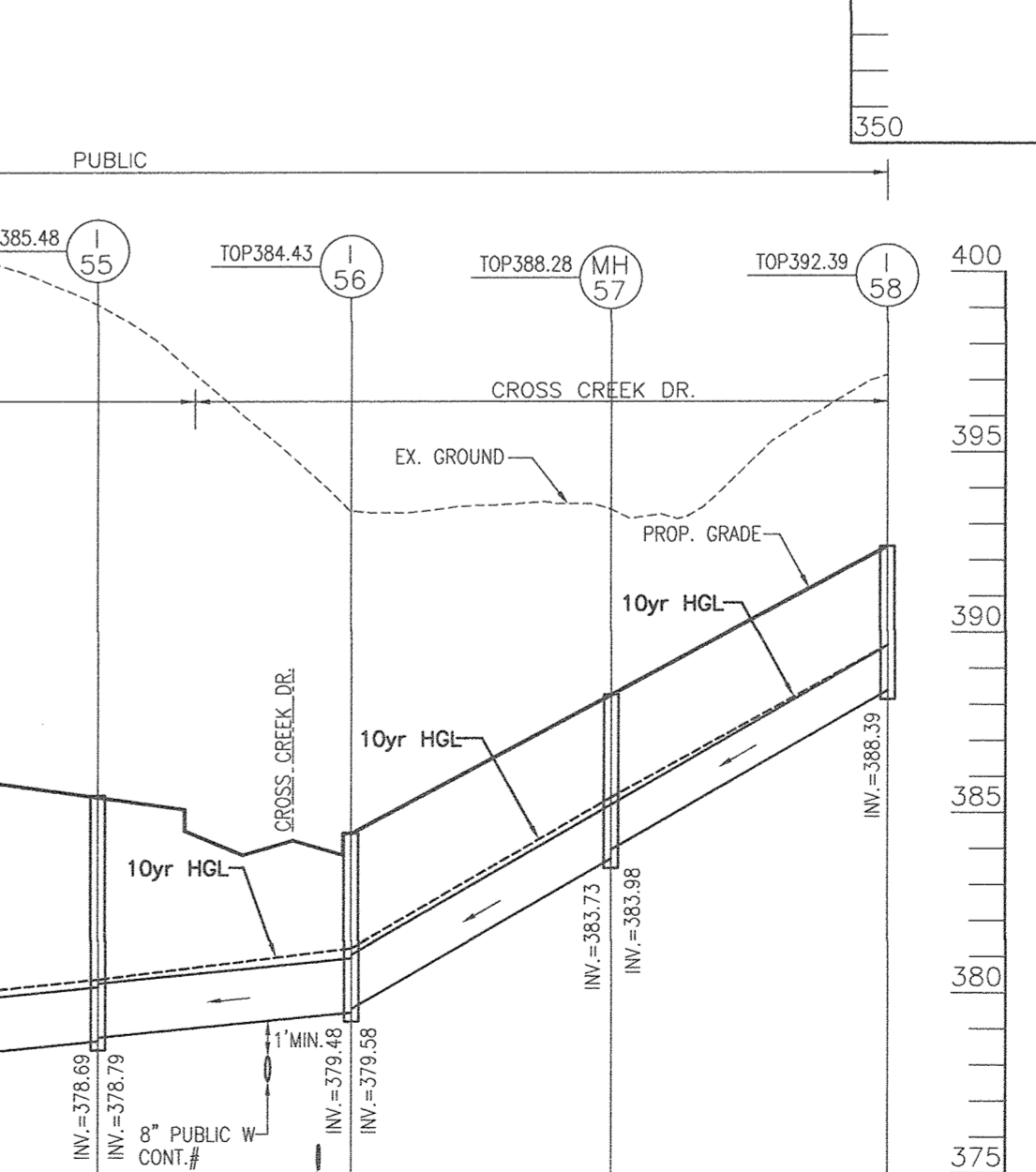
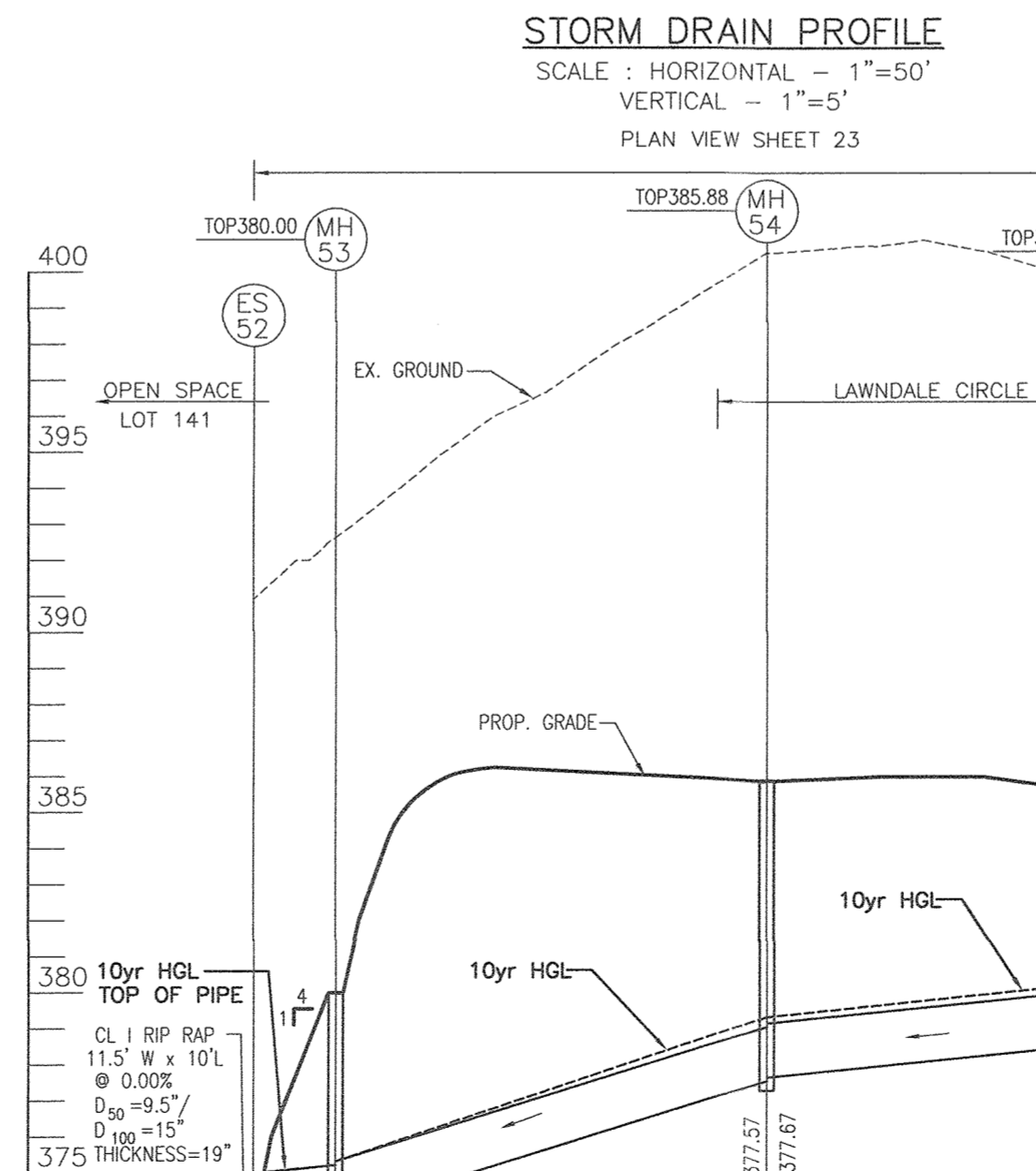
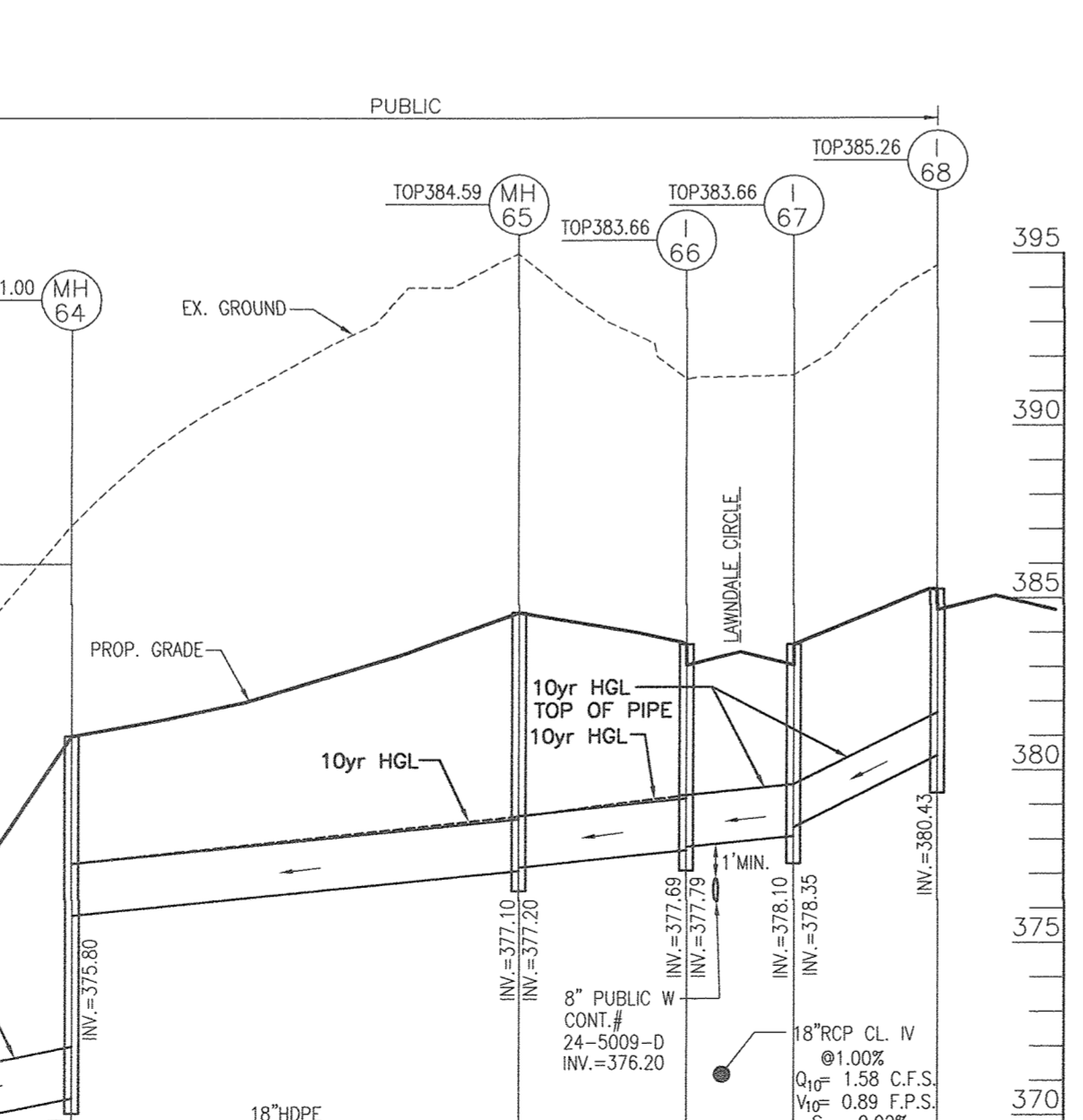
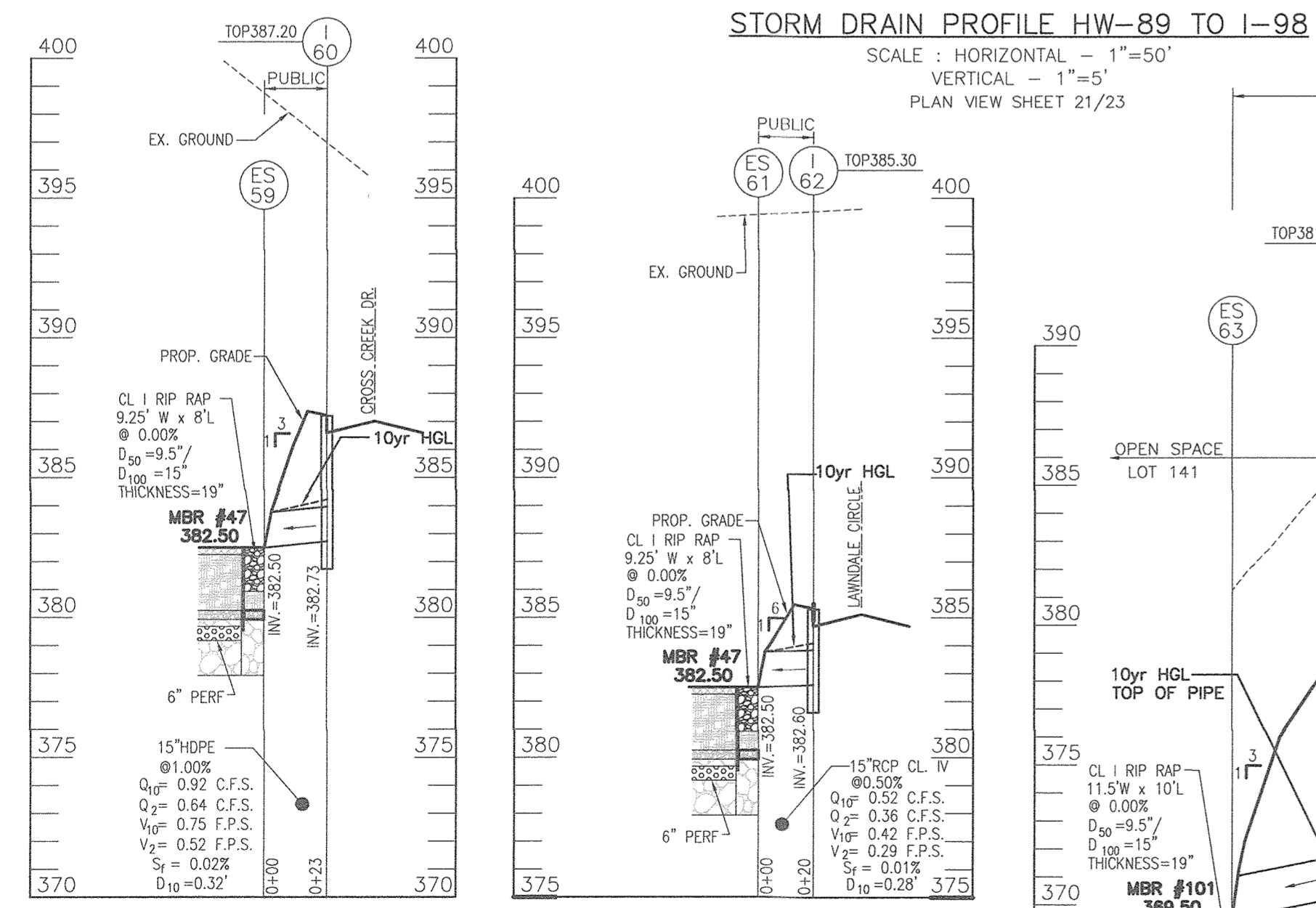
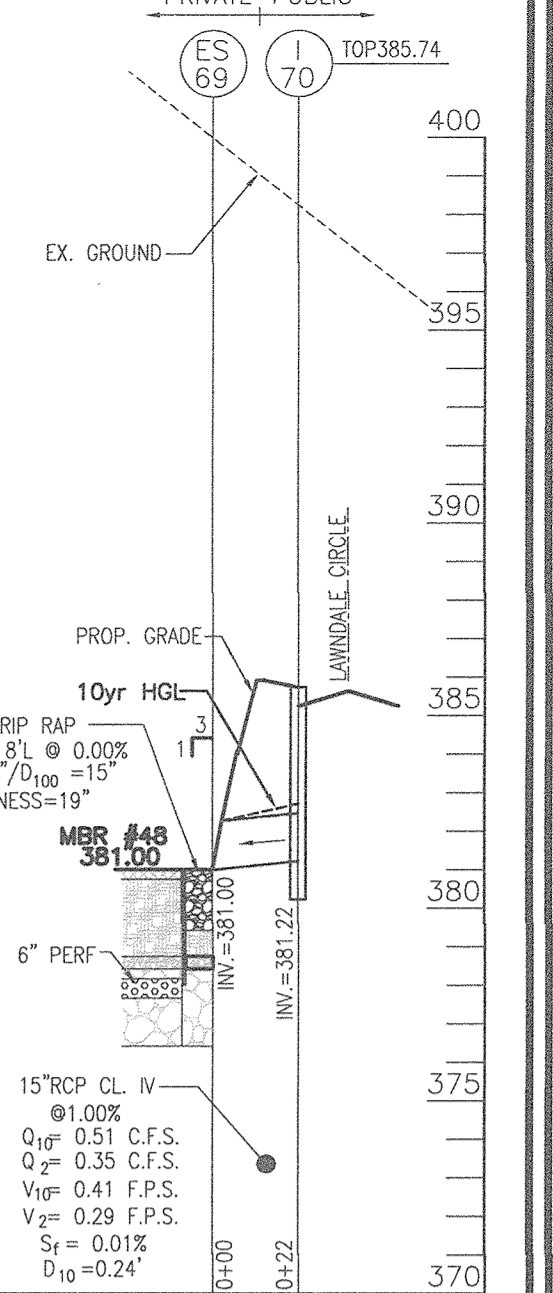
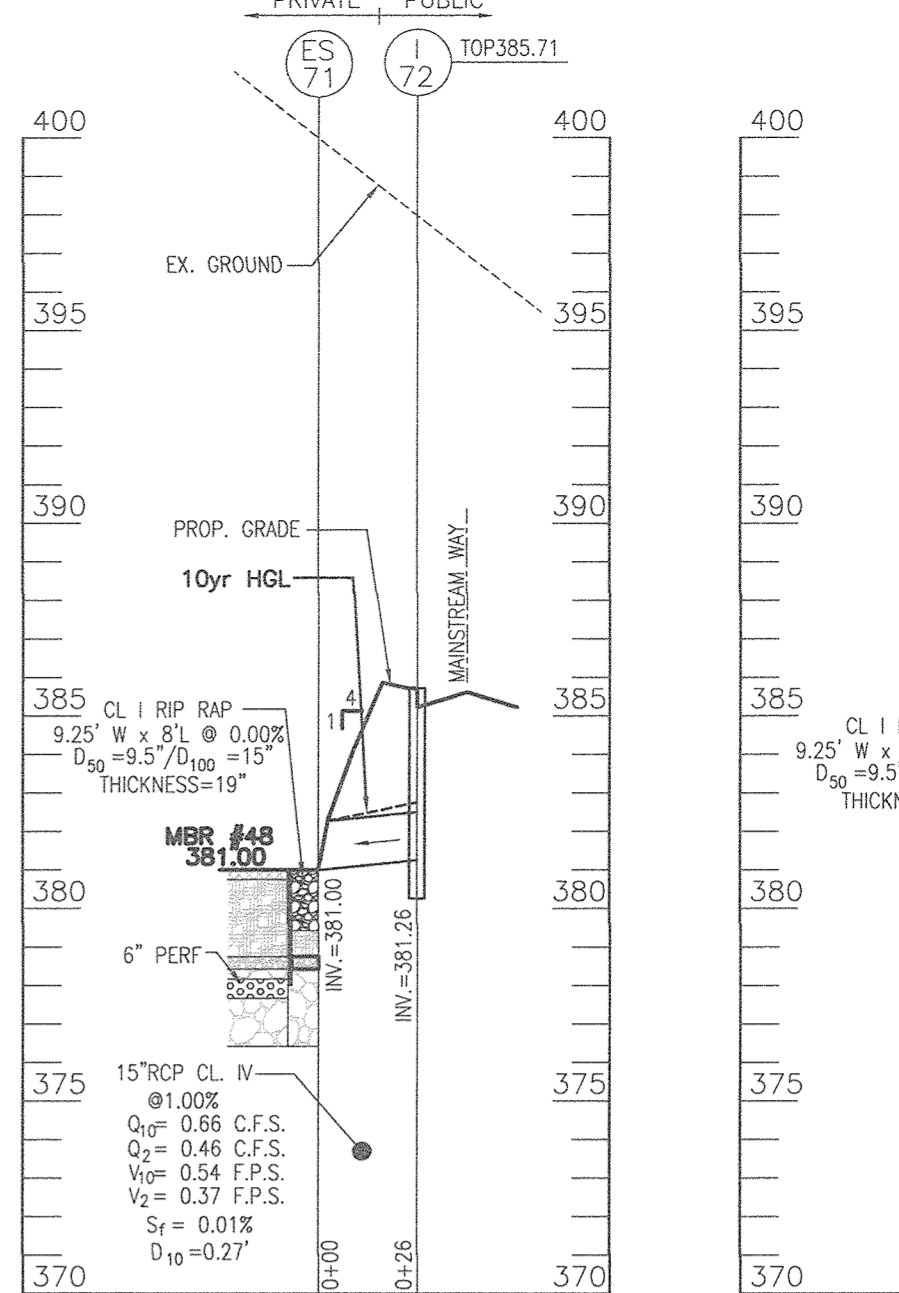
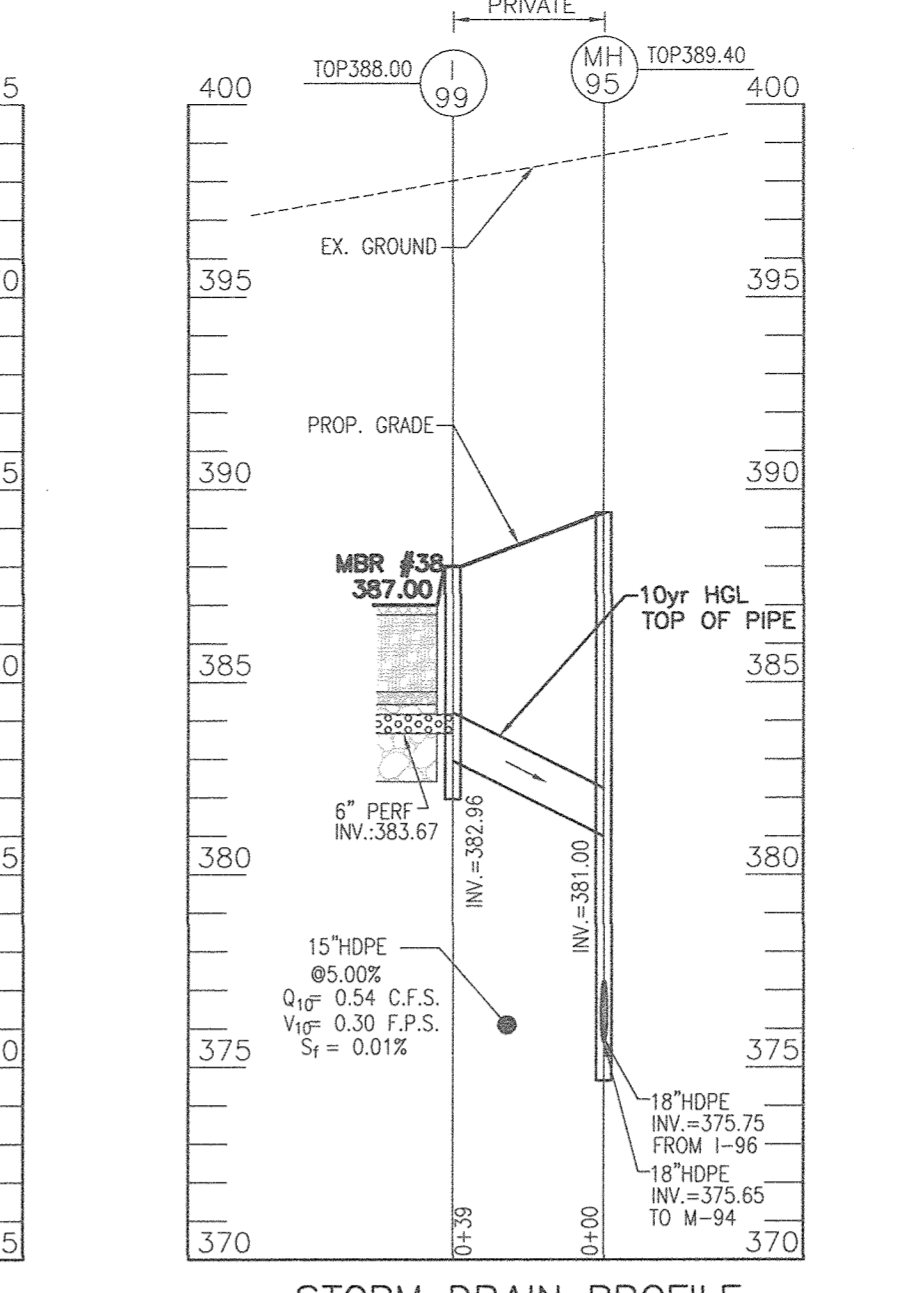
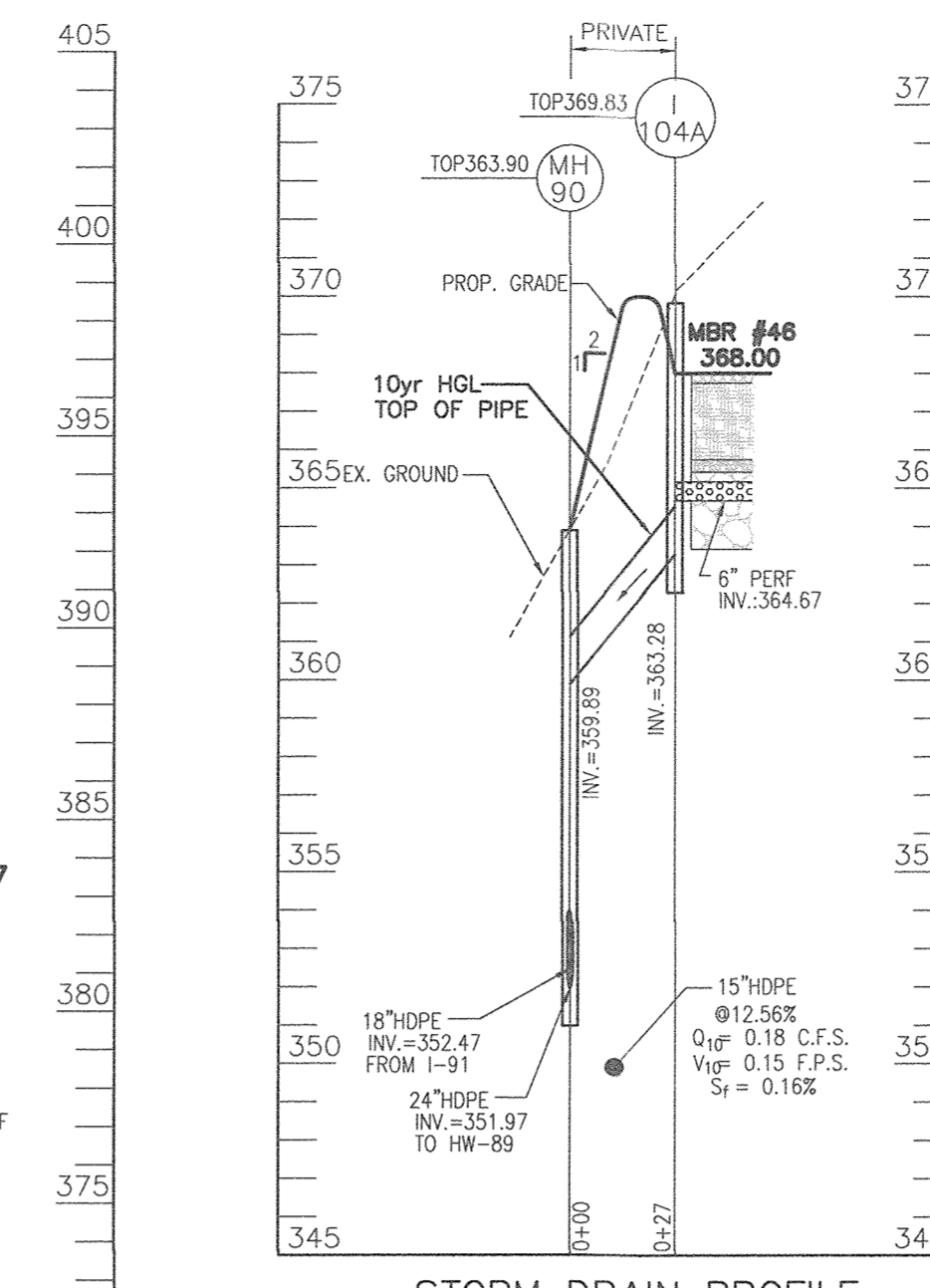
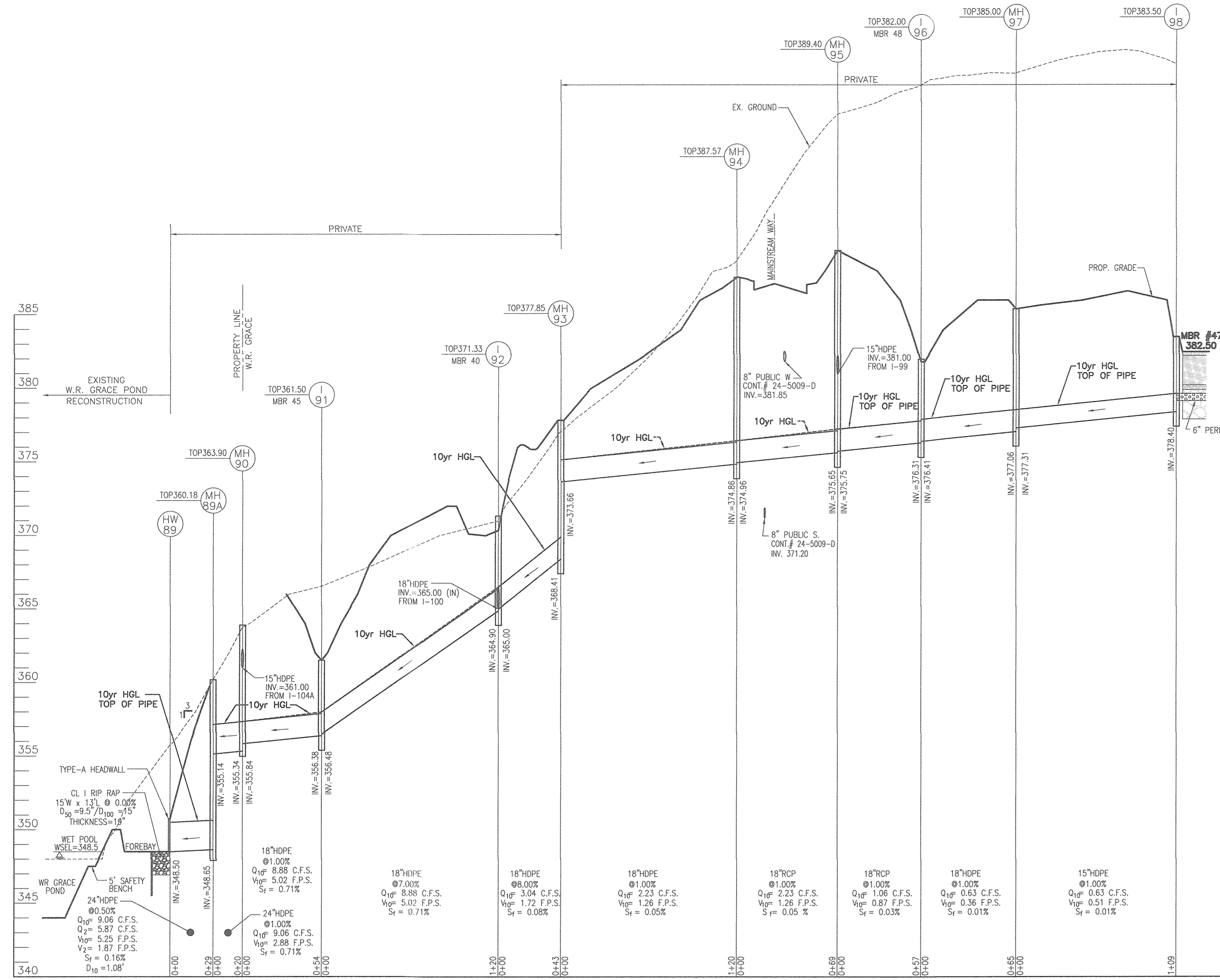
FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH. PARK - PARCELS "B-1" & "C"  
 TAX MAP 35 GRID 21 ZONED: CEF-R P/O PARCEL 145  
 DPZ REFERENCE: SEE SITE DATA HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8951

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. 18913 EXPIRATION DATE: 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

37 SHEET OF 74



**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 21

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.20.19

**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 21

**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 22

**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 22

**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 22

**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 23

OWNER / DEVELOPER: T.M. 35-P-145 (PARCEL B-1)  
SIMPSON OAKS CRPS, LLC  
4750 OWINGS HILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER: T.M. 35-P-145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK, PARCELS "B-1" & "C"  
PLATS 2333A-2333J

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

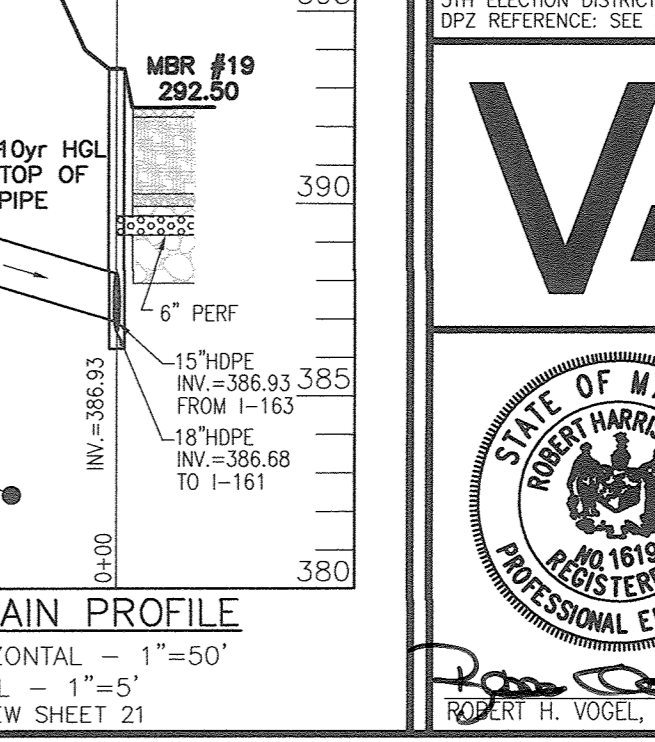
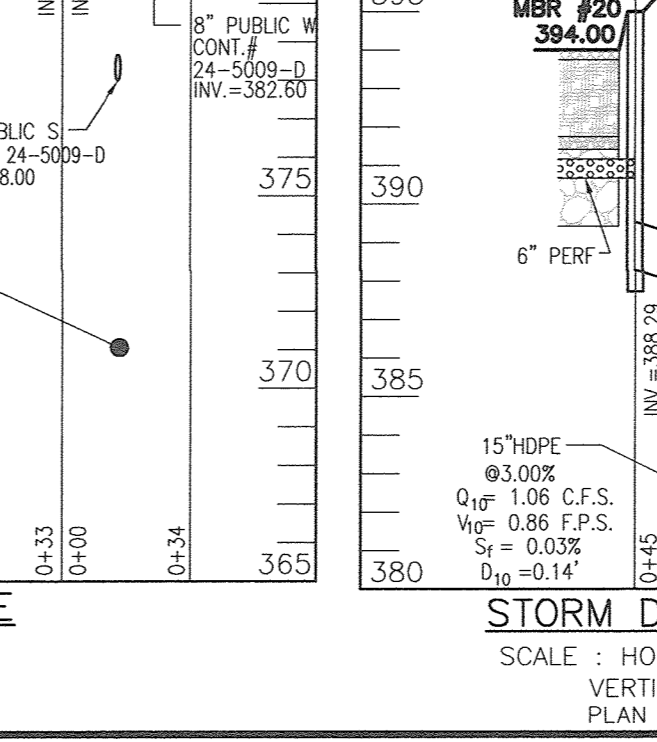
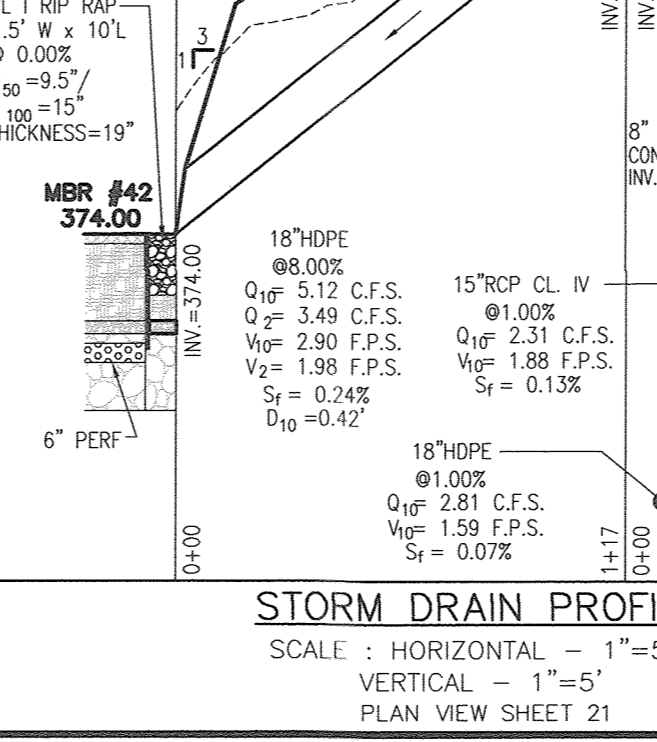
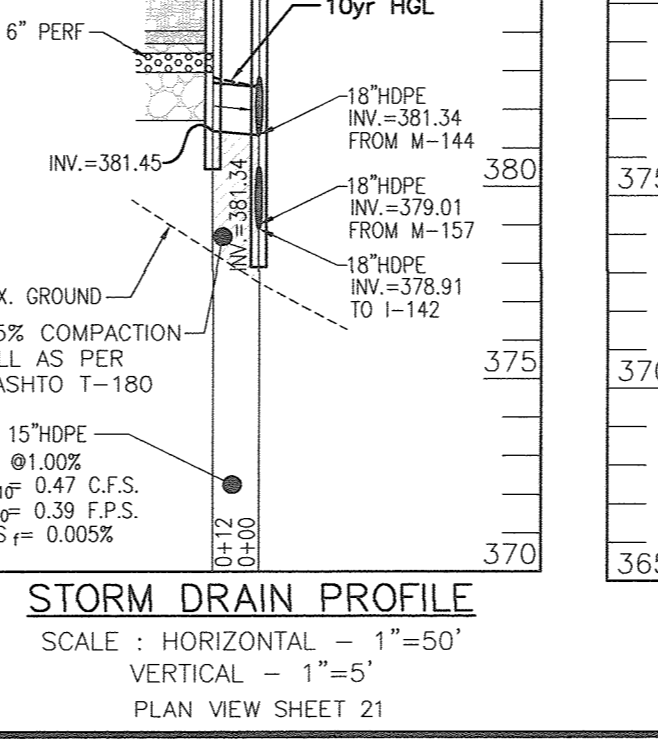
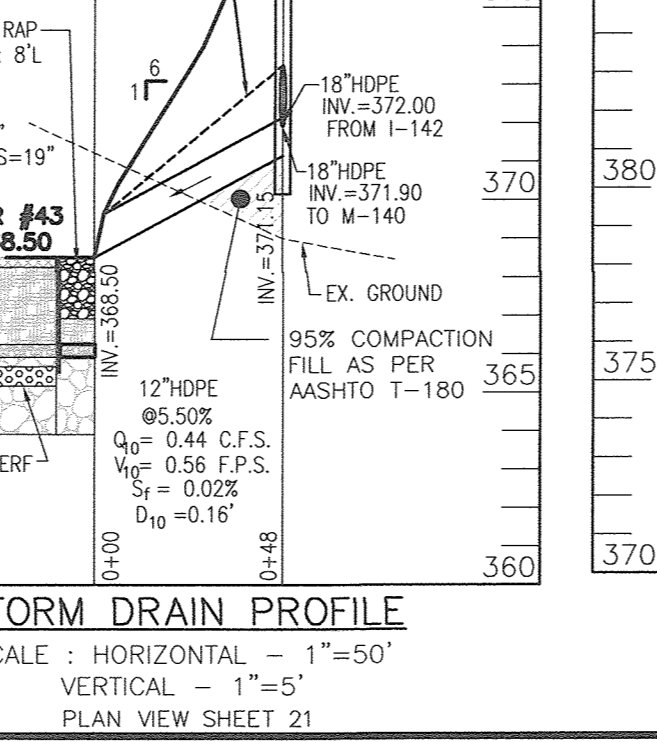
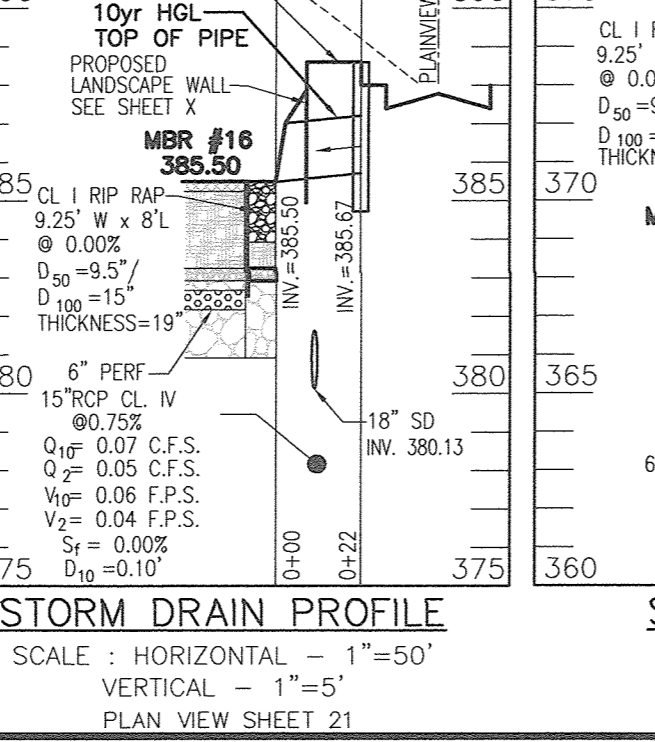
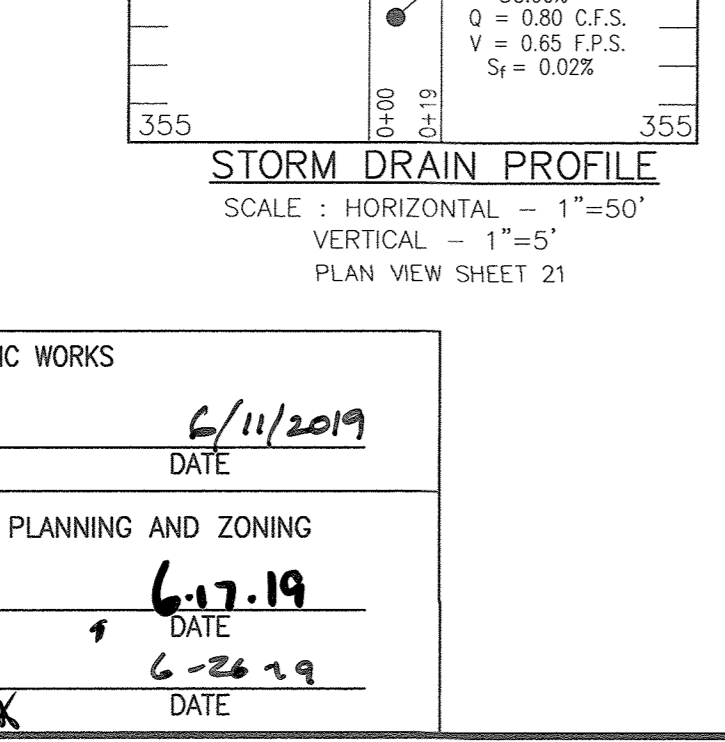
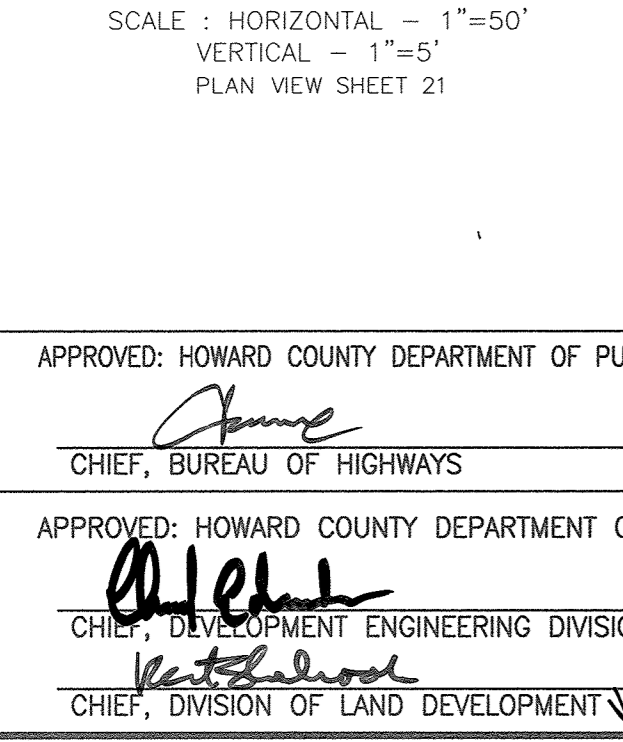
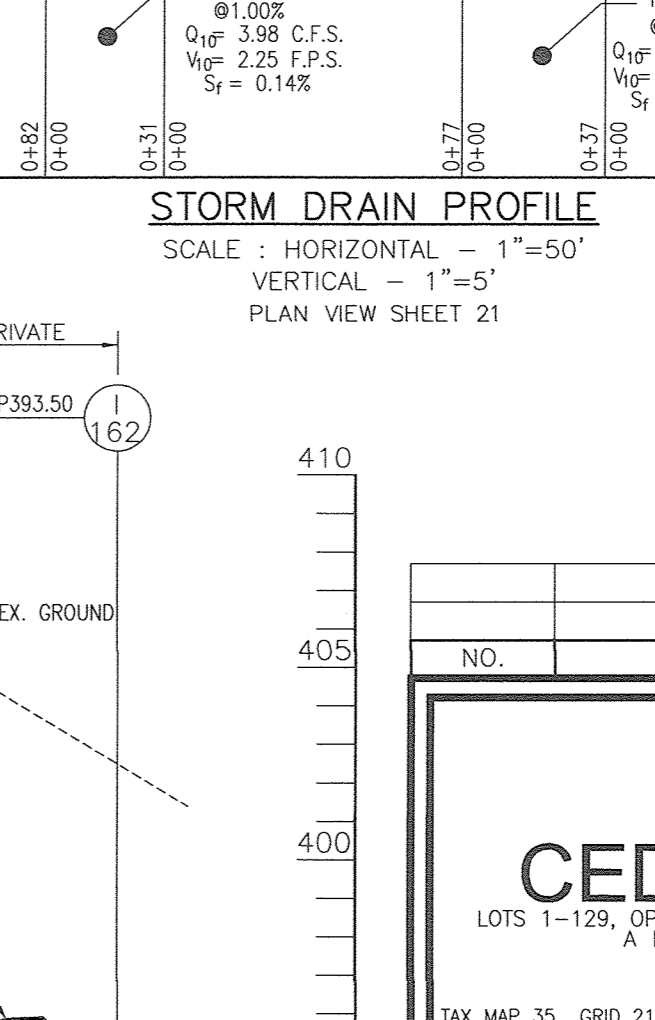
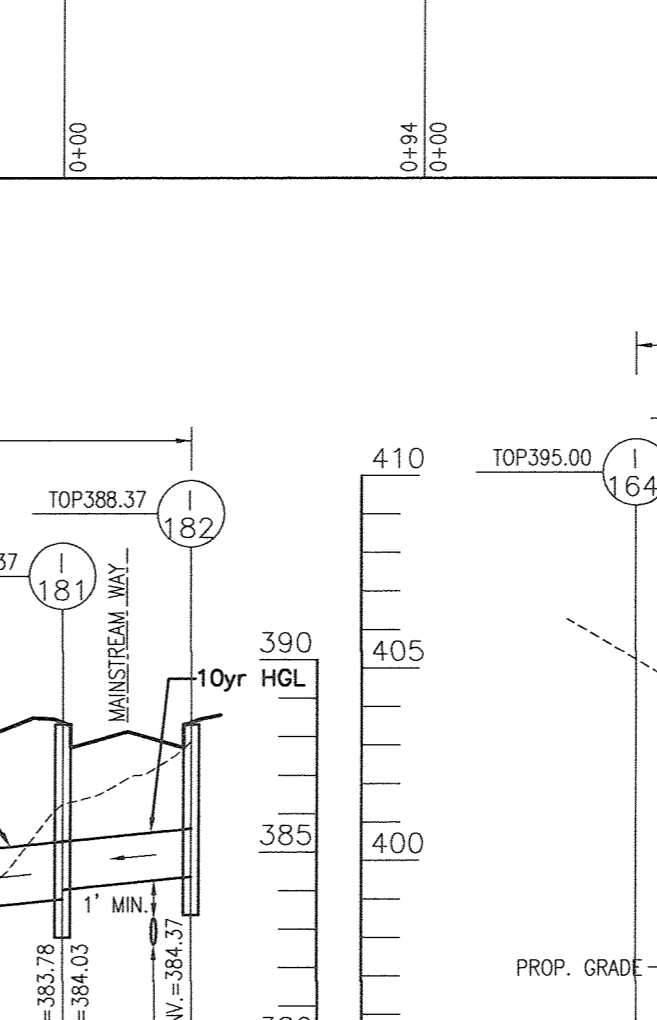
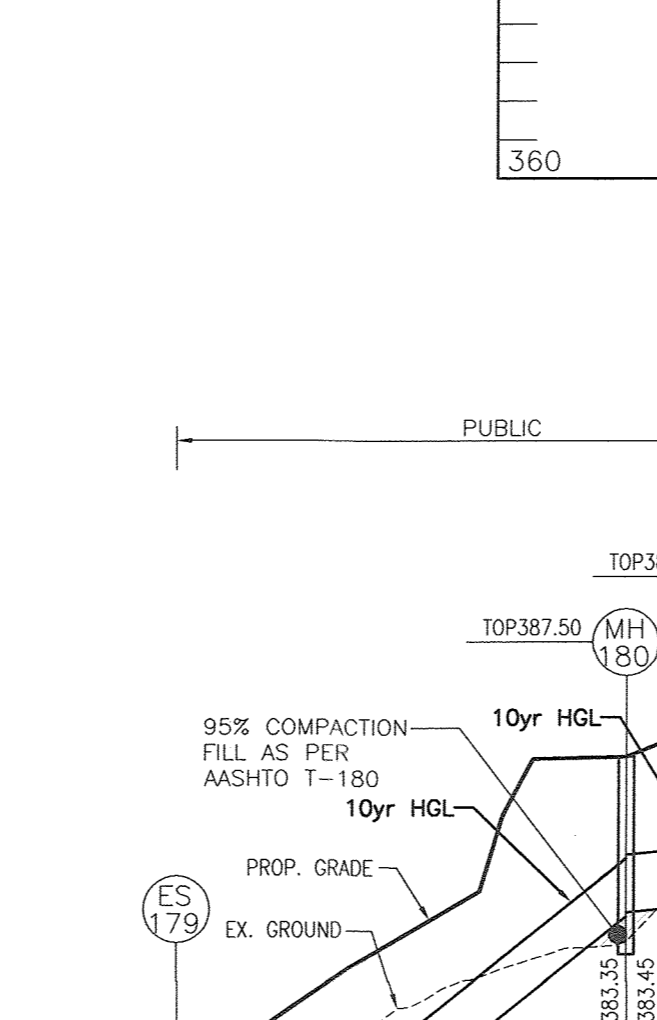
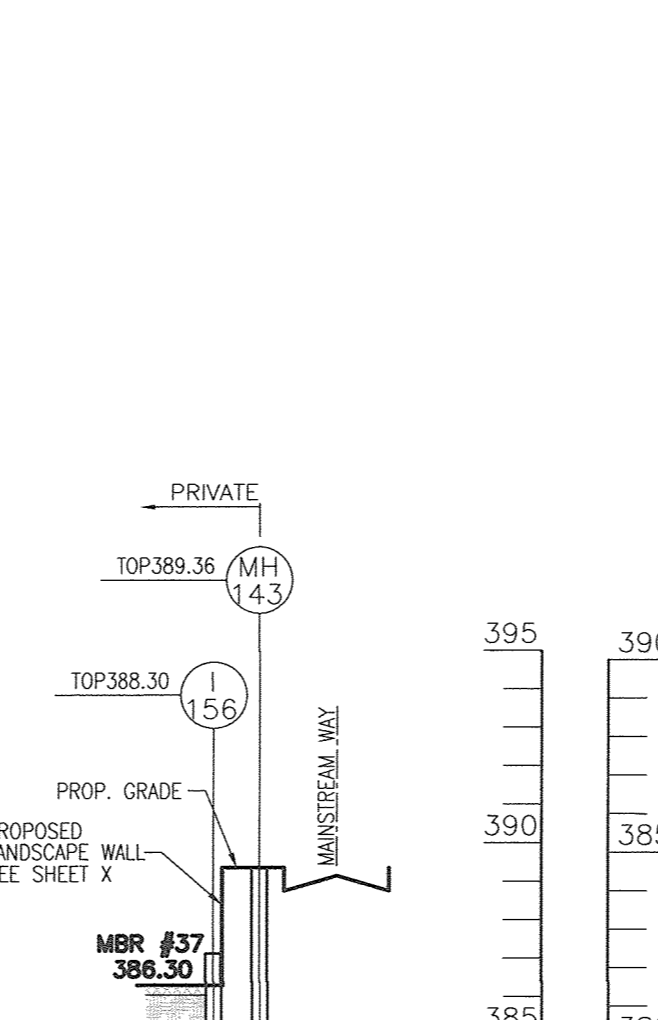
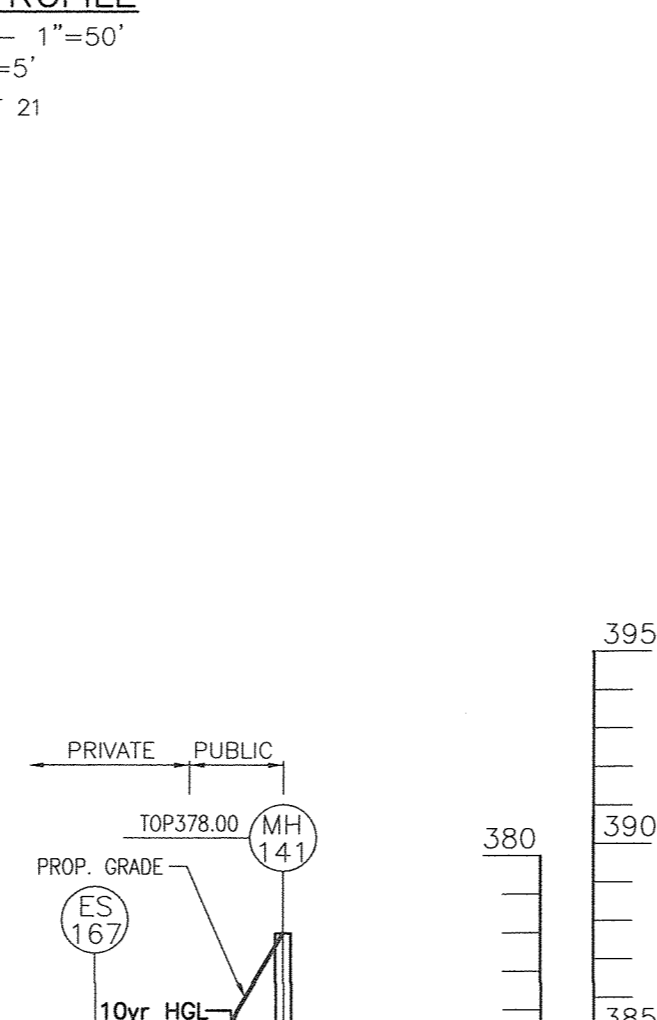
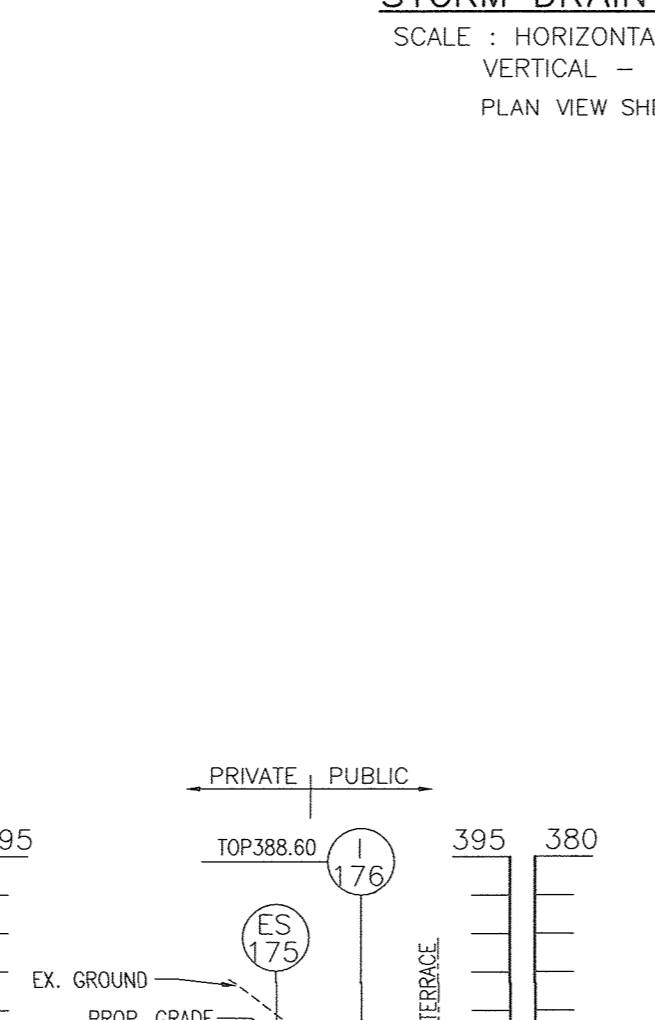
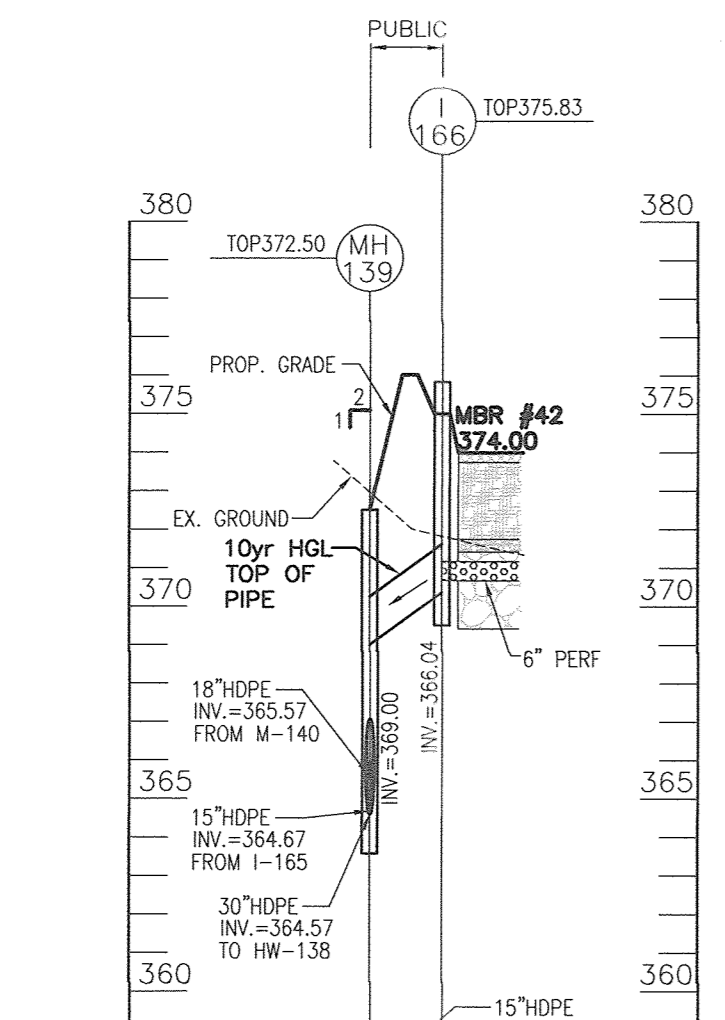
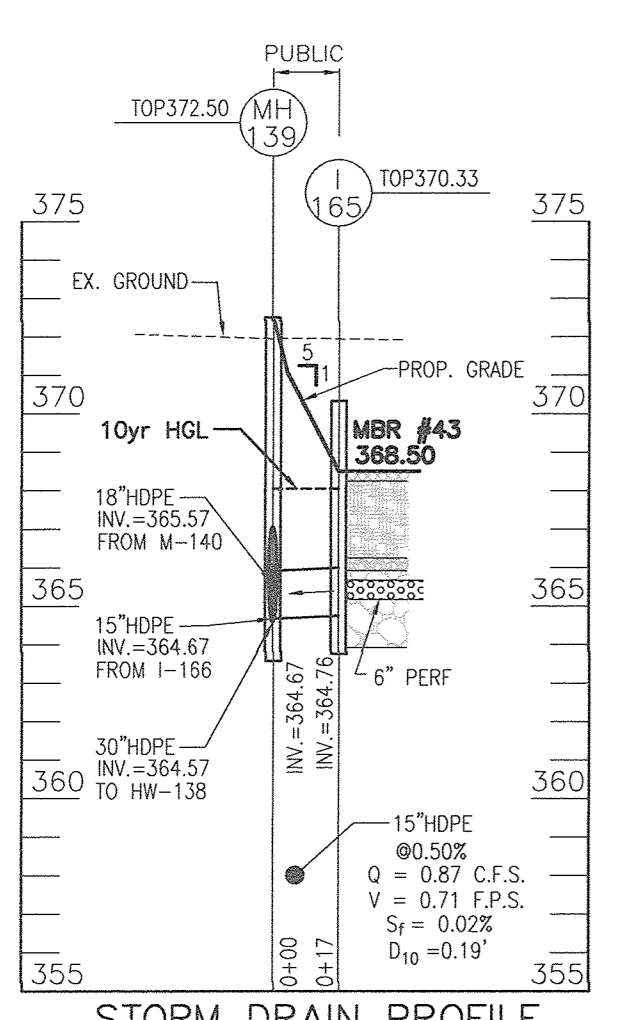
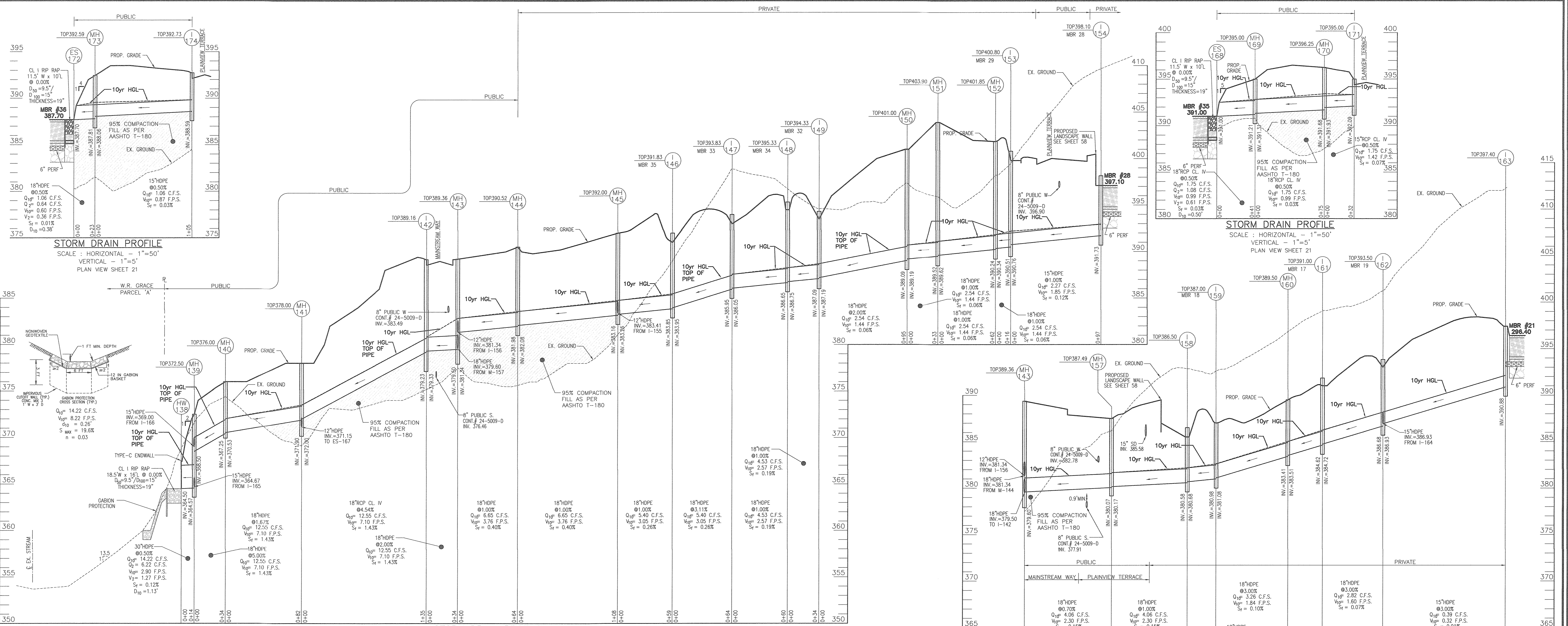
ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

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EXPIRATION DATE: 09-27-2020

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHW  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

38 SHEET OF 74



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS

OWNER / DEVELOPER: SIMPSON OWMS CORP, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRADE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334 - 23337

TAX MAP 35 GRID 22  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

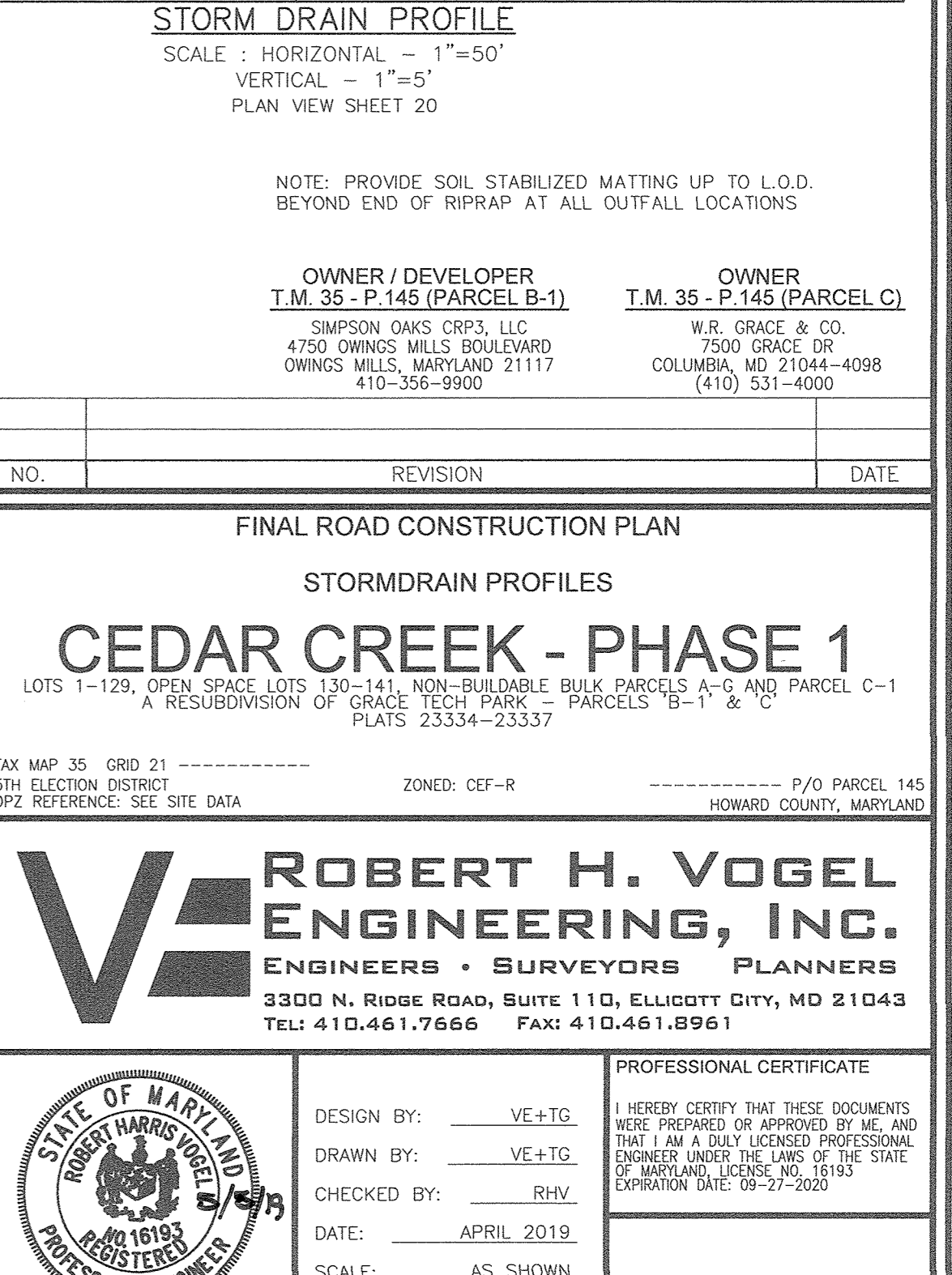
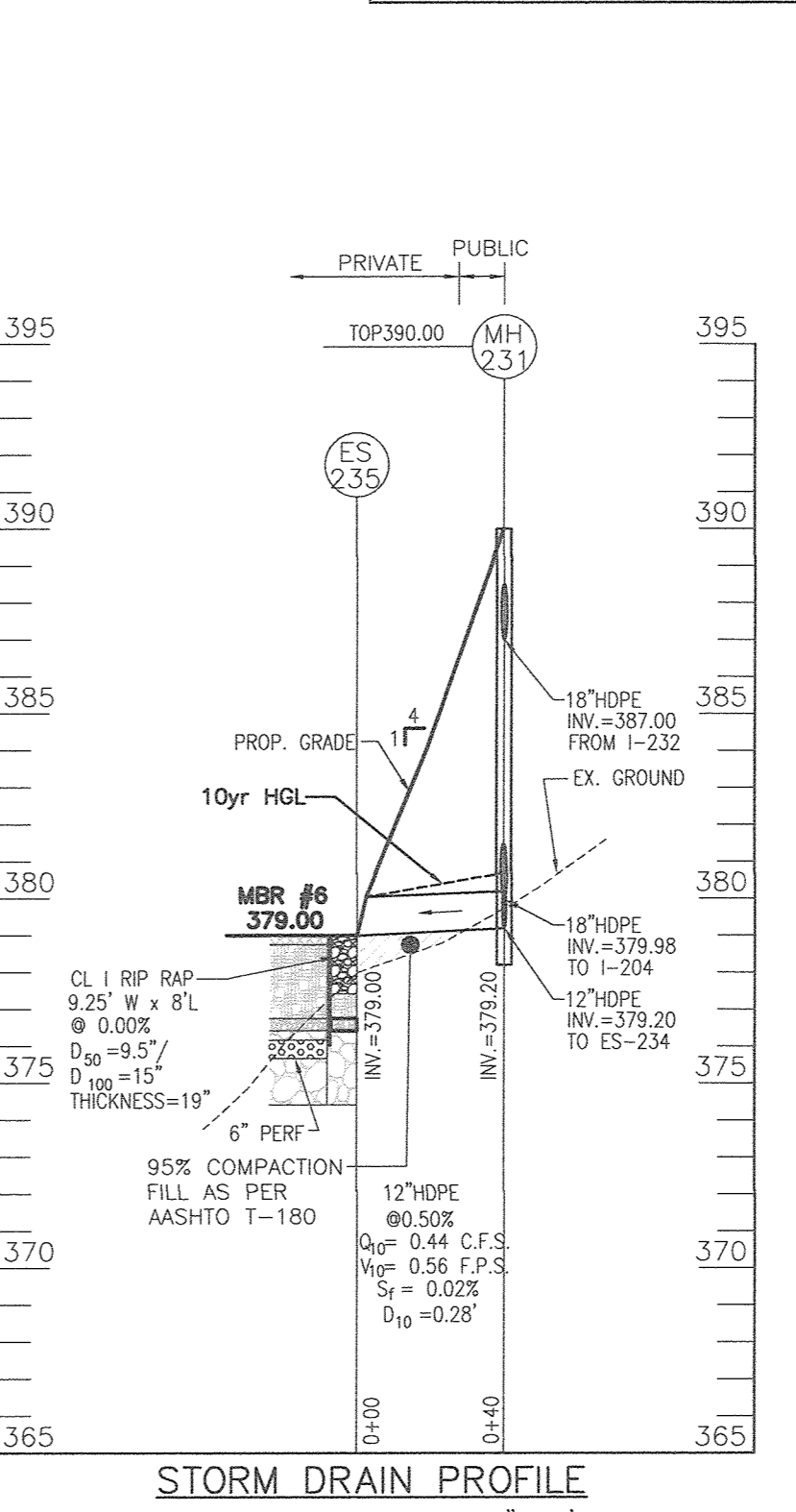
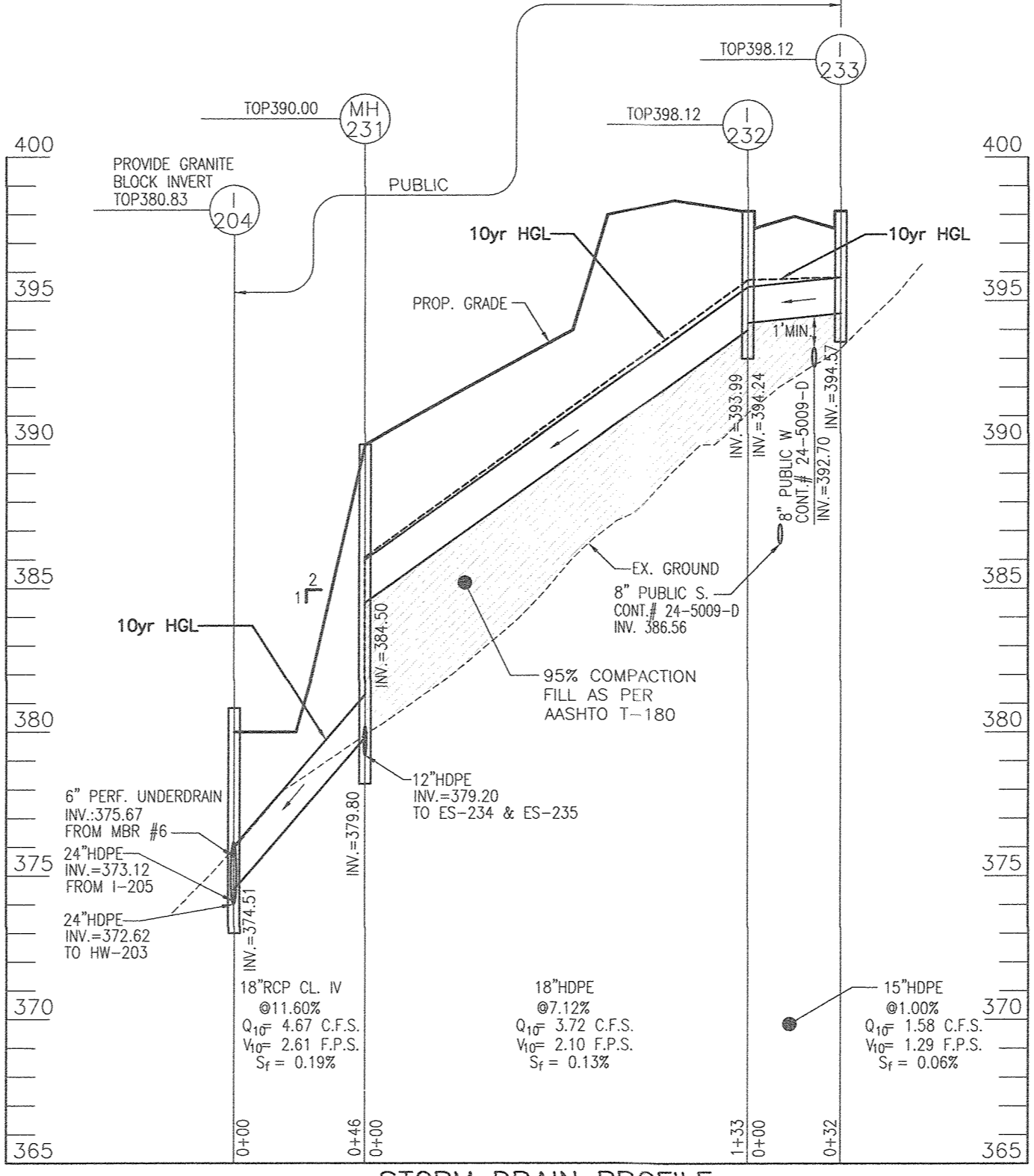
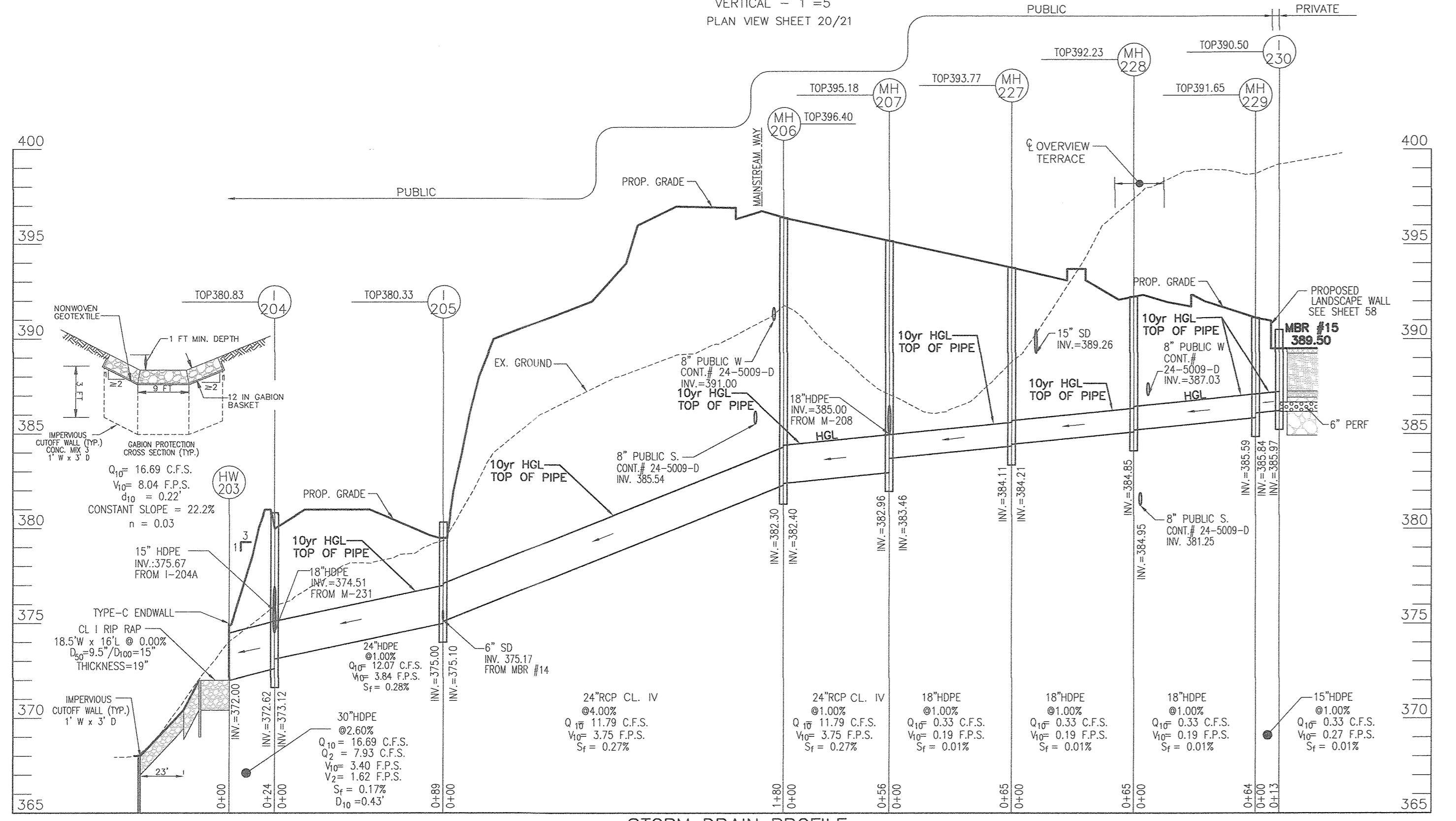
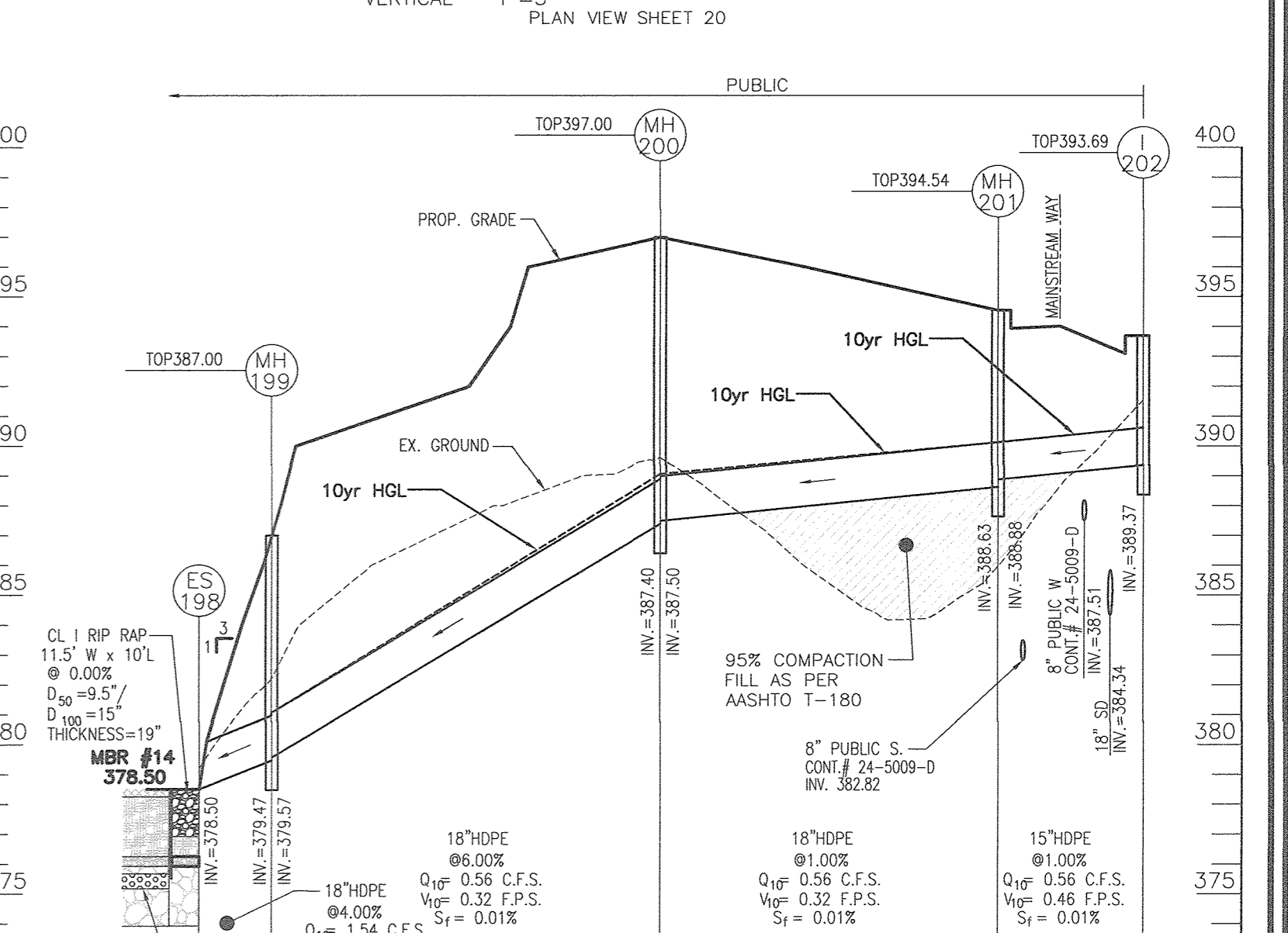
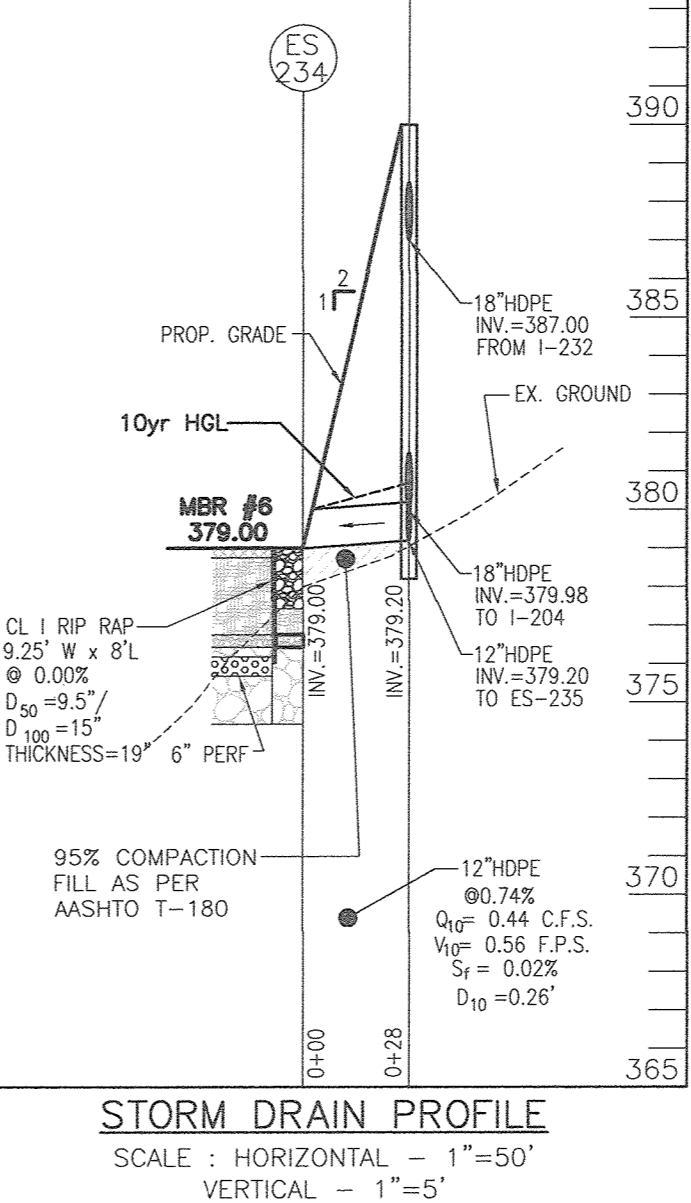
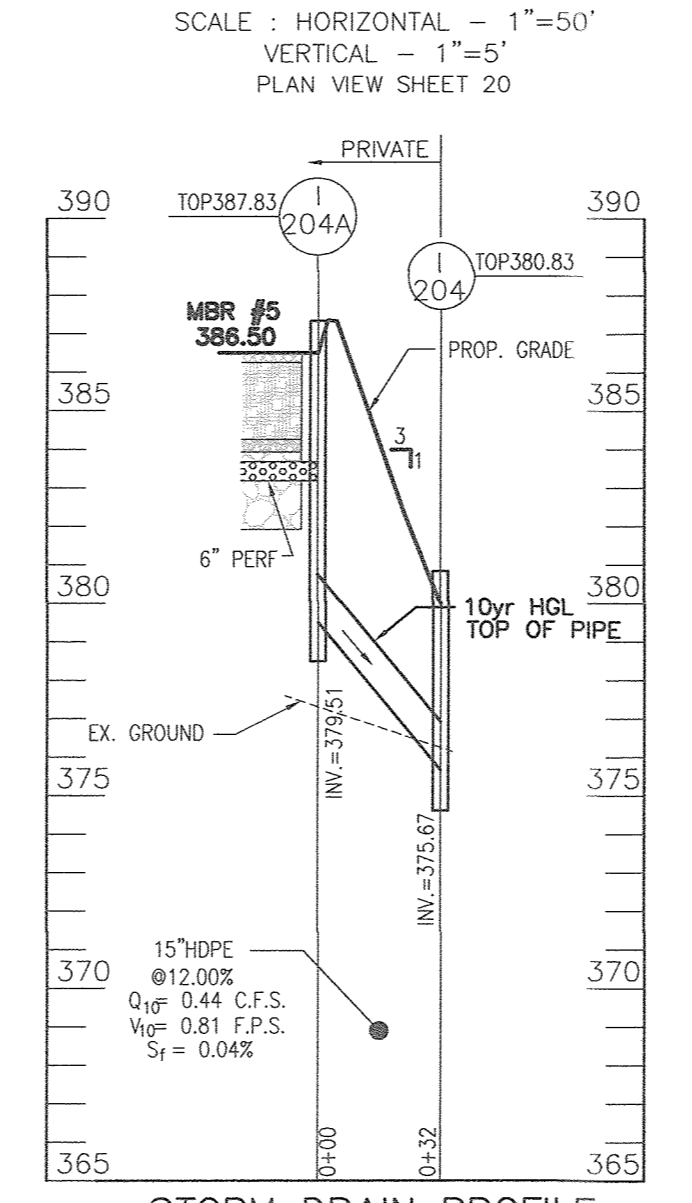
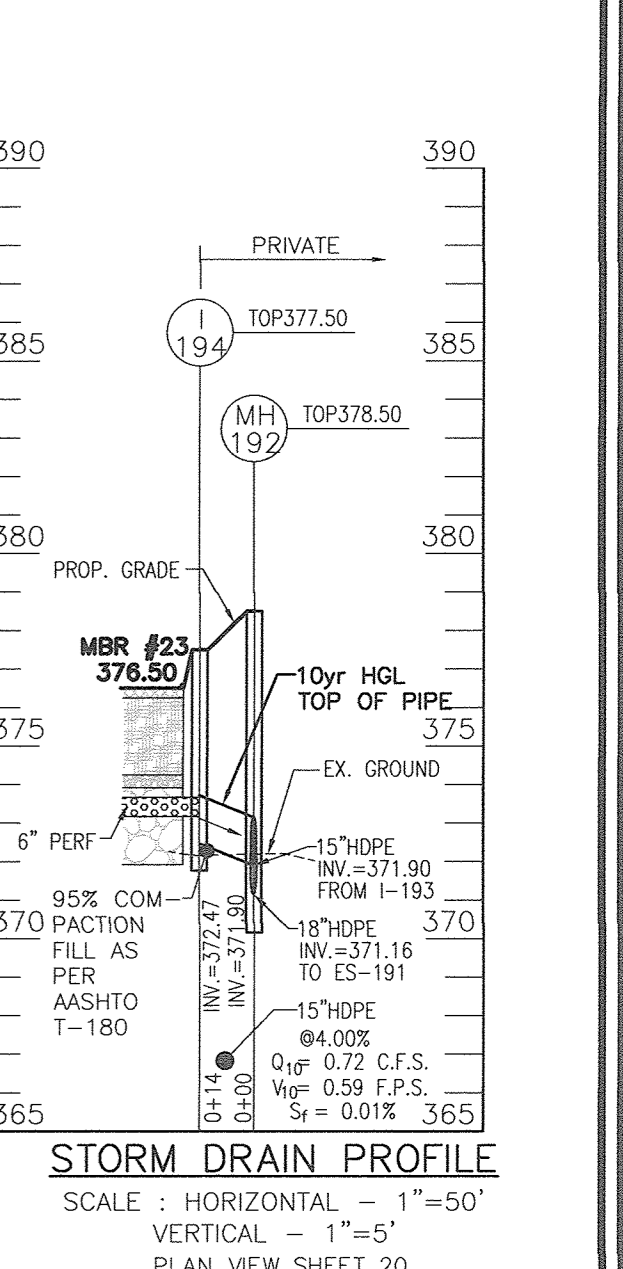
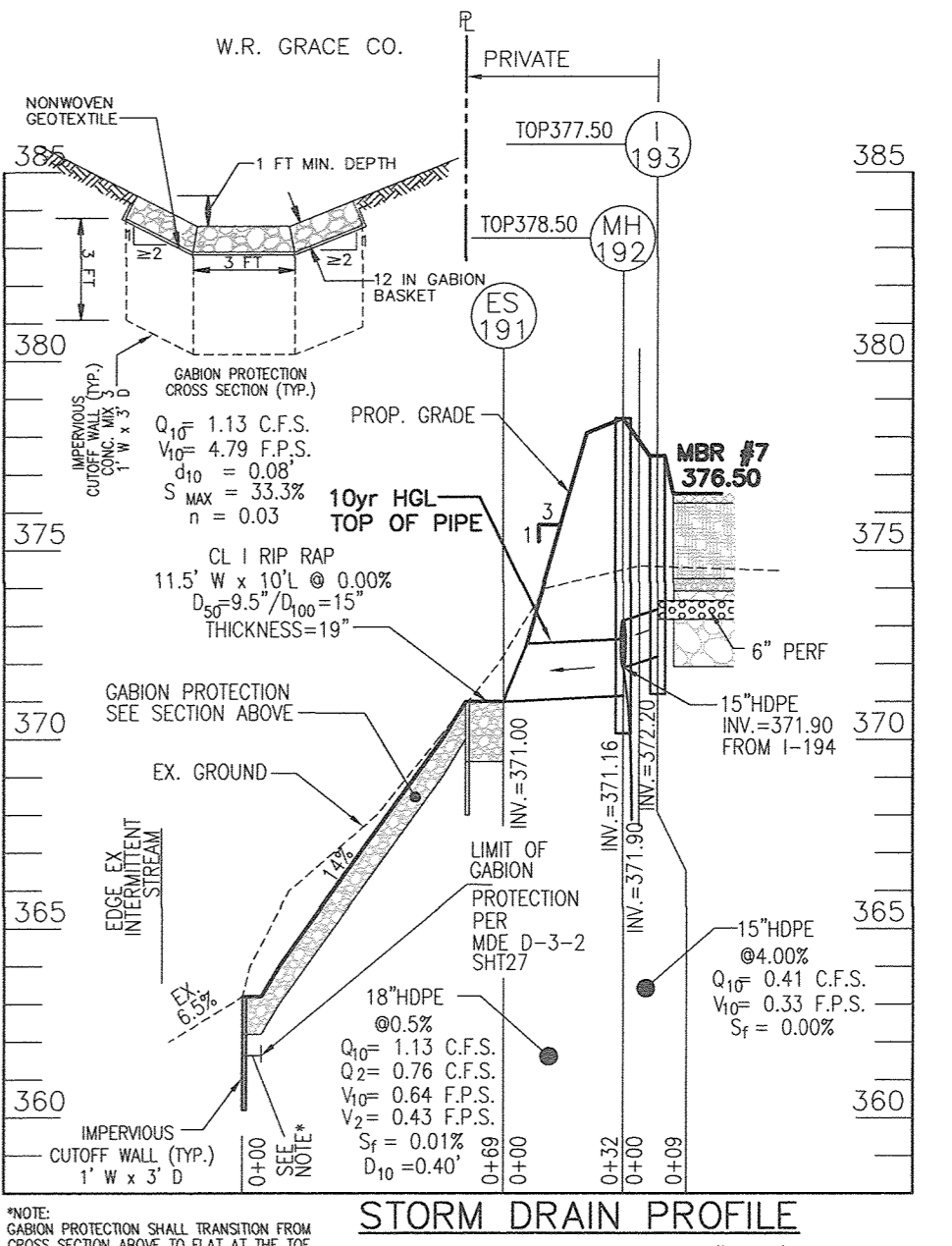
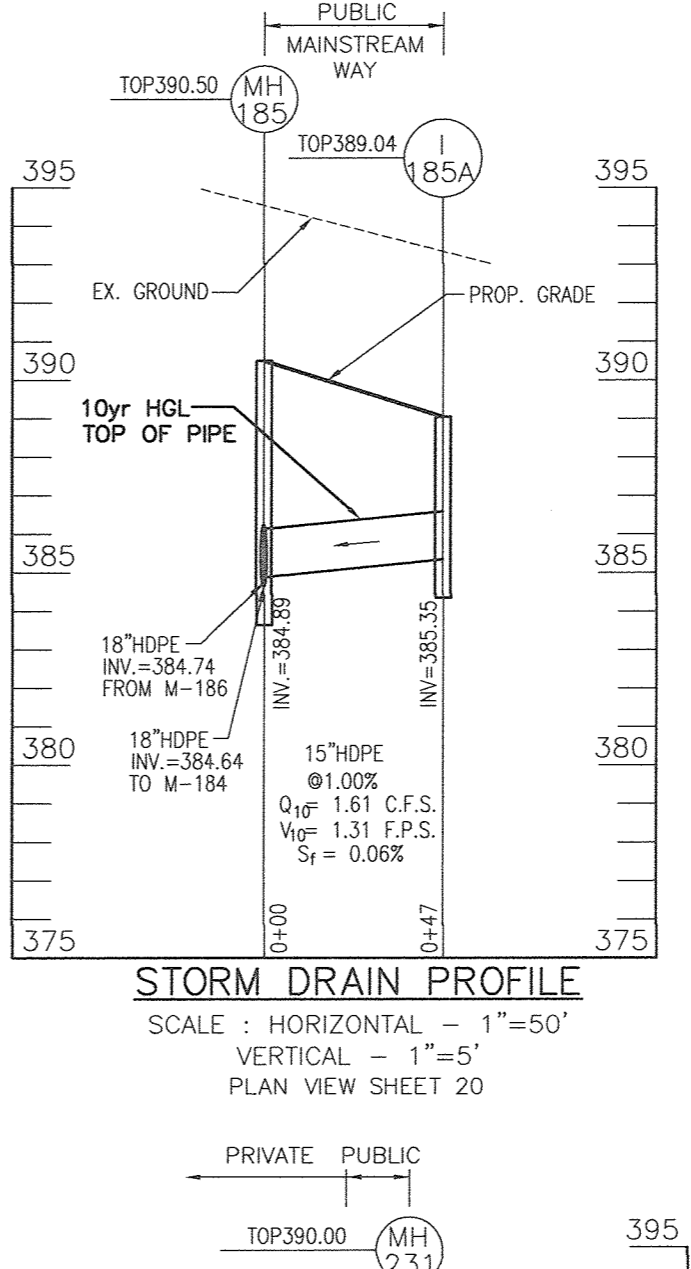
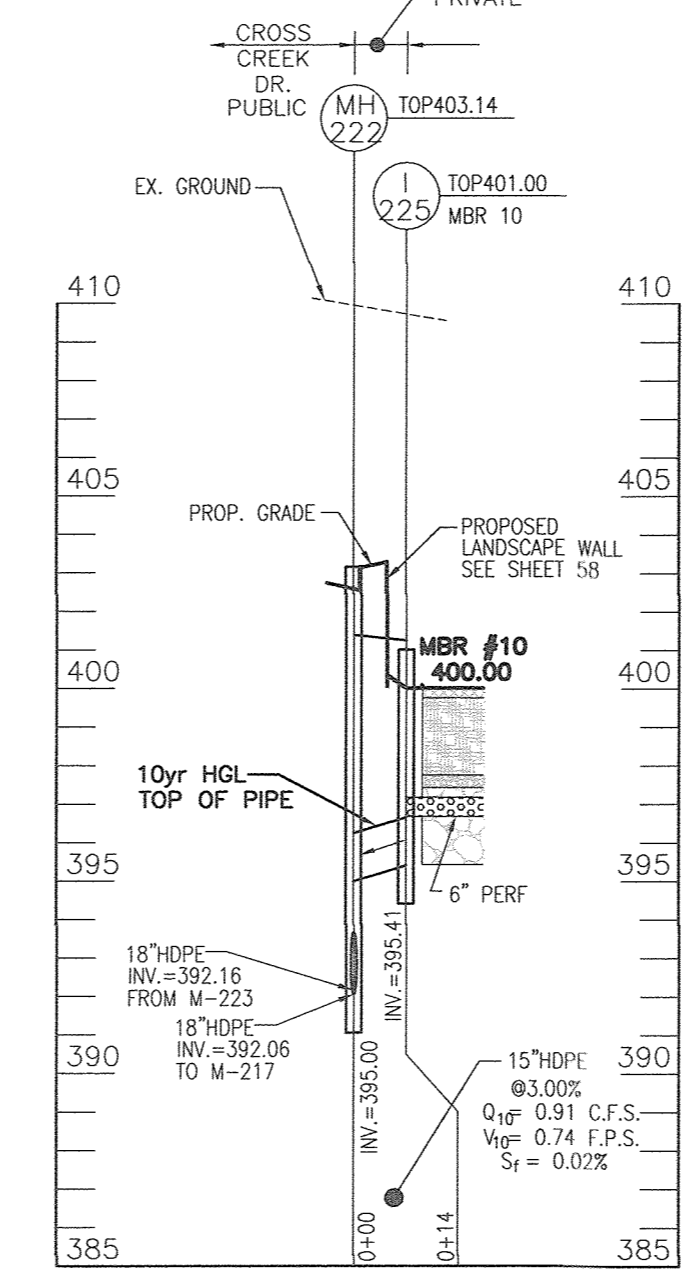
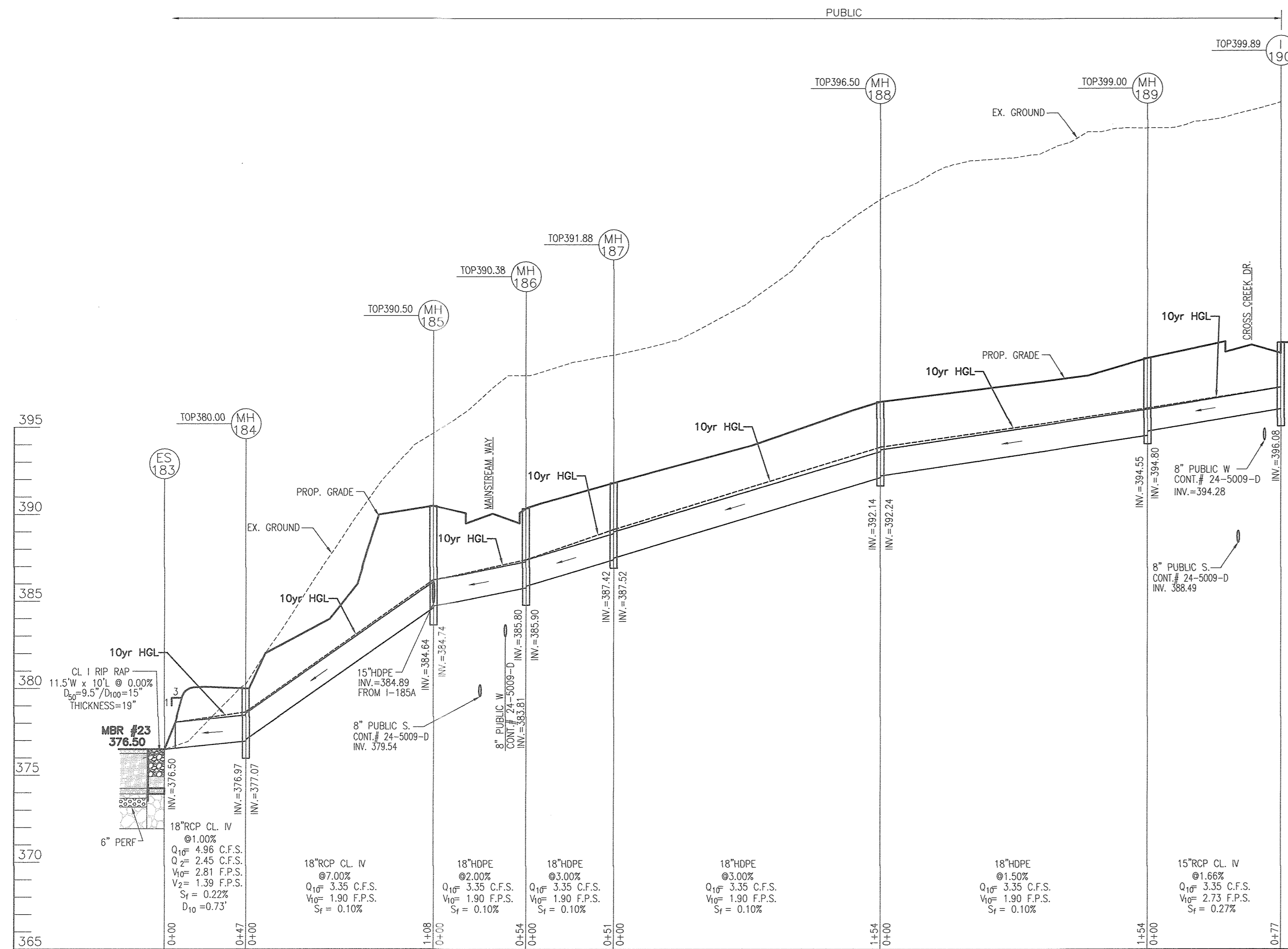
ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE  
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 EXPIRATION DATE: 09-27-2019

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHW  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

39 SHEET OF 74



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 6/11/2017  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] 6-17-19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. REVISION DATE

FINAL ROAD CONSTRUCTION PLAN  
 STORMDRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
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 TEL: 410.461.7666 FAX: 410.461.8961

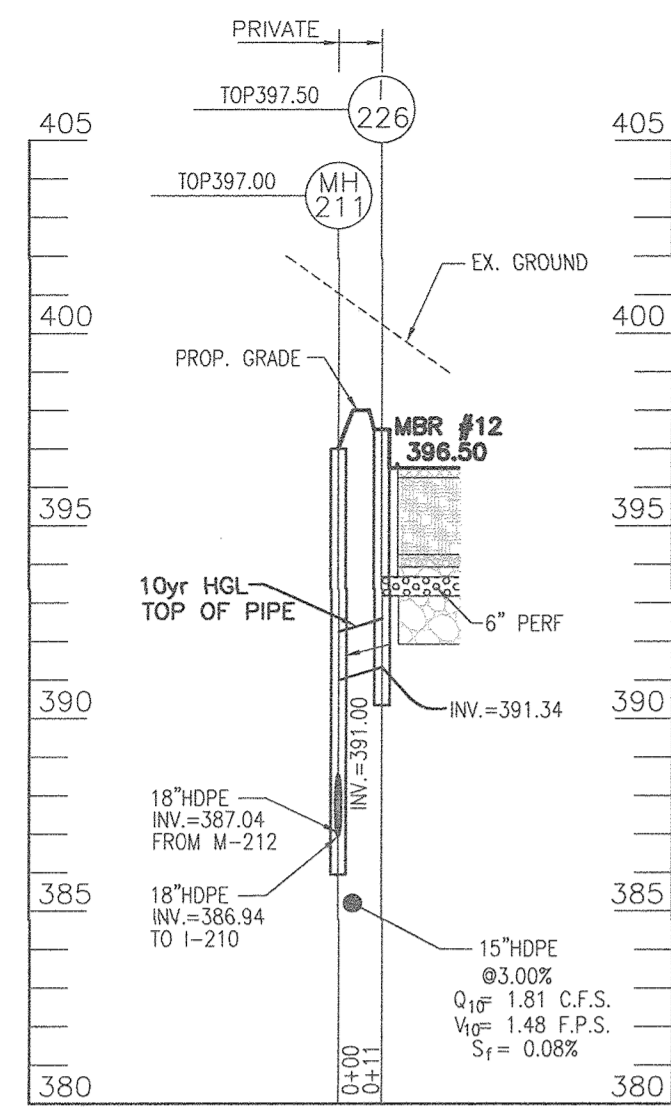
PROFESSIONAL CERTIFICATE  
 DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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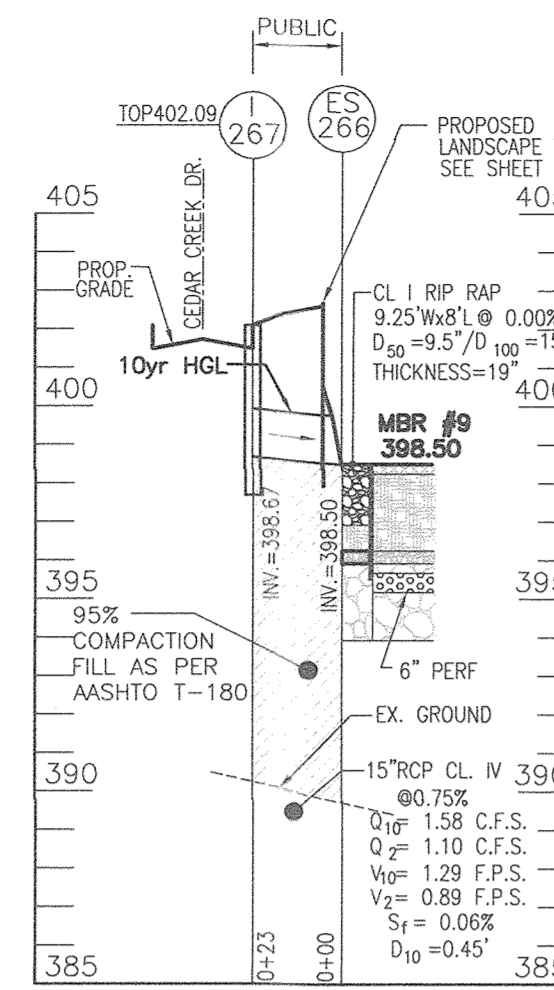
40 SHEET OF 74

ROBERT H. VOGEL, PE No.16193

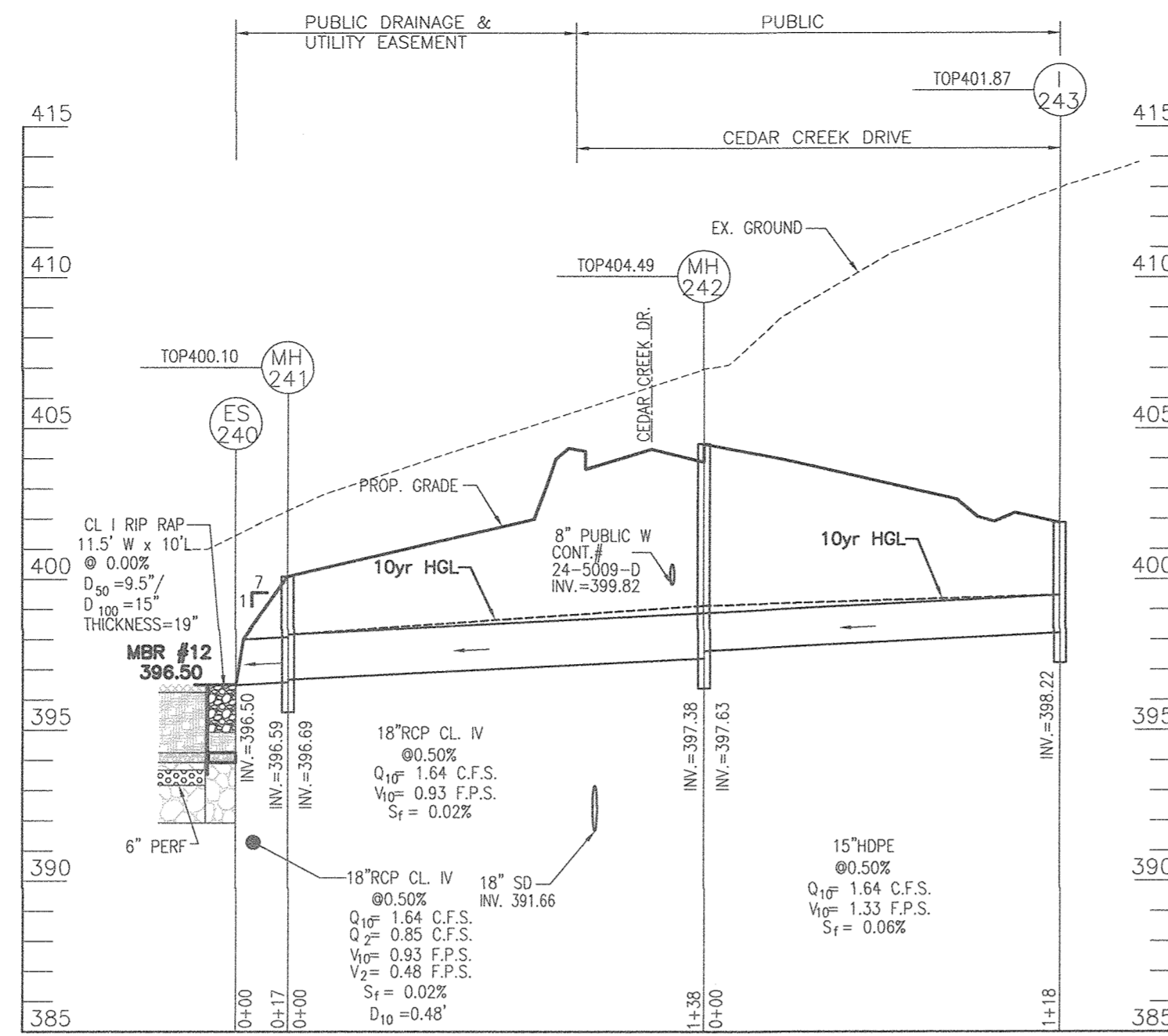




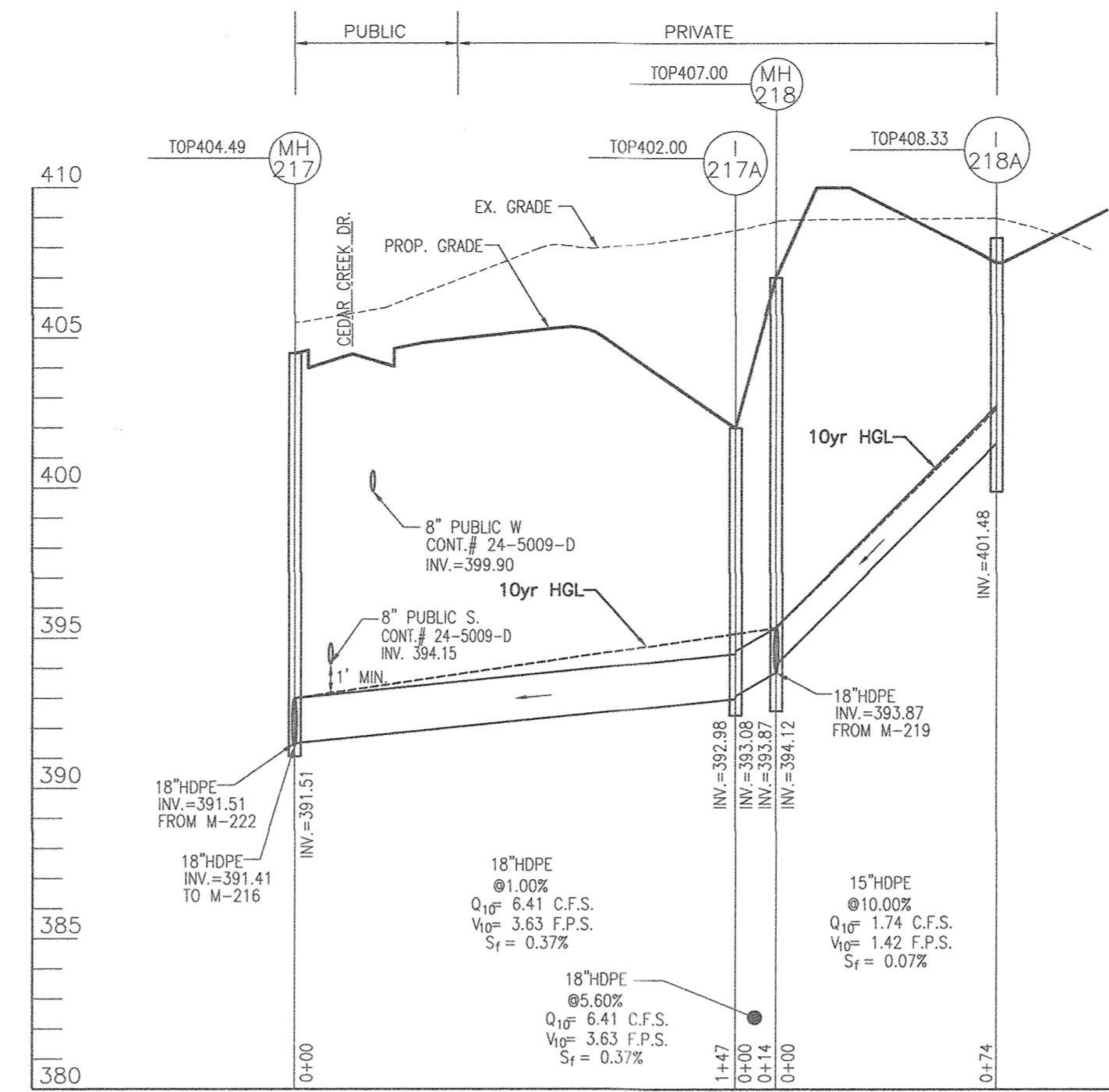
**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



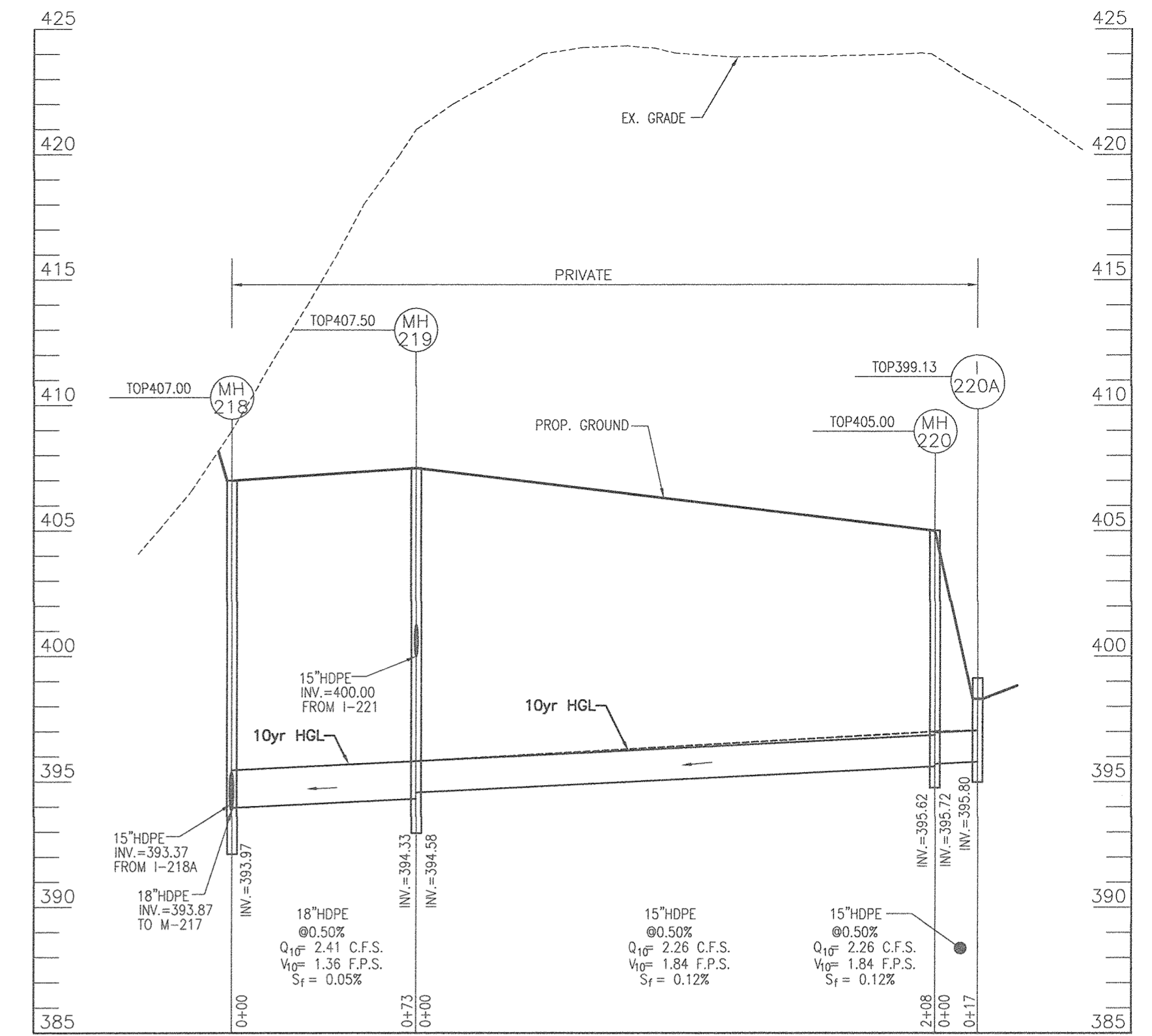
**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



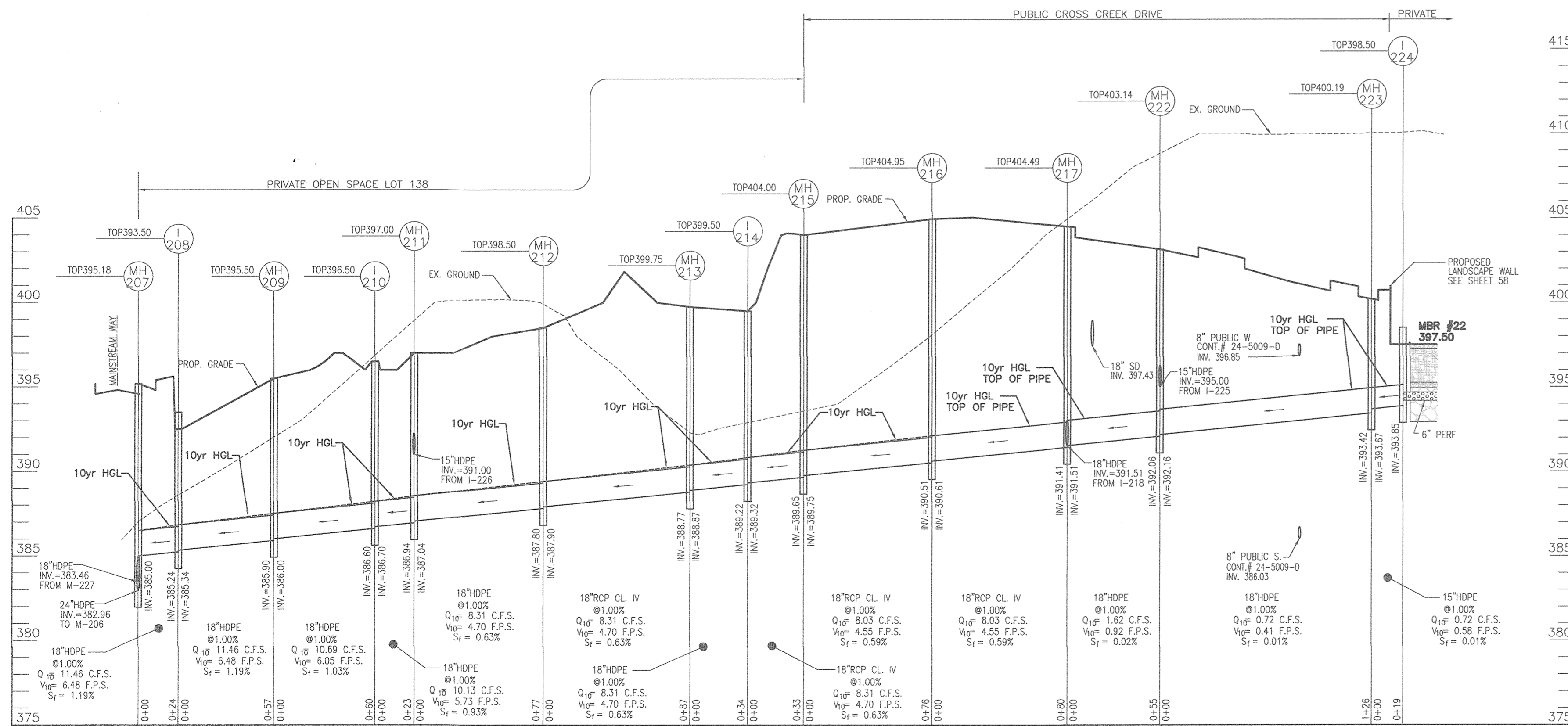
**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



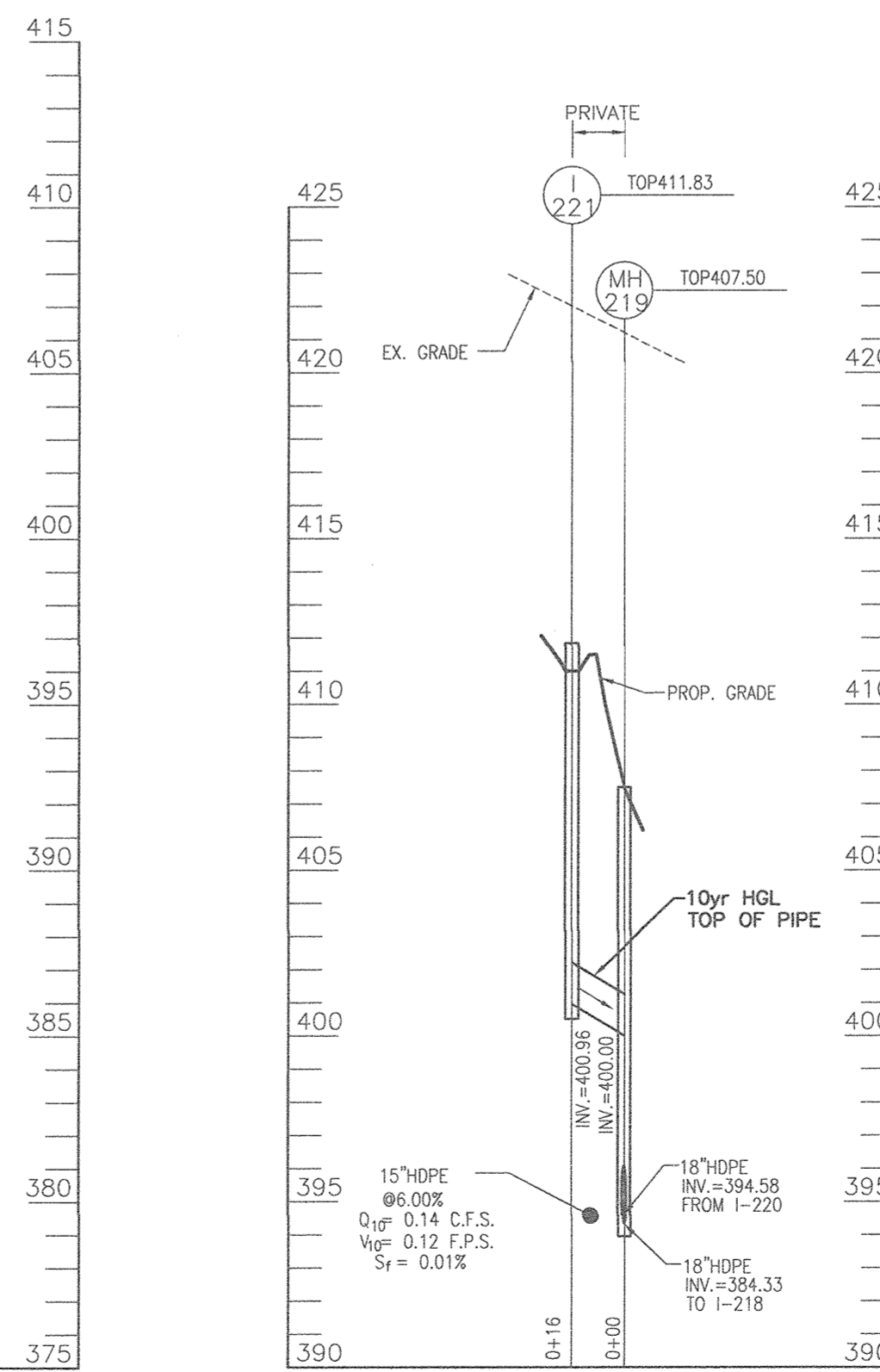
**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



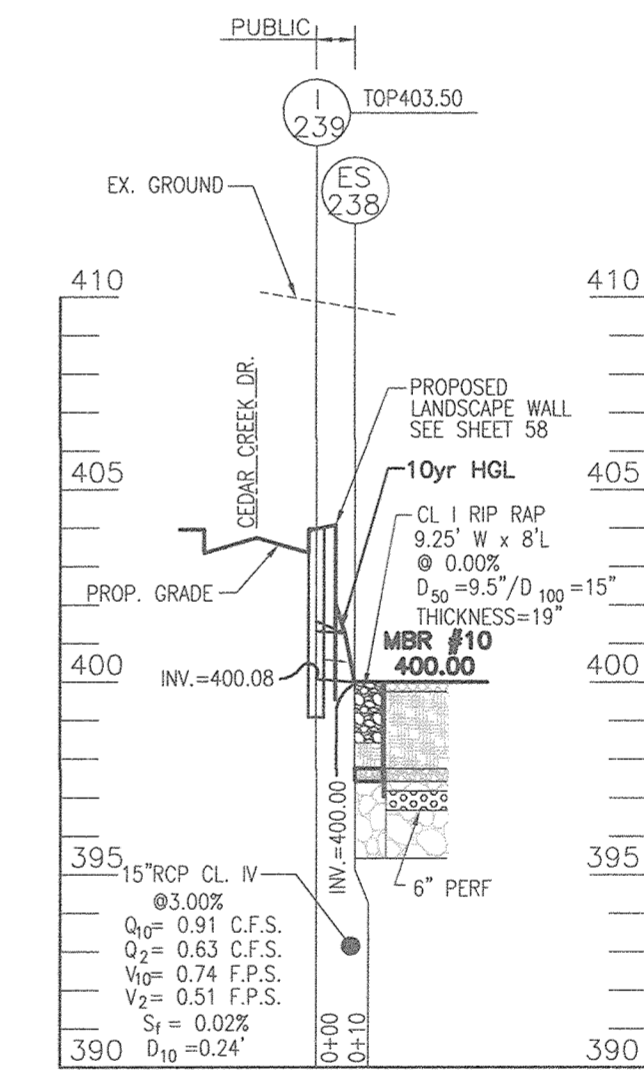
**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



**STORM DRAIN PROFILE**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRPS, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN

STORM DRAIN PROFILES

**CEDAR CREEK - PHASE 1**

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRADE TECH PARK - PARCELS "B-1" & "C"  
PLATS 2333A-2333Z

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

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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: 09-30-2020

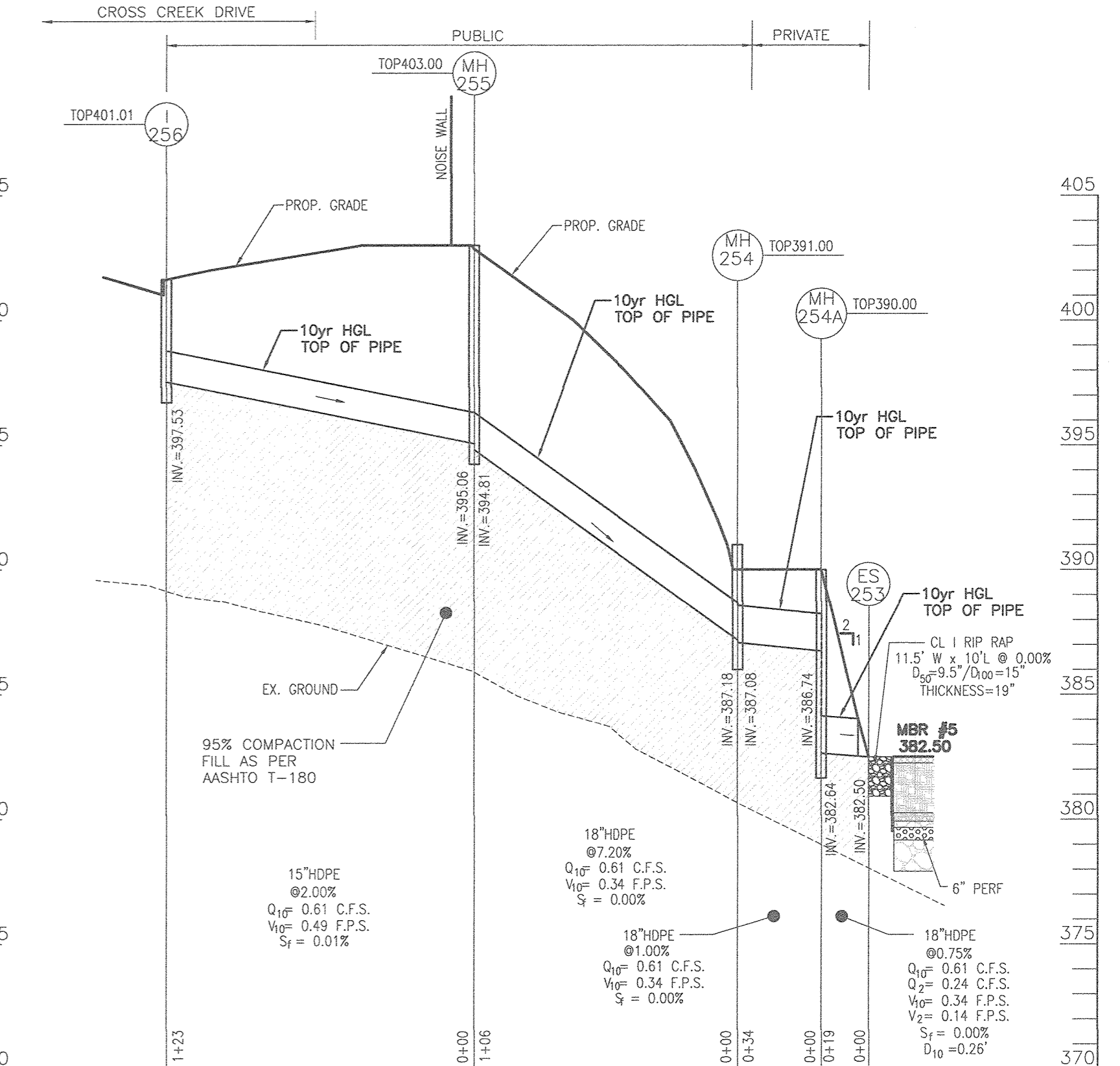
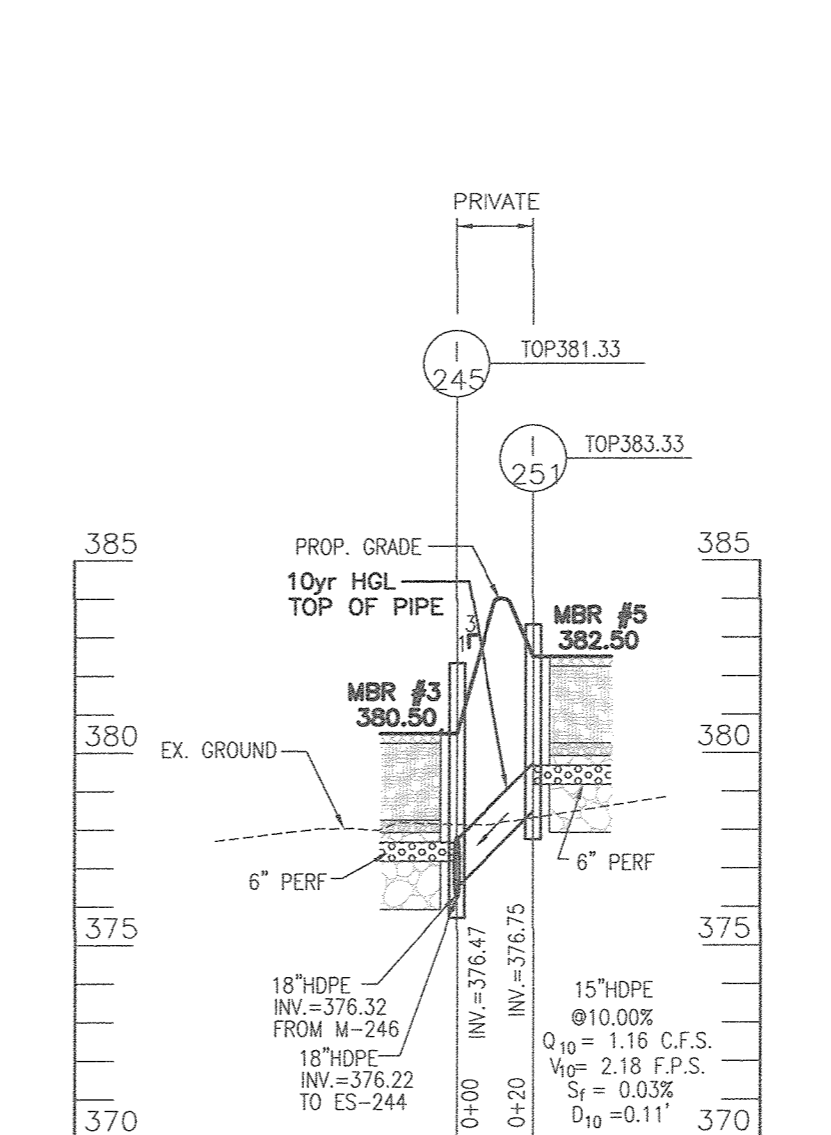
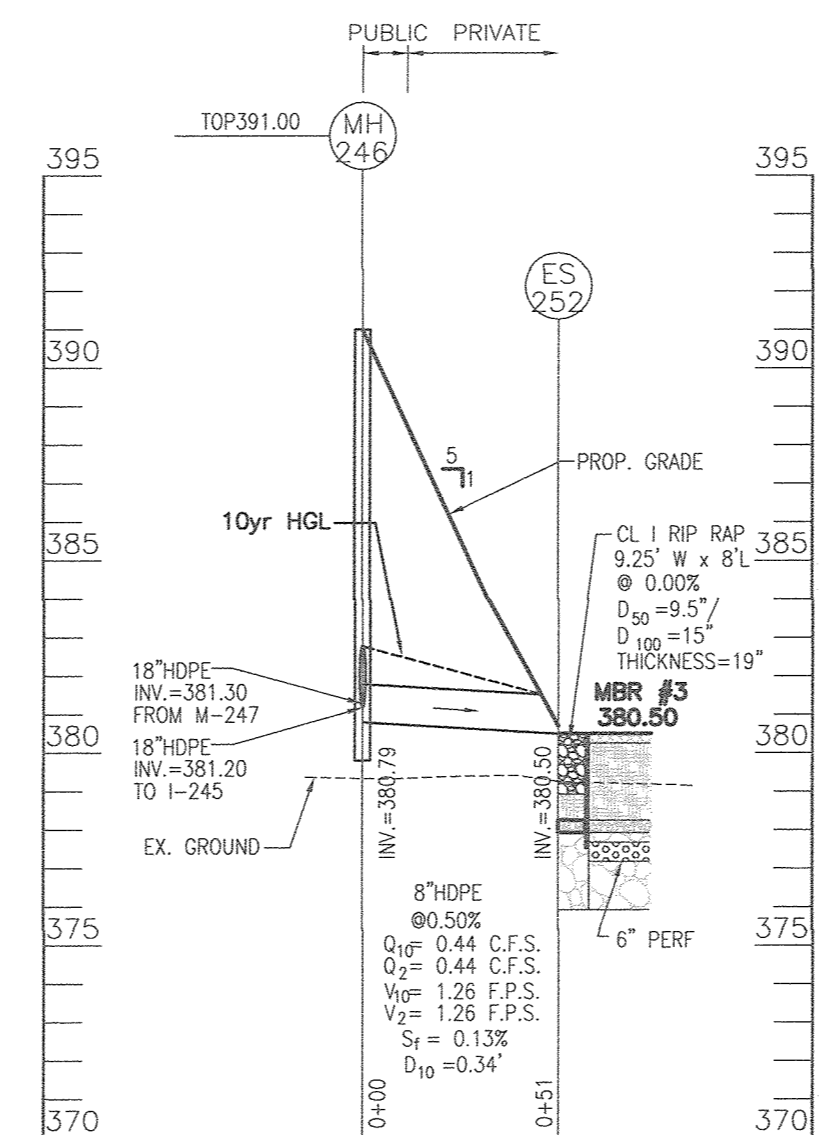
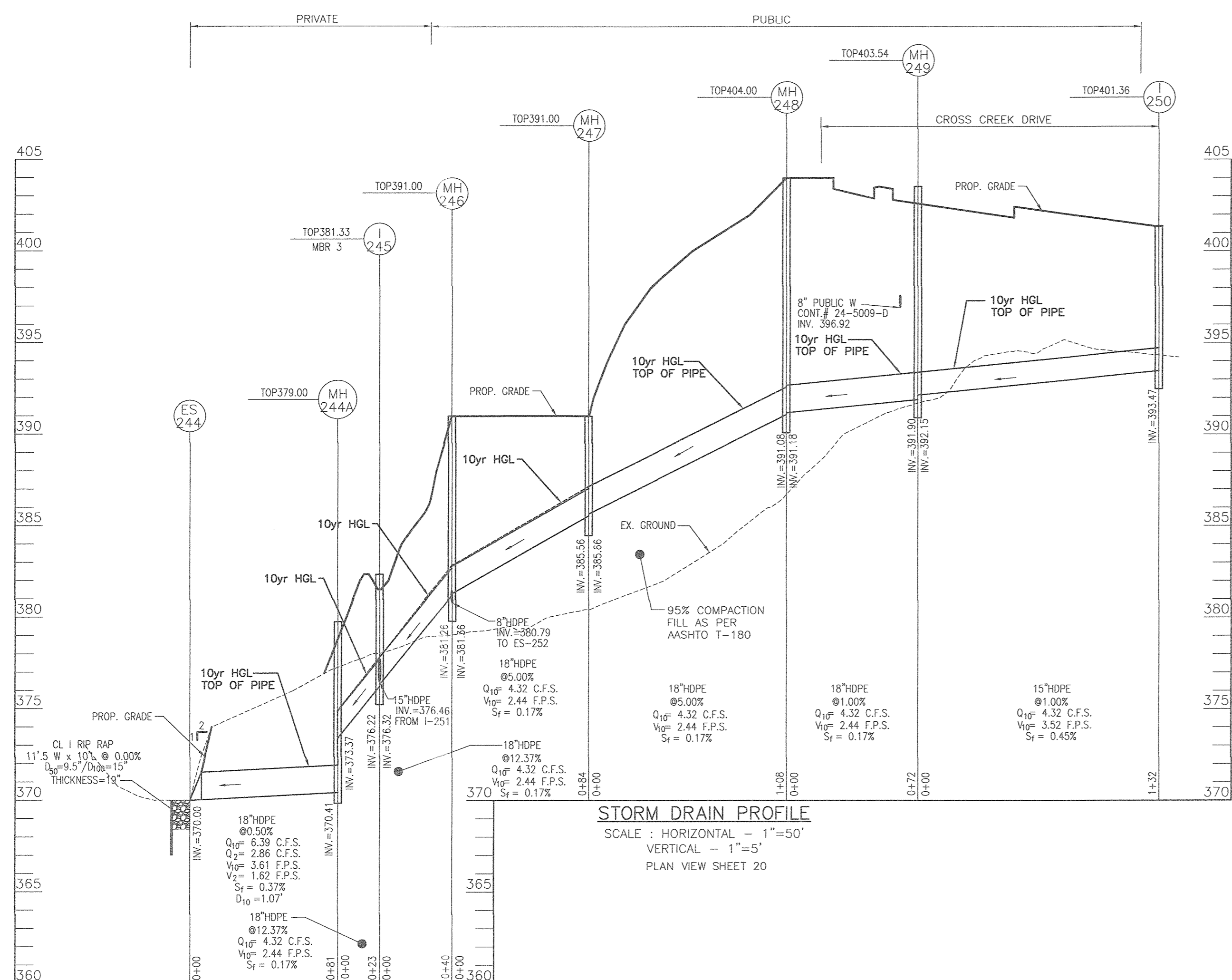
DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHW  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

41 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6-26-19

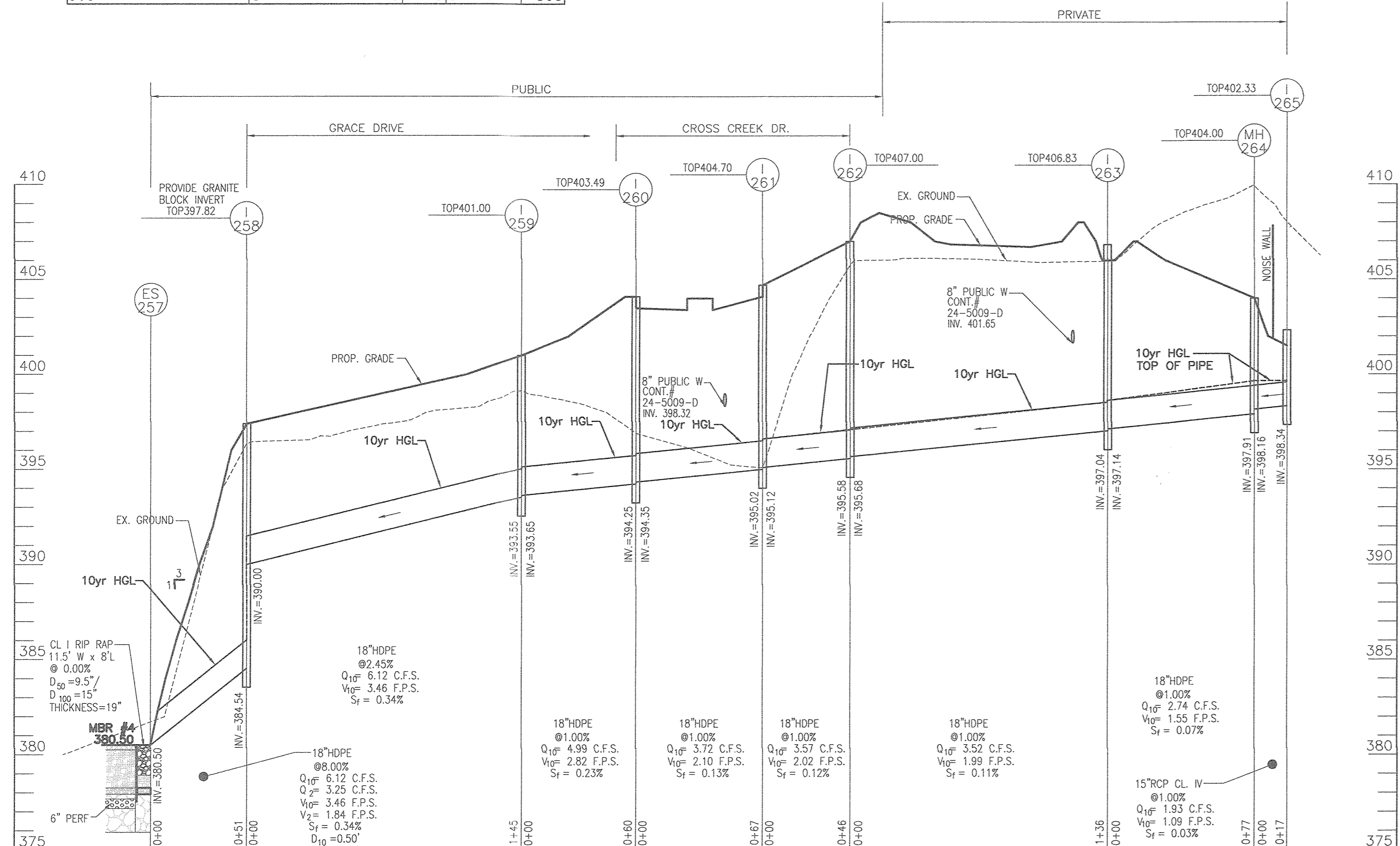


STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20

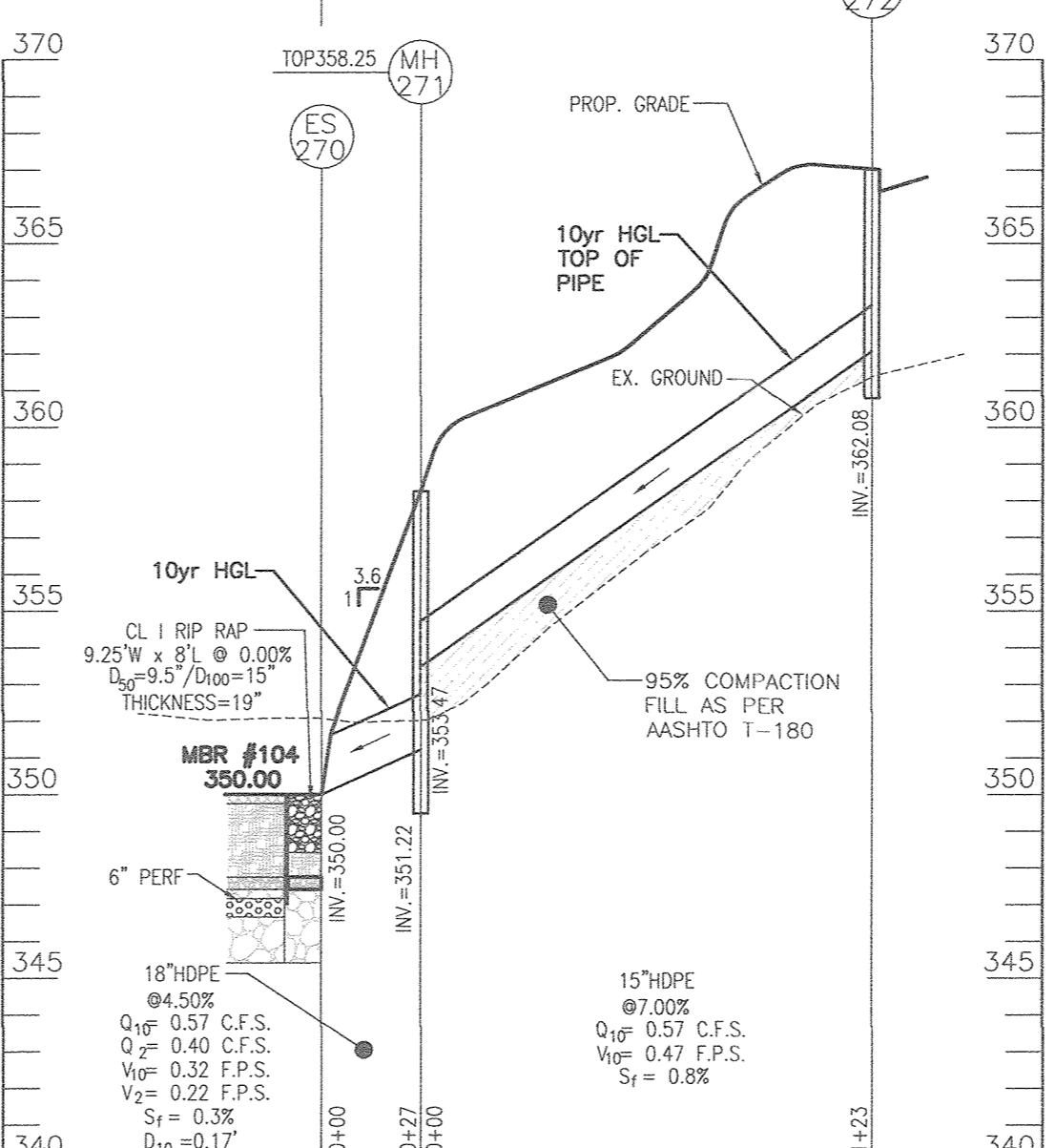
STORM DRAIN PROFILE  
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VERTICAL - 1"=5'  
PLAN VIEW SHEET 20

STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20

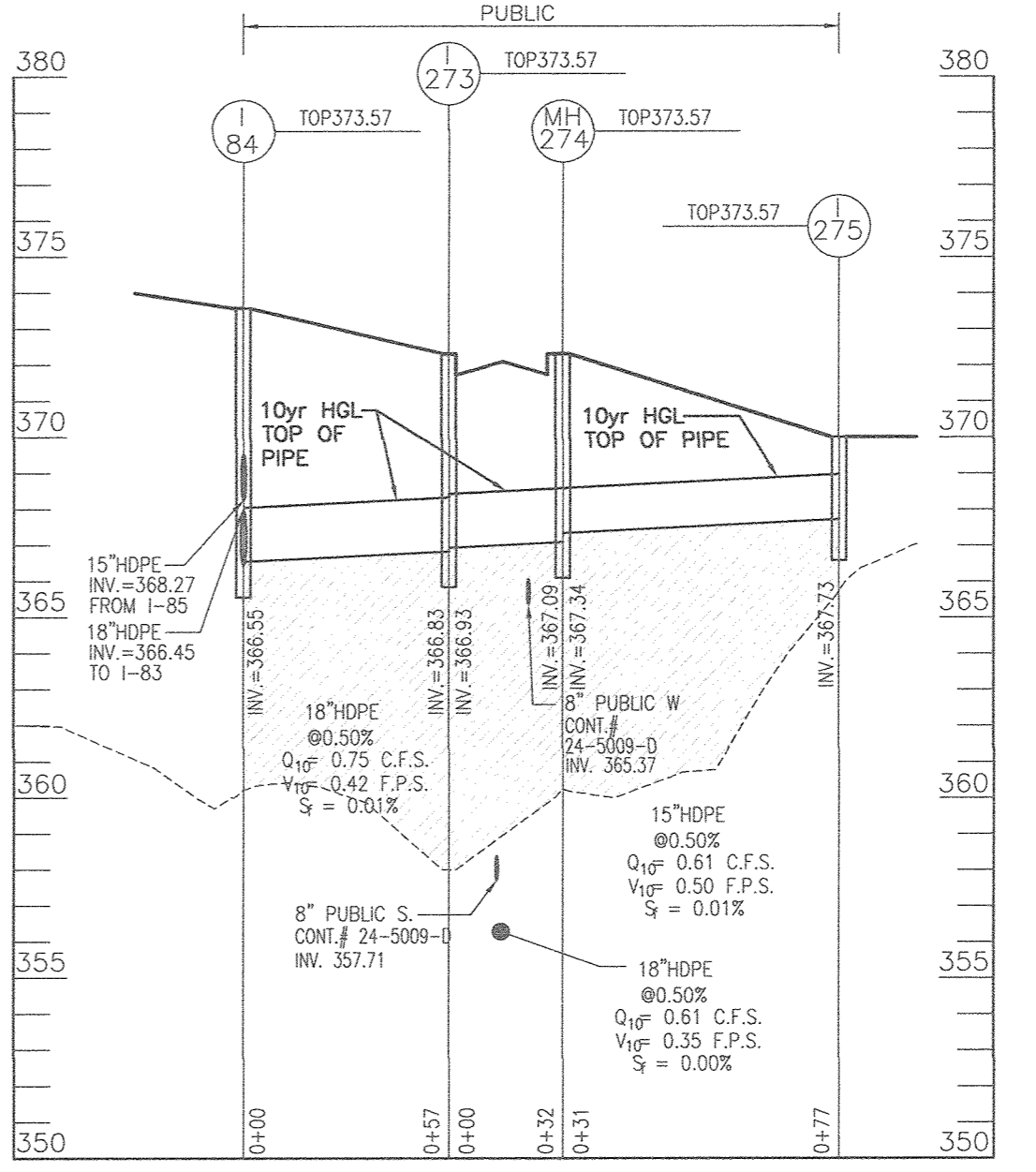
STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



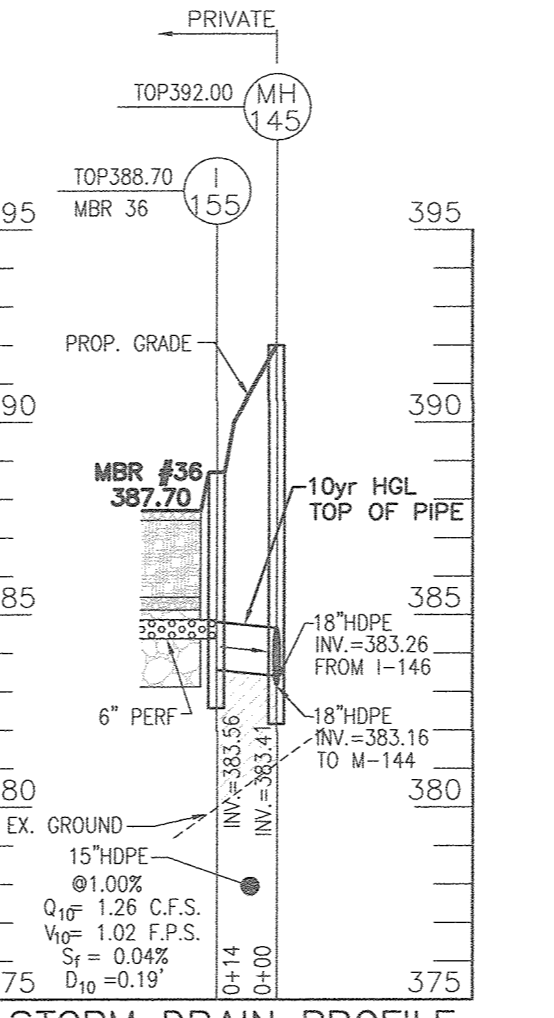
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VERTICAL - 1"=5'  
PLAN VIEW SHEET 20



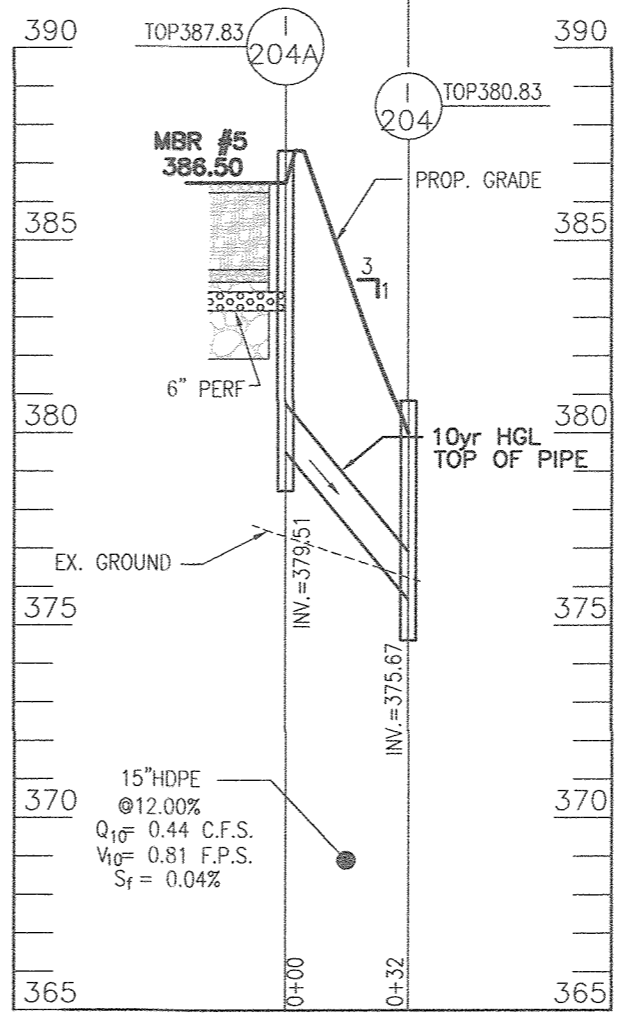
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SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 22



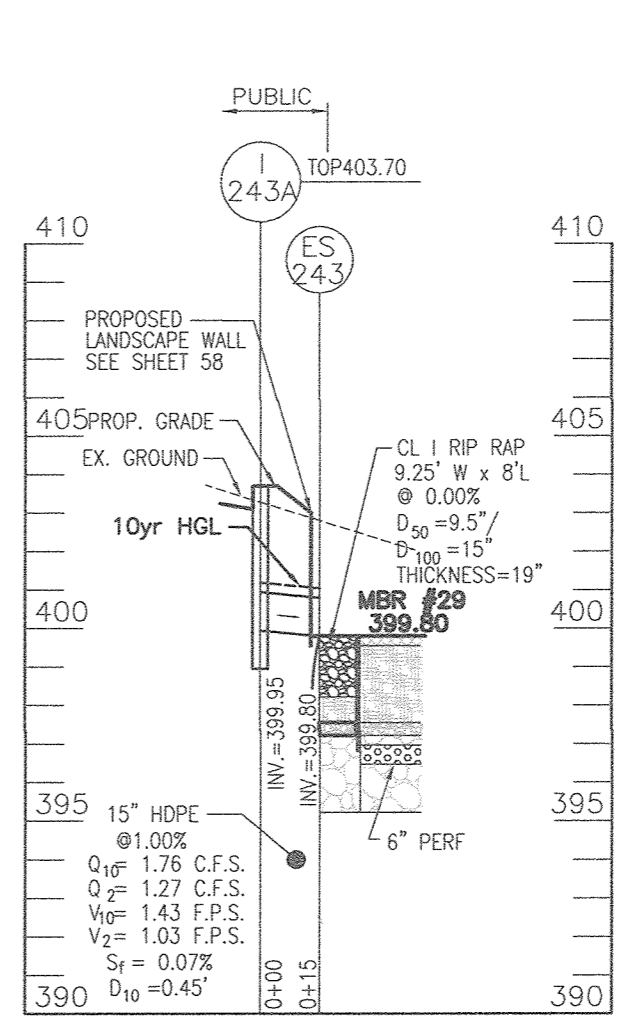
STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 23



STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 21



STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 21



STORM DRAIN PROFILE  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'  
PLAN VIEW SHEET 21

NOTE: PROVIDE SOIL STABILIZED MATTING UP TO L.O.D. BEYOND END OF RIPRAP AT ALL OUTFALL LOCATIONS

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CORP., LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR.  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
STORM DRAIN PROFILES  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35, GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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 09-27-2020

PROFESSIONAL CERTIFICATE

42 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 6-17-19

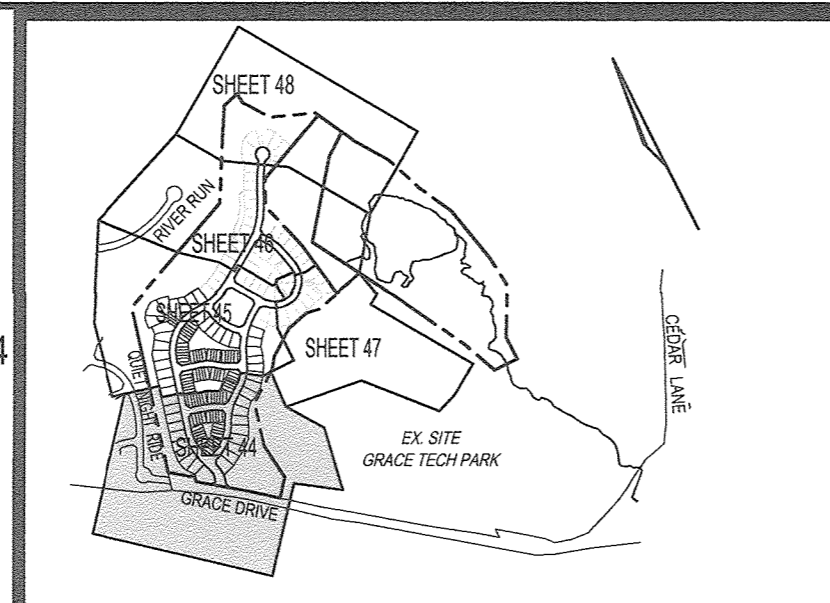
APPROVED: DATE: 6-26-19

STRUCTURE SCHEDULE									
STR #	TYPE	INV. IN	INV. OUT	TOP OR UPPER/LOWER	DETAIL	LOCATION	OWNER/MANT	REMARKS	
16	DBL WR	347.75	351.75	D-4.31	N 55731.54 E 1340370.90	PUBLIC	2.5' INSIDE WIDTH		
19	S	346.97	351.00	D-4.24	N 55718.53 E 1340331.59	PRIVATE			
I-11	D	333.36	341.00	D-4.10	N 55751.34 E 1340325.64	PRIVATE			
I-16	A-10	351.34	355.37	D-4.03	N 55723.31 E 1340233.31	PUBLIC	2.5' INSIDE WIDTH		
123	A-5	358.29	358.04	D-4.02	N 55972.06 E 1340222.07	PUBLIC	2.5' INSIDE WIDTH		
I-24	A-10	350.47	353.24	D-4.03	N 55692.32 E 1339997.95	PUBLIC	3.0' INSIDE WIDTH		
I-29	A-5	360.41	362.10	D-4.02	N 55670.73 E 1339962.46	PUBLIC	3.0' INSIDE WIDTH		
I-29	A-5	360.41	362.22	D-4.02	N 55670.73 E 1339962.46	PUBLIC	3.0' INSIDE WIDTH		
I-29	A-5	360.41	362.22	D-4.02	N 55670.73 E 1339962.46	PUBLIC	3.0' INSIDE WIDTH		
I-30	A-10	362.25	362.00	D-4.03	N 55691.11 E 1340129.29	PUBLIC	3.0' INSIDE WIDTH		
I-31	A-10	362.25	362.00	D-4.03	N 55691.11 E 1340129.29	PUBLIC	3.0' INSIDE WIDTH		
I-34	D	337.85	342.23	D-4.10	N 55691.18 E 1339899.55	PRIVATE			
I-35	D	337.75	342.23	D-4.10	N 55691.18 E 1339899.55	PRIVATE			
I-37	D	345.85	351.50	D-4.10	N 55691.84 E 1339946.08	PRIVATE			
I-43	D	381.62	391.67	D-4.10	N 55645.50 E 1339941.07	PRIVATE			
I-44	D	374.29	374.50	D-4.10	N 55647.45 E 1339941.71	PRIVATE			
I-45	D	365.20	370.50	D-4.10	N 55638.94 E 1339951.50	PRIVATE			
I-48	A-5	369.50/369.35	369.25	D-4.02	N 55616.68 E 1339821.13	PUBLIC	3.0' INSIDE WIDTH		
I-49	A-5	376.86	376.61	D-4.02	N 55638.43 E 1339898.68	PUBLIC	3.0' INSIDE WIDTH		
I-50	A-5	377.19	380.83	D-4.02	N 55655.69 E 1339881.25	PUBLIC	2.5' INSIDE WIDTH		
I-51	A-5	369.82	373.29	D-4.02	N 55663.92 E 1339830.71	PUBLIC	2.5' INSIDE WIDTH		
I-55	A-5	379.63	379.53	D-4.02	N 55647.17 E 1339860.31	PUBLIC	3.0' INSIDE WIDTH		
I-56	A-5	380.42	380.32	D-4.02	N 55628.42 E 1339822.91	PUBLIC	3.0' INSIDE WIDTH		
I-58	A-10	389.23	389.23	D-4.02	N 55654.91 E 1339868.59	PUBLIC	2.5' INSIDE WIDTH		
I-60	A-5	382.73	387.20	D-4.02	N 55647.47 E 1339893.25	PUBLIC	2.5' INSIDE WIDTH		
I-62	5' SHALLOW COG	382.60	385.30	MD 374.66	N 55644.49 E 1339827.83	PUBLIC			
I-66	A-10	377.79	377.69	D-4.03	N 55643.38 E 1339807.61	PUBLIC	3.0' INSIDE WIDTH		
I-67	A-5	378.35	378.10	D-4.02	N 55623.20 E 1339783.89	PUBLIC	2.5' INSIDE WIDTH		
I-68	A-5	380.43	385.26	D-4.02	N 55629.42 E 1339742.63	PUBLIC	2.5' INSIDE WIDTH		
I-70	A-5	381.22	385.74	D-4.02	N 55635.38 E 1339723.10	PUBLIC	2.5' INSIDE WIDTH		
I-72	5' SHALLOW COG	381.00	385.71	MD 374.66	N 55629.71 E 1339713.34	PUBLIC			
I-73	D	384.04	384.04	D-4.10	N 55659.27 E 1340214.37	PRIVATE			
I-79	D	383.96	389.50	D-4.10	N 55654.75 E 1340321.97	PRIVATE			
I-83	YARD	366.13	366.03	D-4.12	N 55624.24 E 1340172.43	PRIVATE			
I-84	A-5	366.55/368.27	366.45	D-4.02	N 55630.13 E 1340145.13	PUBLIC	2.5' INSIDE WIDTH		
I-85	A-5	366.55	373.57	D-4.02	N 55630.83 E 1340114.92	PUBLIC	2.5' INSIDE WIDTH		
I-87	A-10	375.00	370.84	D-4.03	N 55615.11 E 1339910.69	PUBLIC	2.5' INSIDE WIDTH		
I-88	A-5	375.30	380.41	D-4.02	N 55618.04 E 1339913.41	PUBLIC	2.5' INSIDE WIDTH		
I-91	D	366.48	366.38	D-4.10	N 55691.21 E 1339843.25	PRIVATE			
I-92	D	365.00	371.33	D-4.10	N 55644.03 E 1339731.16	PRIVATE			
I-96	D	376.41	378.31	D-4.10	N 55625.83 E 1339699.91	PRIVATE			
I-98	D	374.40	384.33	D-4.10	N 55642.40 E 1339628.69	PRIVATE			
I-99	D	382.96	388.83	D-4.10	N 55626.19 E 1339595.57	PRIVATE			
I-101	A-5	383.25	383.15	D-4.02	N 556138.32 E 1339611.89	PUBLIC	3.0' INSIDE WIDTH		
I-103	A-5	387.58	391.17	D-4.02	N 556120.91 E 1339514.76	PUBLIC	2.5' INSIDE WIDTH		
I-104	A-5	383.28	396.83	D-4.10	N 55603.99 E 1339896.97	PRIVATE			
I-106	A-5	389.76	395.51	D-4.02	N 55625.55 E 1339433.85	PUBLIC	3.0' INSIDE WIDTH		
I-107	A-5	394.47	394.47	D-4.02	N 55624.52 E 1339411.24	PUBLIC	2.5' INSIDE WIDTH		
I-109	D	396.92	375.83	D-4.10	N 55617.75 E 1339414.12	PRIVATE			
I-113	A-10	396.36	400.00	D-4.03	N 55607.93 E 1339346.67	PUBLIC	2.5' INSIDE WIDTH		
I-115	D	375.25	375.15	D-4.10	N 55662.28 E 1339403.67	PUBLIC			
I-117	D	380.32/380.17	380.07	D-4.10	N 55662.64 E 1339216.01	PUBLIC			
I-120	YARD	395.37	399.27	D-4.12	N 55625.90 E 1339100.93	PUBLIC			
I-124	A-10	399.39	399.29	D-4.03	N 55615.69 E 1339298.34	PUBLIC	3.0' INSIDE WIDTH		
I-124	D	398.26	402.83	D-4.10	N 556145.49 E 1339816.24	PRIVATE			
I-126	D	401.45	408.13	D-4.10	N 556196.42 E 1339832.93	PRIVATE			
I-127	D	402.21	409.33	D-4.10	N 556106.21 E 1338771.64	PRIVATE			
I-129	D	398.68	398.23	D-4.10	N 55620.13 E 1339251.55	PRIVATE			
I-132	D	394.85	400.25	D-4.10	N 55605.28 E 1339201.85	PRIVATE			
I-133	D	384.15	390.33	D-4.10	N 55661.81 E 1339830.30	PRIVATE			
I-137	DBL WR	401.70	405.60	D-4.31	N 55648.86 E 1339078.38	PRIVATE			
I-142	A-5	378.23	373.62	D-4.02	N 55635.83 E 1339471.13	PRIVATE			
I-146	YARD	383.95	383.85	D-4.12	N 556109.60 E 1339350.29	PRIVATE			
I-147	YARD	386.25	383.93	D-4.12	N 556163.27 E 1339024.79	PRIVATE			
I-148	YARD	386.75	386.65	D-4.12	N 556155.52 E 1339021.09	PRIVATE			
I-149	YARD	387.19	387.09	D-4.12	N 556173.64 E 1339130.91	PRIVATE			
I-153	YARD	390.76	390.51	D-4.12	N 556094.25 E 1339090.17	PRIVATE			
I-154	YARD	391.73	398.10	D-4.12	N 556032.60 E 1338974.68	PRIVATE			
I-155	YARD	383.56	388.70	D-4.12	N 556003.04 E 1338968.17	PRIVATE			
I-156	YARD	381.45	387.30	D-4.12	N 555995.02 E 1339428.37	PRIVATE			
I-158	YARD	380.68	387.53	D-4.12	N 555986.74 E 1339326.13	PRIVATE			
I-159	YARD	381.09	387.00	D-4.12	N 555986.72 E 1339325.93	PRIVATE			
I-161	YARD	384.72	384.62	D-4.12	N 555928.24 E 1339200.35	PRIVATE			
I-162	YARD	386.93	386.83	D-4.12	N 555869.19 E 1339148.83	PRIVATE			
I-163	YARD	390.88	397.40	D-4.12	N 555820.05 E 1339027.27	PRIVATE			
I-164	YARD	388.29	395.00	D-4.12	N 555832.92 E 1339121.62	PRIVATE			
I-165	D	384.76	370.33	D-4.10	N 555796.89 E 1339004.99	PRIVATE			
I-166	D	366.04	375.83	D-4.10	N 555770.31 E 1339594.15	PRIVATE			
I-171	10' SHALLOW COG	392.09	395.00	MD 374.66	N 555931.35 E 1339191.77	PUBLIC			
I-174	A-5	392.59	392.74	D-4.02	N 555972.99 E 1339099.69	PUBLIC	2.5' INSIDE WIDTH		
I-176	10' SHALLOW COG	385.67	388.60	MD 374.66	N 555875.42 E 1339179.64	PUBLIC			
I-182	A-5	384.37	388.37	D-4.02	N 555833.66 E 1339386.86	PUBLIC	2.5' INSIDE WIDTH		
I-185A	A-5	385.35	389.04	D-4.02	N 555725.14 E 1339326.37	PUBLIC	2.5' INSIDE WIDTH		
I-190	A-10	396.08	399.89	D-4.03	N 555919.24 E 1339876.39	PUBLIC	2.5' INSIDE WIDTH		
I-193	D	372.20	378.33	D-4.10	N 555480.16 E 1339206.46	PRIVATE			
I-194	D	372.47	378.33	D-4.10	N 555479.44 E 1339204.63	PRIVATE			
I-197	A-10	390.27	394.02	D-4.03	N 555379.42 E 1339182.66	PUBLIC	2.5' INSIDE WIDTH		
I-202	A-5	398.37	393.99	D-4.02	N 555902.24 E 1339129.29	PUBLIC	2.5' INSIDE WIDTH		
I-204	D	375.67/373.12	372.62	D-4.03	N 555285.58 E 1339177.38	PRIVATE			
I-204	D	379.51	375.67	D-4.10	N 555275.99 E 1339146.57	PRIVATE			
I-205	D	375.10	375.00	D-4.10	N 555387.22 E 1339213.61	PRIVATE			
I-208	YARD	385.34	385.24	D-4.12	N 555540.83 E 1339301.88	PRIVATE			
I-210	YARD	386.70	386.60	D-4.12	N 555595.37 E 1339890.27	PRIVATE			
I-214	YARD	388.32	389.22	D-4.12	N 555498.82 E 1339845.67	PRIVATE			
I-217A	D	393.37/393.22	392.74	D-4.10	N 555972.99 E 1339099.69	PRIVATE			
I-218A	D	401.48	408.33	D-4.10	N 555822.80 E 1339252.22	PRIVATE			
I-220A	D	395.80	399.13	D-4.10	N 555839.66 E 1338756.15	PRIVATE			
I-221	D	401.51	411.00	D-4.10	N 555746.45 E 1338863.28	PRIVATE			
I-224	YARD	393.85	398.50	D-4.12	N 555801.74 E 1338899.51	PRIVATE			
I-225	YARD	395.41	401.00	D-4.12	N 555880.36 E 1338802.22	PRIVATE			
I-226	YARD	391.34	397.50	D-4.12	N 555877.07 E 1338955.97	PRIVATE			
I-230	YARD	385.97	390.50	D-4.12	N 555990.99 E 1339003.04	PRIVATE			
I-232	A-10	394.24	393.99	D-4.03	N 555410.83 E 1339000.04	PUBLIC	2.5' INSIDE WIDTH		
I-233	A-10	394.57	398.12	D-4.03	N 555434.15 E 1339027.62	PUBLIC	2.5' INSIDE WIDTH		
I-239	A-5	400.08	403.50	D-4.02	N 555696.98 E 1338858.81	PUBLIC	2.5' INSIDE WIDTH		
I-243	A-5	398.22	401.87	D-4.02	N 555768.42 E 1338835.62	PUBLIC	2.5' INSIDE WIDTH		
I-243A	A-5	399.95	403.70	D-4.02	N 555123.08 E 1338964.20	PUBLIC	2.5' INSIDE WIDTH		
I-245	D	376.48/376.32	372.22	D-4.10	N 555128.88 E 1339086.37	PUBLIC			
I-250	A-10	393.47	401.36	D-4.03	N 555133.35 E 1339819.89	PUBLIC	2.		

**NOTE:**  
 IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:  
 1) THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.  
 2) THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.  
 3) A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

**NOTE**  
 FOREST CONSERVATION AREAS 3 & 4 SHALL BE PLANTED WITH 1" CALIPER TREES PER CONDITION 4, WP-16-078.

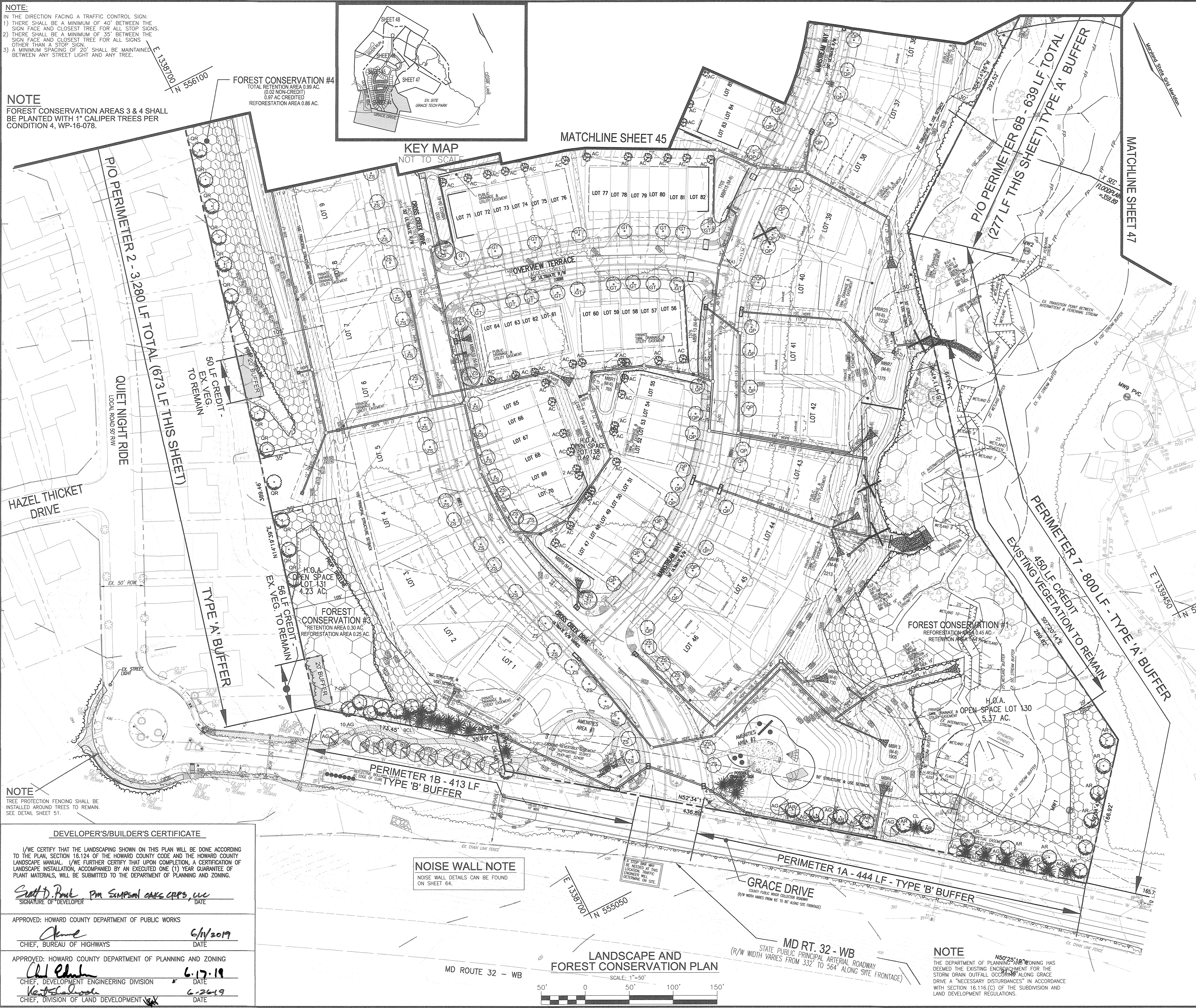
**FOREST CONSERVATION #4**  
 TOTAL RETENTION AREA 0.99 AC.  
 (0.92 NON-CREDIT)  
 0.97 AC CREDITED  
 REFORESTATION AREA 0.88 AC.



**KEY MAP**  
 NOT TO SCALE

**MATCHLINE SHEET 45**

**MATCHLINE SHEET 47**



**LEGEND:**

---	EXISTING CONTOUR	---	EXISTING TREE LINE (FIELD LOCATED)
---	PROPOSED CONTOUR	---	EXISTING STERAM
---	EXISTING FLOOD PLAN	---	EXISTING STERAM BUFFER
---	EXISTING FIRE HYDRANT	---	EXISTING WETLAND
---	EXISTING WATER LINE	---	EXISTING WETLAND BUFFER
---	EXISTING STORM DRAIN	---	EXISTING FENCE
---		---	PROPERTY LINE
---		---	RIGHT-OF-WAY LINE
---		---	SOILS BOUNDARY
---		---	PROPOSED CURB
---		---	PROP. PERIMETER TREES
---		---	PROP. STREET TREES
---		---	PUBLIC STORMWATER MANAGEMENT DRAINAGE & UTILITY EASEMENT
---		---	PRIVATE DRAINAGE & UTILITY EASEMENT
---		---	PRIVATE STORMWATER MANAGEMENT DRAINAGE & UTILITY EASEMENT
---		---	FENCE DRAINAGE & UTILITY EASEMENT

**DPZ'S POLICIES GOVERNING THE PLACEMENT OF LANDSCAPING AND STREET TREES IN PROXIMITY TO BGE'S POWER LINES OR TRANSMISSION RIGHT-OF-WAY ARE BASED ON BGE'S PUBLISHED "PLANTING ZONE CONCEPT" WHICH SPECIFIES THE MAXIMUM ALLOWABLE SIZE OF PLANT MATERIALS FOR THREE DEFINED ZONES. AS THE DISTANCE FROM BGE EQUIPMENT INCREASES, SO DOES THE SIZE OF THE ALLOWABLE PLANT MATERIALS. THESE THREE ZONES ARE DEFINED AS FOLLOWS:**

ZONE	DISTANCE FROM THE BGE POWER LINE OR TRANSMISSION RIGHT-OF-WAY	MAXIMUM HEIGHT OF VEGETATION
GREEN	UP TO 20 FEET	25 FEET
YELLOW	BETWEEN 20 FEET AND 45 FEET	40 FEET
RED	BETWEEN 45 FEET AND 100 FEET	40 FEET

- B & E NOTES:**
- BGE RESERVES THE RIGHT TO TRIM, TOP OR CUT DOWN ANY TREE IN PROXIMITY TO THE LINE THAT IN THE OPINION OF BGE SHALL BE DEEMED A HAZARD TO THE SAFE AND RELIABLE DELIVERY OF ELECTRICITY.
  - THE DEPARTMENT OF PLANNING AND ZONING MAY AUTHORIZE THE TRIMMING OR REMOVAL OF TREES OR VEGETATION IMMEDIATELY ADJACENT TO THE BGE R/W OR EASEMENT, IF BGE DETERMINES THE TREES ARE COMPROMISING THE SAFETY OR A TRANSMISSION LINE LOCATED WITHIN THEIR UTILITY, R/W OR EASEMENT. IF BGE INTENDS TO TRIM OR REMOVE TREES WITHIN A FOREST CONSERVATION EASEMENT, A LETTER SPECIFYING THE LOCATION AND SCOPE OF WORK NEEDS TO BE SENT TO DPZ AT LEAST 30 DAYS IN ADVANCE OF UNDERTAKING THE WORK. DPZ UNDERSTANDS CONSTITUTIONAL ENERGY'S NEED TO PROTECT ITS TRANSMISSION LINES AND WILL NOT UNREASONABLY WITHHOLD PERMISSION.
  - CALL MISS UTILITY TO MARK UP THE LOCATION OF EXISTING GAS LINE BEFORE PLANTING STREET TREES ALONG GRACE DRIVE & PLANT STREET TREES 10' AWAY FROM EXISTING GASLINE AS REQUIRED.

- NOTES:**
- REFER TO SHEET 49 FOR LANDSCAPE SCHEDULE 'A', STREET TREE REQUIREMENTS AND LANDSCAPING NOTES AND DETAILS.
  - REFER TO SHEET 52 FOR FOREST CONSERVATION COMPUTATIONS, PLANTING NOTES AND DETAILS.

**NOTE:**  
 A TYPICAL DETAIL OF THE GRAVITY WALLS LOCATED NEAR TOWN HOMES AND MICRO-BIORETENTION FACILITIES IS LOCATED ON SHEET 58.

**OWNER / DEVELOPER**  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER**  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

**FINAL ROAD CONSTRUCTION PLAN**  
**LANDSCAPE AND**  
**FOREST CONSERVATION PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TC  
 DRAWN BY: VE+TC  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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 09-27-2020

44 SHEET OF 74

**NOTE**  
 TREE PROTECTION FENCING SHALL BE INSTALLED AROUND TREES TO REMAIN. SEE DETAIL SHEET 51.

**DEVELOPER'S/BUILDER'S CERTIFICATE**

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 18.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

*Scott D. Paul* Pm SIMPSON OAKS CRP3, LLC  
 SIGNATURE OF DEVELOPER DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

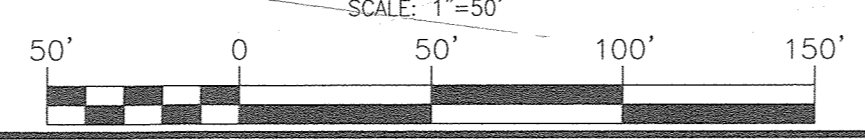
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Chad* 6.17.19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*Kevin* 6.26.19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

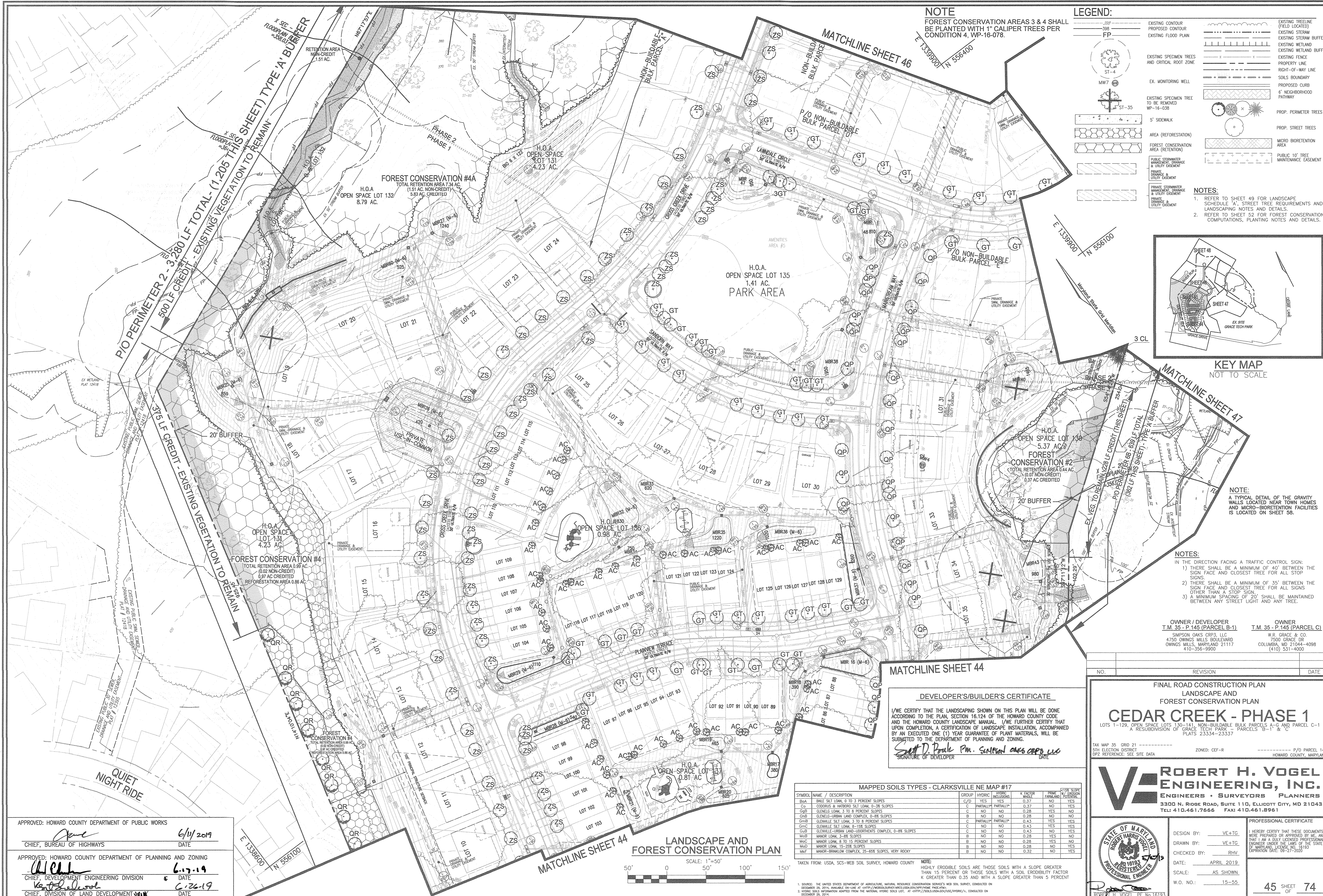
**NOISE WALL NOTE**  
 NOISE WALL DETAILS CAN BE FOUND ON SHEET 64.

**GRACE DRIVE**  
 COUNTY PUBLIC HIGH COLLECTION ROADWAY  
 (R/W WIDTH VARIES FROM 65' TO 87' ALONG SITE FRONTAGE)

**MD RT. 32 - WB**  
 STATE PUBLIC PRINCIPAL ARTERIAL ROADWAY  
 (R/W WIDTH VARIES FROM 332' TO 564' ALONG SITE FRONTAGE)

**NOTE**  
 THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OUTFALL OCCURRING ALONG GRACE DRIVE A "NECESSARY DISTURBANCE" IN ACCORDANCE WITH SECTION 18.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.





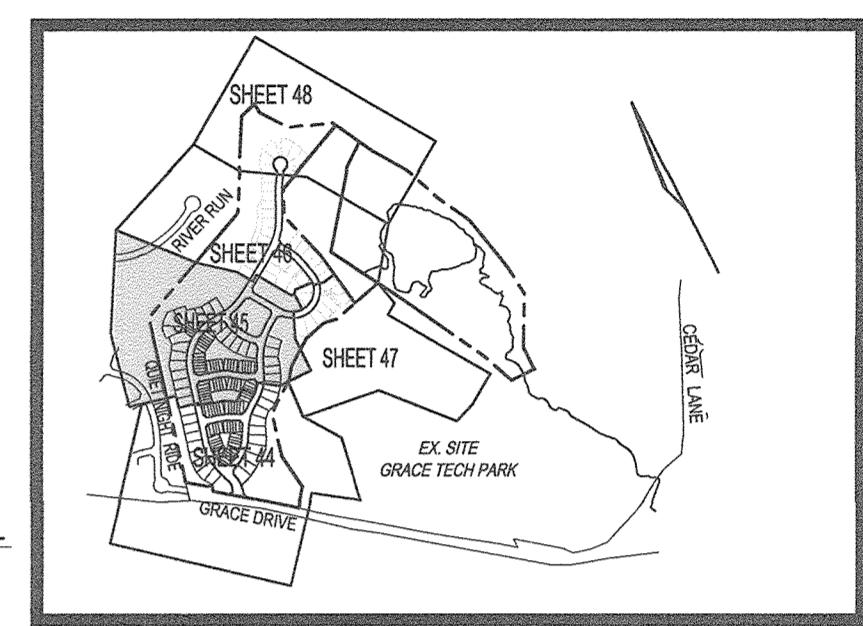
**NOTE**  
 FOREST CONSERVATION AREAS 3 & 4 SHALL BE PLANTED WITH 1" CALIPER TREES PER CONDITION 4, WP-16-078.

**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING FLOOD PLAN
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL
- EXISTING SPECIMEN TREE TO BE REMOVED
- 5' SIDEWALK
- AREA (REFORESTATION)
- FOREST CONSERVATION AREA (RETENTION)
- PUBLIC STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- EXISTING TREELINE (FIELD LOCATED)
- EXISTING STREAM
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- PROPOSED CURB
- 6' NEIGHBORHOOD PATHWAY
- PROP. PERIMETER TREES
- PROP. STREET TREES
- MICRO BIORETENTION AREA
- PUBLIC 10' TREE MAINTENANCE EASEMENT

**NOTES:**

- REFER TO SHEET 49 FOR LANDSCAPE SCHEDULE 'A', STREET TREE REQUIREMENTS AND LANDSCAPING NOTES AND DETAILS.
- REFER TO SHEET 52 FOR FOREST CONSERVATION COMPUTATIONS, PLANTING NOTES AND DETAILS.



**KEY MAP**  
 NOT TO SCALE

**NOTE:**  
 A TYPICAL DETAIL OF THE GRAVITY WALLS LOCATED NEAR TOWN HOMES AND MICRO-BIORETENTION FACILITIES IS LOCATED ON SHEET 58.

**NOTES:**

IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:

- THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
- THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
- A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

**OWNER / DEVELOPER**  
 T.M. 35 - P. 145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER**  
 T.M. 35 - P. 145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

**MATCHLINE SHEET 44**

**DEVELOPER'S/BUILDER'S CERTIFICATE**

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

*Sgt. D. Paul Pm. SIMPSON OAKS CRP3, LLC*  
 SIGNATURE OF DEVELOPER DATE

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	PERM	K FACTOR	PROB	FORM	CRUSE	W / PROSP
TSa	TABLE SILE LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	NO	0.37	NO	YES	NO	NO
Co	COOROUS & HARBORD SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	NO	YES	NO
GaB	GLENGLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO	NO
GaB	GLENGLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
GmB	GLENGLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES	YES
GmC	GLENGLE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	YES	YES
GmB	GLENGLE-URBAN LAND-COOROUS/TS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO	YES	NO
MaB	MAJOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MaC	MAJOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MsD	MAJOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	NO	YES	NO
MxT	MAJOR-SMALLER COMPLEX, 25-45% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	NO	YES	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

**NOTE:**  
 HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL EROSION FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 6.17.19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT  
 6.26.19  
 DATE

**LANDSCAPE AND FOREST CONSERVATION PLAN**

SCALE: 1"=50'

50' 0 50' 100' 150'

**FINAL ROAD CONSTRUCTION PLAN**  
 LANDSCAPE AND FOREST CONSERVATION PLAN  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRD 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8951

DESIGN BY: VE+TC  
 DRAWN BY: VE+TC  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

45 SHEET 74  
 OF

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	HYDRO	K FACTOR	PERCENT	PERCENT	PERCENT	PERCENT
BsA	BALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	NO	0.37	NO	YES	NO	NO
Co	ODORUS & HARBOR SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	NO	NO	NO
GpB	GLENNLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO	NO
GpB	GLENNLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
GmB	GLENNLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES	YES
GmC	GLENNLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.43	NO	NO	NO	NO
GmC	GLENNLE-URBAN LAND COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO	NO	NO
MdC	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MdC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MdD	MANOR LOAM, 15-20% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
MdF	MANOR-BRINKLOW COMPLEX, 25-60% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	NO	NO	NO

NOTE: 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.

TAKEN FROM: USDA, SCS-WE8 SOIL SURVEY, HOWARD COUNTY

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON DECEMBER 29, 2014. AVAILABLE ON-LINE AT: <http://websoilsurvey.nrcs.usda.gov/nw/home.page.htm>

2. HYDRO SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRO SOILS LOC. AT: <http://soils.usda.gov/hydro/hydro/>, CONSULTED ON DECEMBER 29, 2014.

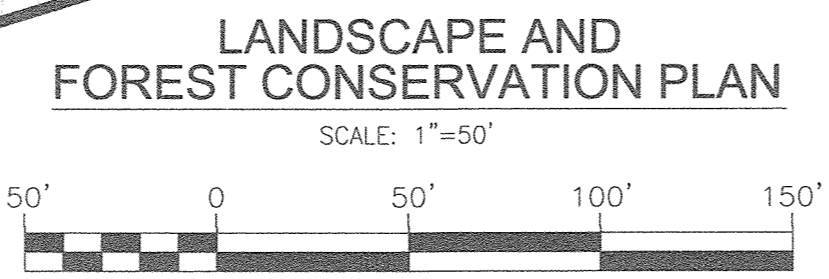
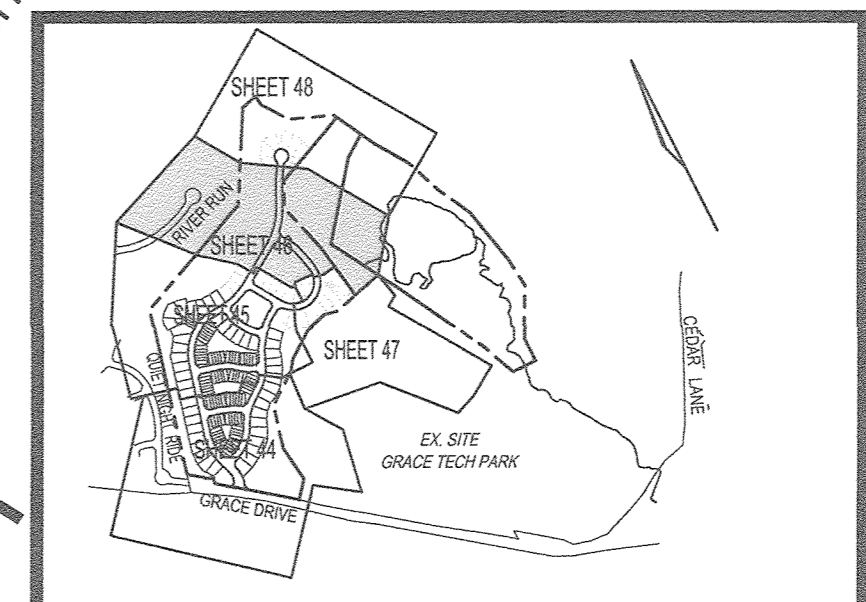
**NOTES:**

- REFER TO SHEET 49 FOR LANDSCAPE SCHEDULE 'A', STREET TREE REQUIREMENTS AND LANDSCAPING NOTES AND DETAILS.
- REFER TO SHEET 52 FOR FOREST CONSERVATION COMPUTATIONS, PLANTING NOTES AND DETAILS.
- REFER TO SHEET 50 FOR SPECIMEN TREE DATA.



**LEGEND: MATCHLINE SHEET 45**

--- 395 ---	EXISTING CONTOUR	---	EXISTING TREELINE (FIELD LOCATED)
--- 398 ---	PROPOSED CONTOUR	---	EXISTING STERAM
--- FP ---	EXISTING FLOOD PLAIN	---	EXISTING STERAM BUFFER
--- 397 ---	EXISTING FIRE HYDRANT	---	EXISTING WETLAND
---	EXISTING WATER LINE	---	EXISTING WETLAND BUFFER
---	EXISTING STORM DRAIN	---	EXISTING FENCE
---	EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE	---	PROPERTY LINE
---	EX. MONITORING WELL	---	RIGHT-OF-WAY LINE
---	EXISTING SPECIMEN TREE TO BE REMOVED (W.P. 16-108)	---	SOILS BOUNDARY
---	5' SIDEWALK	---	PROPOSED CURB
---	AREA (REFORESTATION)	---	MICRO BIORETENTION AREA
---	FOREST CONSERVATION AREA (RETENTION)	---	PUBLIC 10' TREE MAINTENANCE EASEMENT
---		---	SWM PERIMETER TREES
---		---	PERIMETER TREES
---		---	STREET TREES



**NOTES:**

- IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN: 1) THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS. 2) THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN. 3) A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-13-19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

**DEVELOPER'S/BUILDER'S CERTIFICATE**

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION ACCOMPANIED BY AN EXECUTED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

Signed: *S. D. Paul* Pm Simpson Oaks CRP3, LLC  
 DATE: 4/24/19

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

**FINAL ROAD CONSTRUCTION PLAN**  
**LANDSCAPE AND FOREST CONSERVATION PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS 'B-1' & 'C'  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DP2 REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

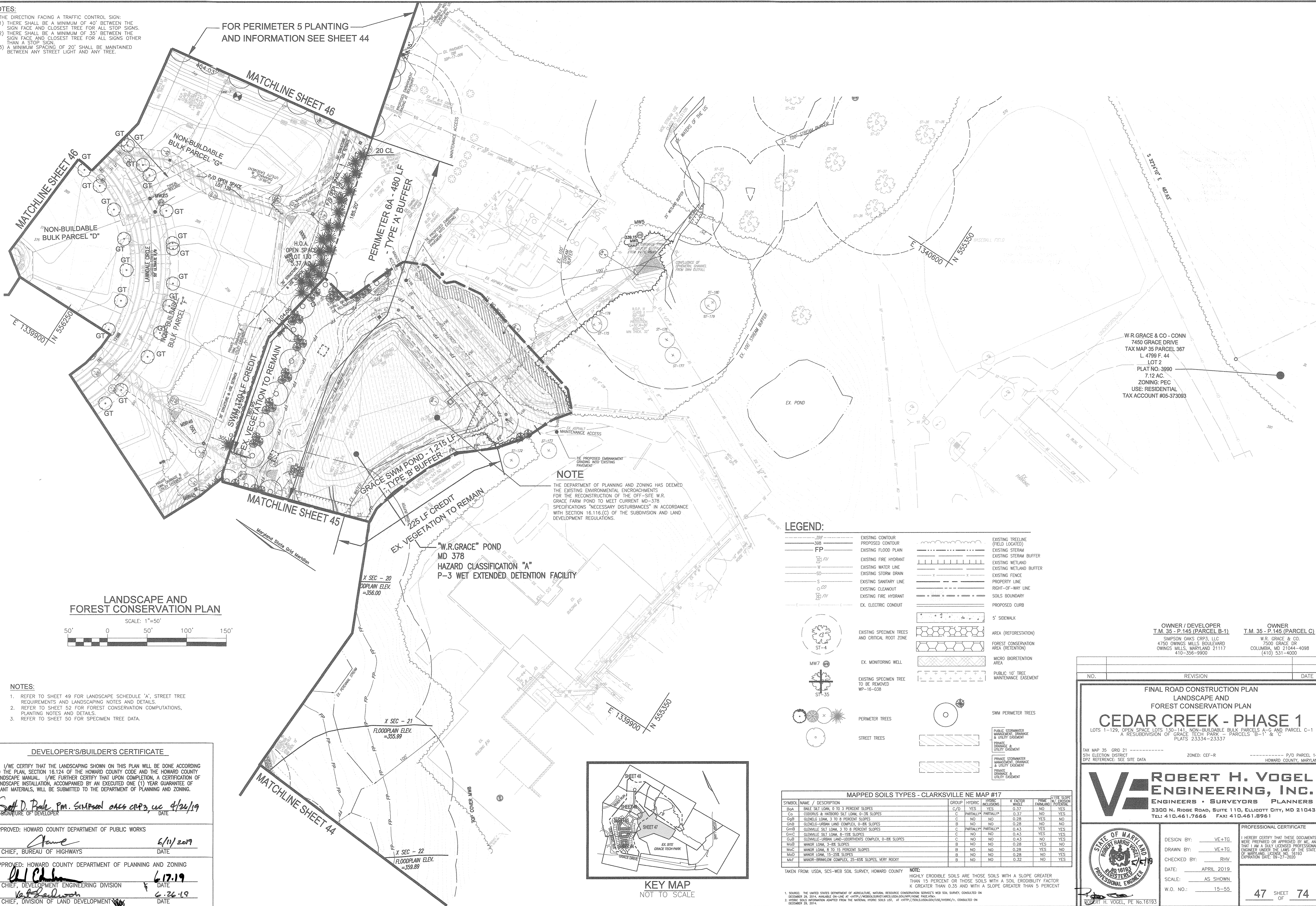
DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

46 SHEET OF 74

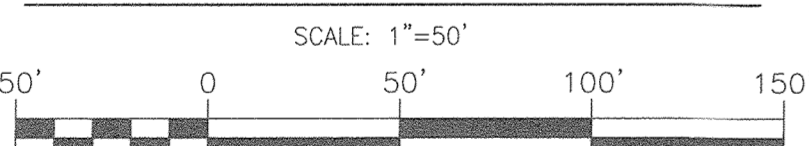
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 2) THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.  
 3) A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

FOR PERIMETER 5 PLANTING AND INFORMATION SEE SHEET 44



**NOTE**  
 THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENVIRONMENTAL ENCROACHMENTS FOR THE RECONSTRUCTION OF THE OFF-SITE W.R. GRACE FARM POND TO MEET CURRENT MD-378 SPECIFICATIONS "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

**LANDSCAPE AND FOREST CONSERVATION PLAN**



- NOTES:**  
 1. REFER TO SHEET 49 FOR LANDSCAPE SCHEDULE 'A', STREET TREE REQUIREMENTS AND LANDSCAPING NOTES AND DETAILS.  
 2. REFER TO SHEET 52 FOR FOREST CONSERVATION COMPUTATIONS, PLANTING NOTES AND DETAILS.  
 3. REFER TO SHEET 50 FOR SPECIMEN TREE DATA.

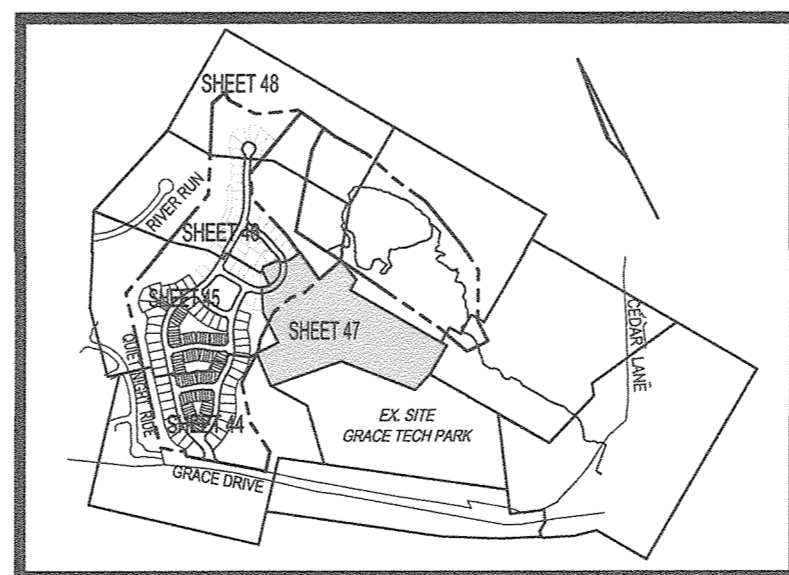
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*Scott D. Park* P.M. SIMPSON OAKS CRP3, LLC 4/24/19  
 SIGNATURE OF DEVELOPER DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James* 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*W. Chm* 6/17/19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*W. Chm* 6/26/19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE



**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING FLOOD PLAIN
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- EXISTING STORM DRAIN
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EX. ELECTRIC CONDUIT
- EXISTING TREELINE (FIELD LOCATED)
- EXISTING STERAM
- EXISTING STERAM BUFFER
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- PROPOSED CURB
- 5' SIDEWALK
- AREA (REFORESTATION)
- FOREST CONSERVATION AREA (RETENTION)
- MICRO BIORESTORATION AREA
- PUBLIC 10' TREE MAINTENANCE EASEMENT
- SWM PERIMETER TREES
- PERIMETER TREES
- STREET TREES
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EX. MONITORING WELL
- EXISTING SPECIMEN TREE TO BE REMOVED
- PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT
- PRIVATE STORMWATER MANAGEMENT, DRAINAGE & UTILITY EASEMENT

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	HYDRIC INCLUSIONS	K FACTOR	PERCENT	PERCENT	PERCENT	PERCENT
BsA	BULK SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES	NO	NO
Co	CLAYEY SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES	NO	NO
GsB	GLENLEIG LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO	NO	NO
GsB	GLENLEIG-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO	NO	NO
GsB	GLENLEIG SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES	YES	YES
GsC	GLENLEIG SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	YES	YES
GsC	GLENLEIG-URBAN LAND-UDORRTHS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES	NO	NO
MsB	MAJOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MsC	MAJOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO
MsD	MAJOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES	NO	NO
MsE	MAJOR-SHRIKLOW COMPLEX, 25-55% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES	NO	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 NOTE: 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  
 1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON DECEMBER 28, 2014. AVAILABLE ON-LINE AT: <http://websoilsurvey.nrcs.usda.gov/wf/home.pl?lang=eng>  
 2. HYDRIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST, AT: <http://soils.usda.gov/soils/hydric/>, CONSULTED ON DECEMBER 28, 2014.

W.R. GRACE & CO - CONN  
 7450 GRACE DRIVE  
 TAX MAP 35 PARCEL 367  
 L. 4789 F. 44  
 LOT 2  
 PLAT NO. 3990  
 7.42 AC.  
 ZONING: PEC  
 USE: RESIDENTIAL  
 TAX ACCOUNT #05-373093

OWNER / DEVELOPER  
**T.M. 35 - P.145 (PARCEL B-1)**  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
**T.M. 35 - P.145 (PARCEL C)**  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**LANDSCAPE AND FOREST CONSERVATION PLAN**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-6 AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS 'B-1' & 'C'  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 6TH ELECTION DISTRICT  
 ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLIOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**  
 DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

47 SHEET OF 74





**LANDSCAPING NOTES**

- AT THE TIME OF PLANT INSTALLATION, ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPE PLAN SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENT IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL. IN ADDITION, NO SUBSTITUTIONS OR RELIGATIONS 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 TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS. ALL OTHER REQUIRED LANDSCAPING SHALL BE PERMANENTLY MAINTAINED IN GOOD CONDITION, AND WHEN NECESSARY, REPAIRED OR REPLACED.
- SHOULD ANY TREE DESIGNATED FOR PRESERVATION FOR WHICH LANDSCAPING CREDITS ARE REQUESTED PRIOR TO RELEASE OF BONDS, THE OWNER WILL BE REQUIRED TO REPLACE THE TREE WITH THE EQUIVALENT SPECIES OR WITH A TREE WHICH WILL OBTAIN THE SAME HEIGHT, SPREAD, AND GROWTH CHARACTERISTICS. THE REPLACEMENT TREE MUST BE A MINIMUM OF 3 INCHES IN CALIPER AND INSTALLED AS REQUIRED IN THE HOWARD COUNTY LANDSCAPE MANUAL.
- PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THE FINAL PLAN.
- SURETY FOR THE PROPOSED LANDSCAPING SHALL BE BASED ON THE NUMBER OF PLANTINGS REQUIRED.
- THE REMOVAL OF TREES 30' OR GREATER DBH IS PROHIBITED WITHOUT COUNTY APPROVAL.
- THE LANDSCAPING ASSOCIATED WITH THE TRAIL SYSTEM WITHIN PARCEL 412 WILL BE ADDRESSED WITH THE SDP FOR THAT PARCEL.

**LANDSCAPE SCHEDULE NOTES:**

- ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AAN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH HRD PLANTING SPECIFICATIONS.
- 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 PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

**NOTES:**

- IN THE DIRECTION FACING A TRAFFIC CONTROL SIGN:
  - THERE SHALL BE A MINIMUM OF 40' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL STOP SIGNS.
  - THERE SHALL BE A MINIMUM OF 35' BETWEEN THE SIGN FACE AND CLOSEST TREE FOR ALL SIGNS OTHER THAN A STOP SIGN.
  - A MINIMUM SPACING OF 20' SHALL BE MAINTAINED BETWEEN ANY STREET LIGHT AND ANY TREE.

CATEGORY	ADJACENT TO ROADWAYS AND PERIMETER PROPERTIES							TOTAL
	1A	1B	2	3	4	5	6A	
PERIMETER FRONTAGE DESIGNATION	B	B	A	A	B	A	B	A
LANDSCAPE TYPE	B	A	A	A	B	A	B	A
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	444	413	3,280	939	896	678	490	800
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	YES 2,100	YES 504	YES 896	NO YES 170	YES 228	YES 450
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET DESCRIBE BELOW IF NEEDED)	NO	NO	NO	NO	NO	NO	NO	NO
NUMBER OF PLANTS REQUIRED	444	413	1,180	435	185	411	180	350
SHADE TREES	1,500	9	1,500	2	1,500	3	1,500	60
EVERGREEN TREES	1,400	11	1,400	10	1,400	10	1,400	21
SHRUBS	-	-	-	-	-	-	-	-
NUMBER OF PLANTS PROVIDED	9	8	20	7	0	0	6	50
SHADE TREES	11	10	-	-	-	-	6	14
EVERGREEN TREES	-	-	-	-	-	-	-	-
OTHER TREES (2:1 SUBSTITUTION)	-	-	-	-	-	-	-	-
SHRUBS (10:1 SUBSTITUTION)	-	-	-	-	-	-	-	-
EX. SPECIMEN TREES TO REMAIN	-	-	-	-	-	-	-	-
DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

- (1) PLANTINGS PROVIDED NEAR LOTS 1 - 14
- (2) 678 TOTAL PROPERTY BOUNDARY PERIMETER 678 LF TO BE PLANTED AS PART OF THE STORMWATER MANAGEMENT AREA PERIMETER CALCULATIONS TOTAL SWM PERIMETER IS 1920 LF. SEE SCHEDULE D.
- (3) 480 TOTAL PROPERTY BOUNDARY PERIMETER 480 LF TO BE PLANTED AS PART OF THE STORMWATER MANAGEMENT AREA PERIMETER CALCULATIONS TOTAL SWM PERIMETER IS 1215 LF. TOTAL PERIMETER PLANTING REQUIREMENT IS REDUCED TO 185 LF (480-295=185)

THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS AND THE LANDSCAPE MANUAL. A FINANCIAL SURETY FOR THE PERIMETER LANDSCAPING IN THE AMOUNT OF \$21,150 FOR THE REQUIRED 80 SHADE TREES (\$18,000) AND 21 EVERGREENS (21) \$3,150 SHALL BE POSTED AS PART OF THE FINAL PLAN DEVELOPER'S AGREEMENT.

KEY	QUAN	BOTANICAL NAME	SIZE	REM.
SHADE = 489				
QR 28	1	QUERCUS RUBRA NORTHERN RED OAK	2 1/2"-3" CAL.	B & B
AR 22	1	ACER RUBRUM 'OCTOBER GLORY' OCTOBER GLORY RED MAPLE	2 1/2"-3" CAL.	B & B
EVERGREEN = 39				
CL 41	1	CUPRESSOCYPRIS LEYLANDI LEYLAND CYPRESS	8"-10" HL.	B & B

NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.

**STREET TREE CALCULATIONS**

STREET NAME	LINEAR FEET	NO. REQUIRED	NO. PROVIDED
CROSS CREEK DRIVE-2,812 LF	5624/40	141	141
MAINSTREAM WAY-1260 LF	2520/40	63	63
LAWNDALE CIRCLE-1173 LF	2346/40	59	59
OVERVIEW TERRACE-330 LF	660/40	17	17
PLAINVIEW TERRACE-513 LF	1026/40	26	26
SANBORN WAY-352 LF	704/40	18	18
GRACE DRIVE - 876 LF	876/40	22	22
TOTAL		346	346

PUBLIC STREET TREES ARE PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH SECTION 16.124(e)(1) OF THE SUBDIVISION REGULATIONS AND THE LANDSCAPE MANUAL.

**STREET TREE NOTES:**

- WHEN THE DISTANCE BETWEEN THE CURB AND SIDEWALK IS 6 FEET OR GREATER, TREES SHALL BE LOCATED WITHIN THE RIGHT OF WAY AND SHALL BE CENTERED BETWEEN THE CURB AND THE SIDEWALK.
- WHEN THE DISTANCE BETWEEN THE CURB AND THE SIDEWALK IS LESS THAN 6 FEET, AND WHERE TREES ARE PLANTED CLOSER THAN 3 FEET TO THE SIDEWALK, A BIOLOGIC ROOT INHIBITOR BARRIER OR PHYSICAL CONTAINER BARRIER SHALL BE REQUIRED.
- WHEN THE DISTANCE BETWEEN THE CURB AND THE SIDEWALK IS LESS THAN 6 FEET, TREES MAY BE PLANTED 3 FEET FROM THE SIDEWALK IN THE DIRECTION AWAY FROM THE ROAD, A 10 FOOT WIDE TREE MAINTENANCE EASEMENT SHALL BE REQUIRED IF THE RIGHT OF WAY IS LIMITED.
- TREES SHALL BE PLACED A MINIMUM OF 30 FEET FROM ALL SIGNS AND INTERSECTIONS WHEN PLANTED BETWEEN SIDEWALK AND CURB, AND BE LOCATED WITH CONSIDERATION OF UNDERGROUND UTILITIES AND STRUCTURES. STREET TREES MAY NOT BE PLANTED WITHIN 5 FEET OF A DRAIN INLET STRUCTURE, 5 FEET OF AN OPEN SPACE PLANTING STRIP, OR 10 FEET OF A DRIVEWAY.

KEY	QUAN	SYMBOL	BOTANICAL NAME	SIZE	REM.
ZS 141	1	○	ZELKOVA SERBATA 'VILLAGE GREEN' VILLAGE GREEN JAPANESE ZELKOVA	2 1/2"-3" CAL.	B & B
OP 63	1	○	QUERCUS ROBUR 'FASTIGIATA' COLUMBIAN ENGLISH OAK	2 1/2"-3" CAL.	B & B
GT 120	1	○	GLEDITSIA TRIACANTHOS 'NEMIS' 'IMPERIAL' IMPERIAL THORNLESS HONEY LOCUST	2 1/2"-3" CAL.	B & B
AG 22	1	○	ACER RUBRUM 'AUTUMN FLAME' AUTUMN FLAME RED MAPLE	2 1/2"-3" CAL.	B & B

PUBLIC STREET TREES ARE PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH SECTION 16.124(e)(1) OF THE SUBDIVISION REGULATIONS AND THE LANDSCAPE MANUAL. FINANCIAL SURETY (\$ 103,800) SHALL BE POSTED AS PART OF THIS FINAL PLAN DEVELOPER'S AGREEMENT FOR THE REQUIRED 346 STREET TREES. NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.

**SCHEDULE D - TYPE 'B' BUFFER STORMWATER MANAGEMENT AREA LANDSCAPING**

LINEAR FEET OF PERIMETER	192 LF(SYM# 2)	1215 LF(GRACE)	730 LF(SYM# 3)	TOTAL
CREDIT FOR EXISTING VEGETATION (NO, YES AND LINEAR FEET)	NO	YES 395	NO	
CREDIT FOR OTHER LANDSCAPING (NO, YES AND 30)	NO	NO	NO	
NUMBER OF TREES REQUIRED	1:50 24	800	1:50 15	55
SHADE TREES	1:40 30	1:40 21	1:40 18	69
EVERGREEN TREES	-	-	-	170 (1)
SHRUBS	-	-	-	170 (1)

(1) DUE TO LIMITED SPACE & UTILITY EASEMENTS, SHRUBS PROVIDED. H.O.A. SHALL MAINTAIN AND REPLACE AS REQUIRED: 10 SHRUBS PER 1 SHADE TREE. 10 SHRUBS PER 1 EVERGREEN = 15'-2" X 10' X 10' SHRUBS. STORMWATER MANAGEMENT PLANTINGS HAVE BEEN PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH THE LANDSCAPE MANUAL.

**STORMWATER MANAGEMENT PLANTING LANDSCAPE SCHEDULE**

KEY	QUAN	SYMB	BOTANICAL NAME	SIZE	REM.
SHADE					
LS 38	1	○	LIQUIDAMBAR STRYCHALIA SWETGUM (SEEDLESS CULTIVAR)	2 1/2"-3" CAL.	B & B
EVERGREEN					
PS 73	1	○	PINUS STROBUS EASTERN WHITE PINE	8"-10" HL.	B & B
SHRUB					
NB 170	1	○	MYRICA PENNSYLVANICA NORTHERN BAYBERRY	2'-2 1/2' HT.	B & B

NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.

**SCHEDULE 'C' RESIDENTIAL DEVELOPMENT INTERNAL LANDSCAPING**

NUMBER OF DWELLING UNITS	83 - SFA
NUMBER OF TREES REQUIRED (1:DU SFA)	83
NUMBER OF TREES PROVIDED SHADE TREES OTHER TREES (2:1 SUBSTITUTION)	83

SFA INTERNAL PLANTINGS HAVE BEEN PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH THE LANDSCAPE MANUAL. A FINANCIAL SURETY FOR THE LANDSCAPING IN THE AMOUNT OF \$24,900 FOR THE REQUIRED 83 SHADE TREES (\$24,900) SHALL BE POSTED AS PART OF THE FINAL PLAN DEVELOPER'S AGREEMENT.

**RESIDENTIAL DEVELOPMENT INTERNAL LANDSCAPING PLANTING SCHEDULE**

KEY	QUAN	BOTANICAL NAME	SIZE	REM.
AC 83	1	ACER RUBRUM 'ARMSTRONG' ARMSTRONG COLUMBIAN RED MAPLE	2 1/2"-3" CAL.	B & B

SEE SYMBOL

NOTE: WITH PERMISSION FROM HOWARD COUNTY, PLANTINGS SPECIFIED HEREON MAY BE SUBSTITUTED WITH APPROVED SPECIES LISTED IN APPENDIX B & C OF THE HOWARD COUNTY LANDSCAPE MANUAL.

**SCHEDULE B PARKING LOT INTERNAL LANDSCAPING**

NUMBER OF PROPOSED PARKING SPACES	59
NUMBER OF TREES REQUIRED (1/10 SPACES)	6
NUMBER OF TREES PROVIDED	7
SHADE TREES	-
OTHER TREES (2:1 SUBSTITUTION)	-

**PARKING LOT INTERNAL LANDSCAPING - PLANTING SCHEDULE**

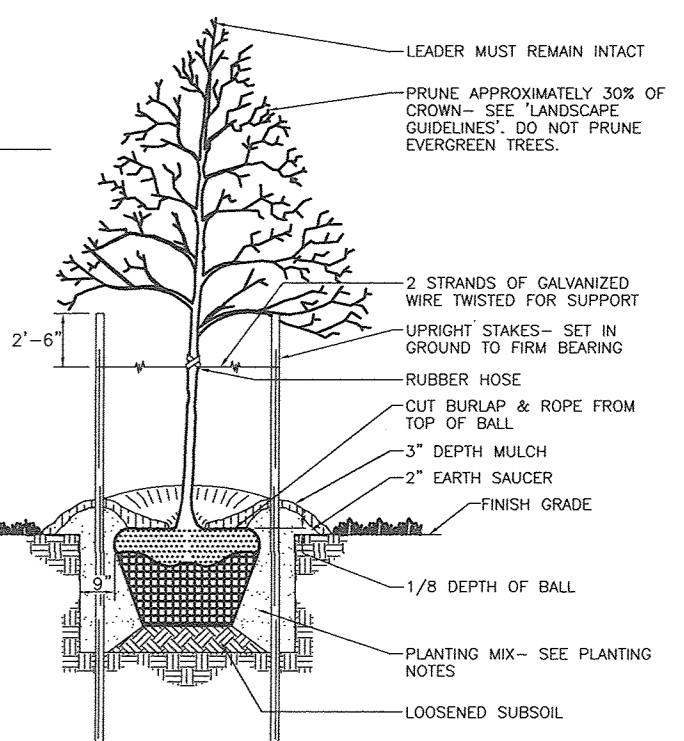
KEY	QUAN	BOTANICAL NAME	SIZE	REM.
ZS 7	1	ZELKOVA SERBATA 'VILLAGE GREEN' VILLAGE GREEN JAPANESE ZELKOVA	2 1/2"-3" CAL.	B & B

SEE SYMBOL

PARKING LOT INTERNAL PLANTINGS HAVE BEEN PROVIDED FOR THIS PROJECT IN ACCORDANCE WITH THE LANDSCAPE MANUAL. A FINANCIAL SURETY FOR THE LANDSCAPING IN THE AMOUNT OF \$2,100 FOR THE REQUIRED 7 SHADE TREES SHALL BE POSTED AS PART OF THE FINAL PLAN DEVELOPER'S AGREEMENT.

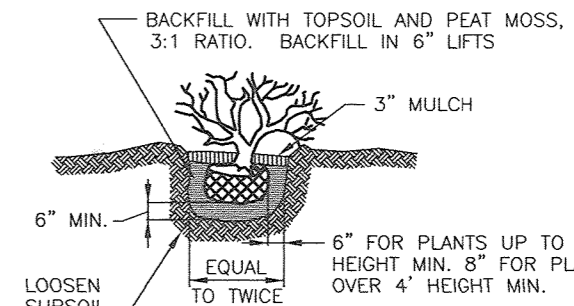
**NOTES**

- SEE "LANDSCAPE SPECIFICATION FOR SUPPORTING TREES LARGER THAN 1-1/2" CAL." FOR MATERIAL, PRODUCT, AND PROCEDURE SPECIFICATIONS.
- SEE "LANDSCAPE GUIDELINES" FOR SUPPORTING TREES LARGER THAN 1-1/2" CAL.
- PLACE UPRIGHT STAKES PARALLEL TO WALKS & BUILDINGS.
- KEEP MULCH 1" FROM TRUNK.
- SEE ARCHITECTURAL PLANS FOR ADDITIONAL PLANTINGS WHICH EXCEED HOWARD COUNTY MINIMUM REQUIREMENTS.
- TREES ARE NOT TO BE PLANTED OVER PRIVATE SEWER CASING.



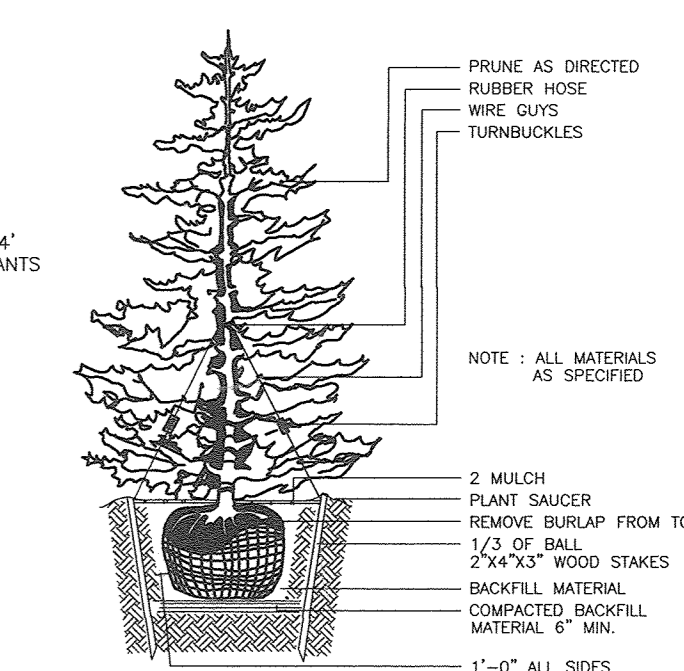
**TREE PLANTING AND STAKING**

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



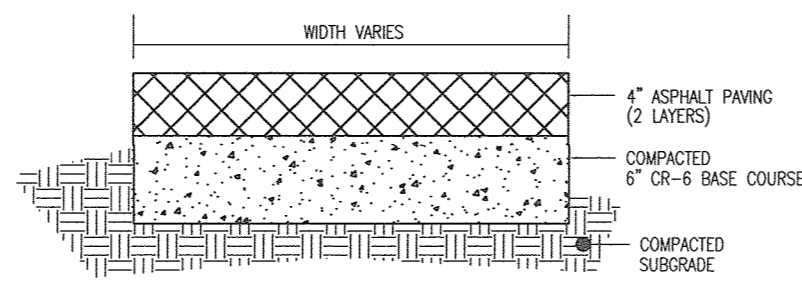
**SHRUB PLANTING DETAIL**

NOT TO SCALE



**TYPICAL EVERGREEN TREE PLANTING DETAIL**

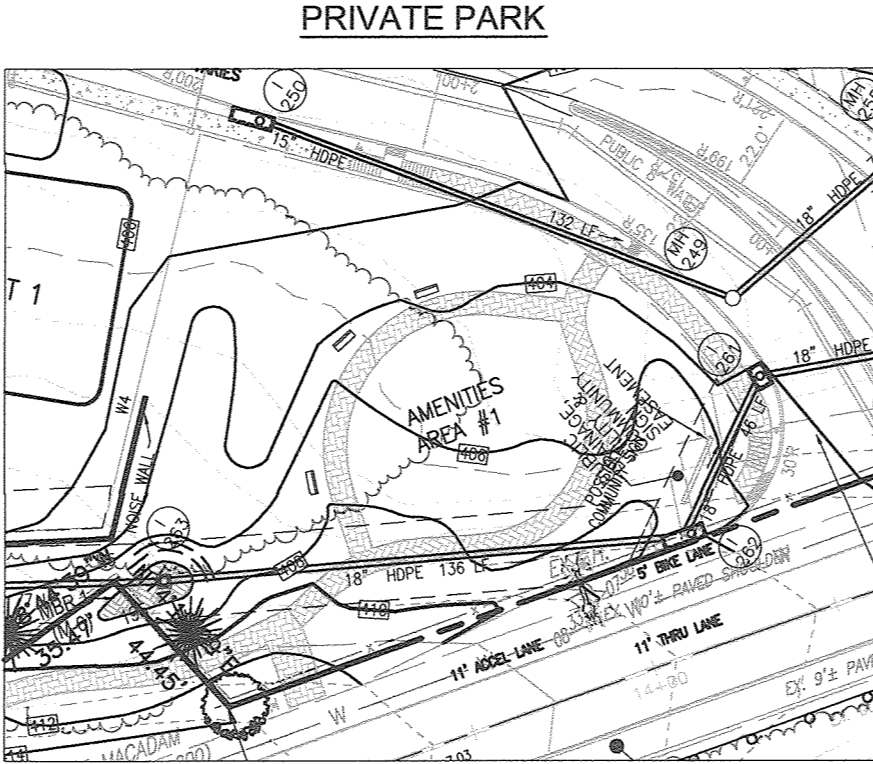
NOT TO SCALE



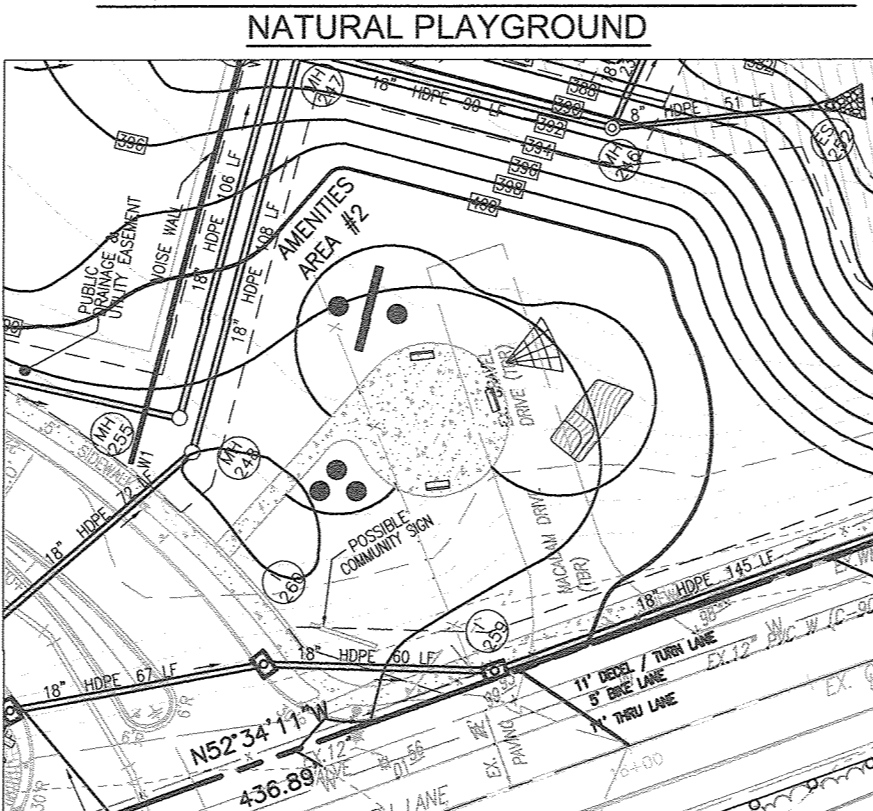
**5', 6' OR 8' ASPHALT PATHWAY DETAIL**

NOT TO SCALE

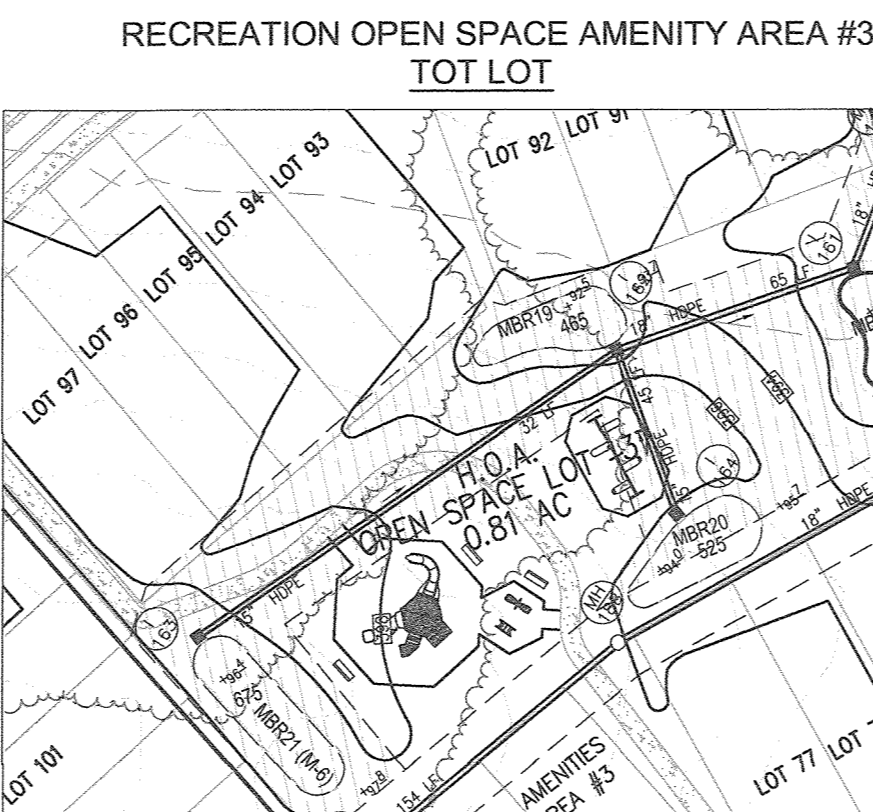
**RECREATION OPEN SPACE AMENITY AREA #1 PRIVATE PARK**



**RECREATION OPEN SPACE AMENITY AREA #2 NATURAL PLAYGROUND**



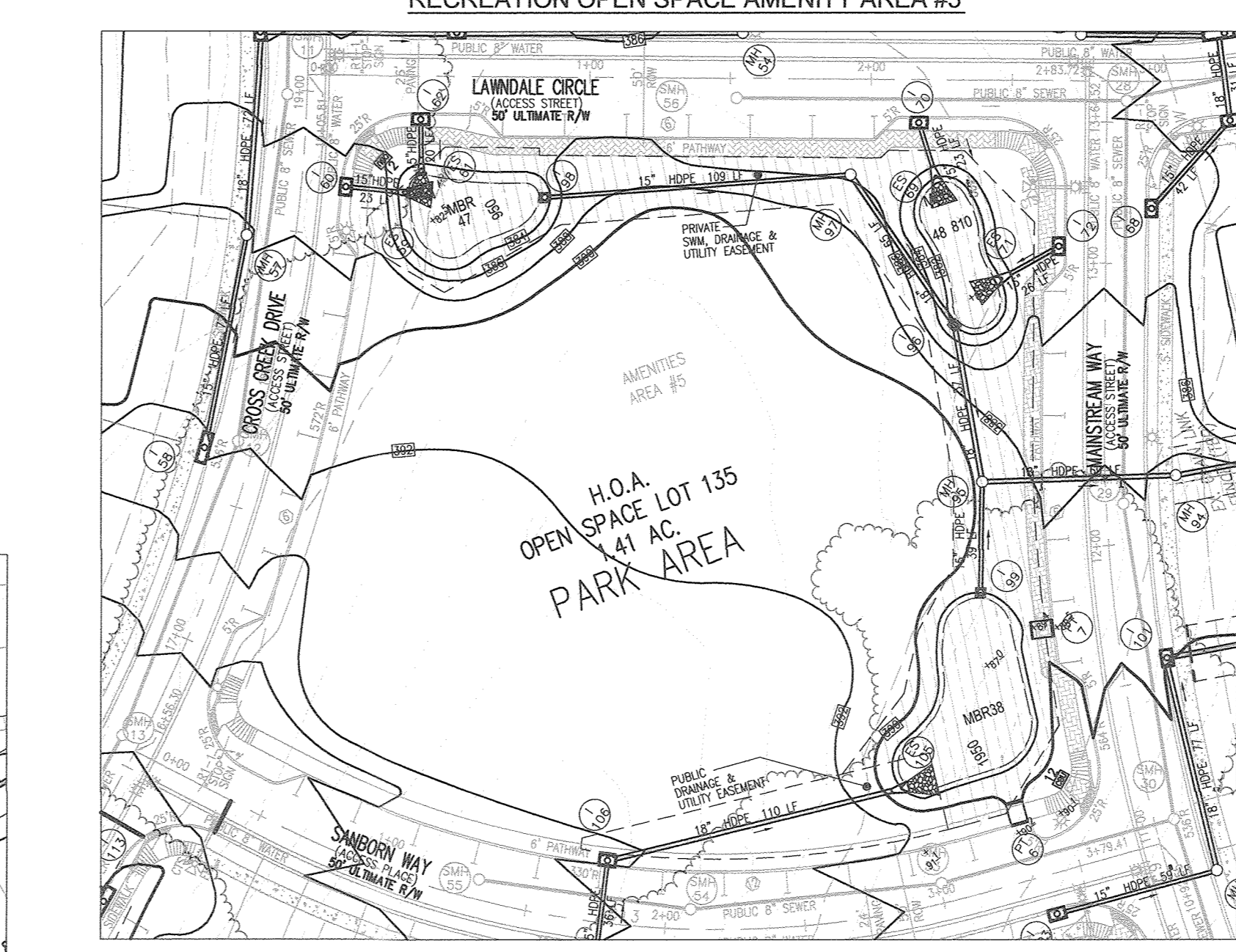
**RECREATION OPEN SPACE AMENITY AREA #3 TOT LOT**



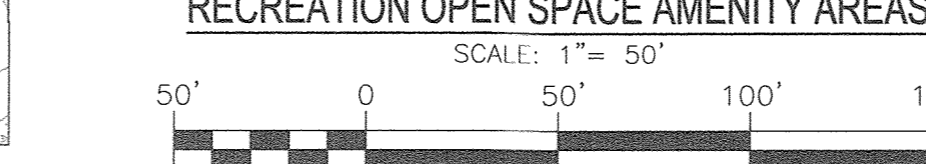
**RECREATION OPEN SPACE AMENITY AREA #4**



**RECREATION OPEN SPACE AMENITY AREA #5**



**RECREATION OPEN SPACE AMENITY AREAS**



**RECREATION OPEN SPACE TABULATION:**

SPECIMEN TREE LIST FOR PARCEL 145, PARCEL 'B-1'

NUMBER	SPECIES	NAME	DBH	CONDITION	COMMENTS
ST-1	LIRIODENDRON TULIPIFERA	TULIPTREE	43"	FAIR	MODERATE LIMB LOSS / CHOKED WITH VINES
ST-2	LIRIODENDRON TULIPIFERA	TULIPTREE	45"	GOOD	
ST-3	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	FAIR	MODERATE LIMB LOSS
ST-4	LIRIODENDRON TULIPIFERA	TULIPTREE	47"	GOOD	
ST-5	LIRIODENDRON TULIPIFERA	TULIPTREE	34"	GOOD	
ST-6	LIRIODENDRON TULIPIFERA	TULIPTREE	45"	GOOD	
ST-7	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-8	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-9	LIRIODENDRON TULIPIFERA	TULIPTREE	39"	GOOD	
ST-10	LIRIODENDRON TULIPIFERA	TULIPTREE	41"	GOOD	
ST-11	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED
ST-12	LIRIODENDRON TULIPIFERA	TULIPTREE	50"	GOOD	
ST-13	LIRIODENDRON TULIPIFERA	TULIPTREE	51"	GOOD	
ST-14	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-15	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-16	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-17	LIRIODENDRON TULIPIFERA	TULIPTREE	39"	GOOD	TRUNK SPLITTING / BARK ROTTING OFF --- TO BE REMOVED
ST-18	LIRIODENDRON TULIPIFERA	TULIPTREE	38"	POOR	TRUNK CAVITY
ST-19	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	FAIR	ONE-SIDED GROWTH / LEANING
ST-20	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-21	LIRIODENDRON TULIPIFERA	TULIPTREE	43"	POOR	TRUNK CAVITY
ST-22	LIRIODENDRON TULIPIFERA	TULIPTREE	43"	POOR	TRUNK SPLITTING / BARK ROTTING OFF --- TO BE REMOVED
ST-23	QUERCUS PALMSTRIS	PRN OAK	32"	POOR	LOST ONE OF TWO TRUNKS
ST-24	PRUNUS SEROTINA	BLACK CHERRY	34"	FAIR	MODERATE LIMB LOSS --- TO BE REMOVED
ST-25	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-26	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-27	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-28	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-29	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-30	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-31	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-32	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-33	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-34	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	TO BE REMOVED
ST-35	LIRIODENDRON TULIPIFERA	TULIPTREE	45"	GOOD	TO BE REMOVED
ST-36	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	POOR	ONE-SIDED GROWTH / ONE TRUNK DEAD
ST-37	QUERCUS RUBRA	RED OAK	30"	GOOD	
ST-38	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	POOR	ONE-SIDED GROWTH / TRUNK CAVITY
ST-39	LIRIODENDRON TULIPIFERA	TULIPTREE	34"	GOOD	
ST-40	QUERCUS ALBA	WHITE OAK	34"	POOR	ONE-SIDED GROWTH / ONE TRUNK DEAD
ST-41	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-42	QUERCUS ALBA	WHITE OAK	41"	GOOD	
ST-43	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-44	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-45	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-46	LIRIODENDRON TULIPIFERA	TULIPTREE	34"	GOOD	
ST-47	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	FAIR	MODERATE LIMB LOSS
ST-48	ACER RUBRUM	RED MAPLE	32"	FAIR	MODERATE LIMB LOSS
ST-49	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-50	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	POOR	TRUNK CAVITY
ST-51	LIRIODENDRON TULIPIFERA	TULIPTREE	73"	GOOD	
ST-52	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-53	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-54	LIRIODENDRON TULIPIFERA	TULIPTREE	41"	GOOD	
ST-55	QUERCUS RUBRA	RED OAK	31"	FAIR	MODERATE LIMB LOSS
ST-56	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-57	QUERCUS RUBRA	RED OAK	30"	GOOD	
ST-58	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-59	LIRIODENDRON TULIPIFERA	TULIPTREE	43"	GOOD	
ST-60	LIRIODENDRON TULIPIFERA	TULIPTREE	34"	GOOD	
ST-61	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-62	QUERCUS ALBA	WHITE OAK	41"	FAIR	LEANING
ST-63	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-64	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-65	LIRIODENDRON TULIPIFERA	TULIPTREE	42"	GOOD	
ST-66	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-67	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-68	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-69	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-70	LIRIODENDRON TULIPIFERA	TULIPTREE	37"	GOOD	
ST-71	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	FAIR	ONE-SIDED GROWTH
ST-72	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-73	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-74	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	POOR	TRUNK CAVITY
ST-75	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-76	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-77	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-78	LIRIODENDRON TULIPIFERA	TULIPTREE	38"	GOOD	
ST-79	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-80	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-81	LIRIODENDRON TULIPIFERA	TULIPTREE	39"	FAIR	LEANING / LIMB LOSS
ST-82	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-83	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-84	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	POOR	OOZING TRUNK WOUND

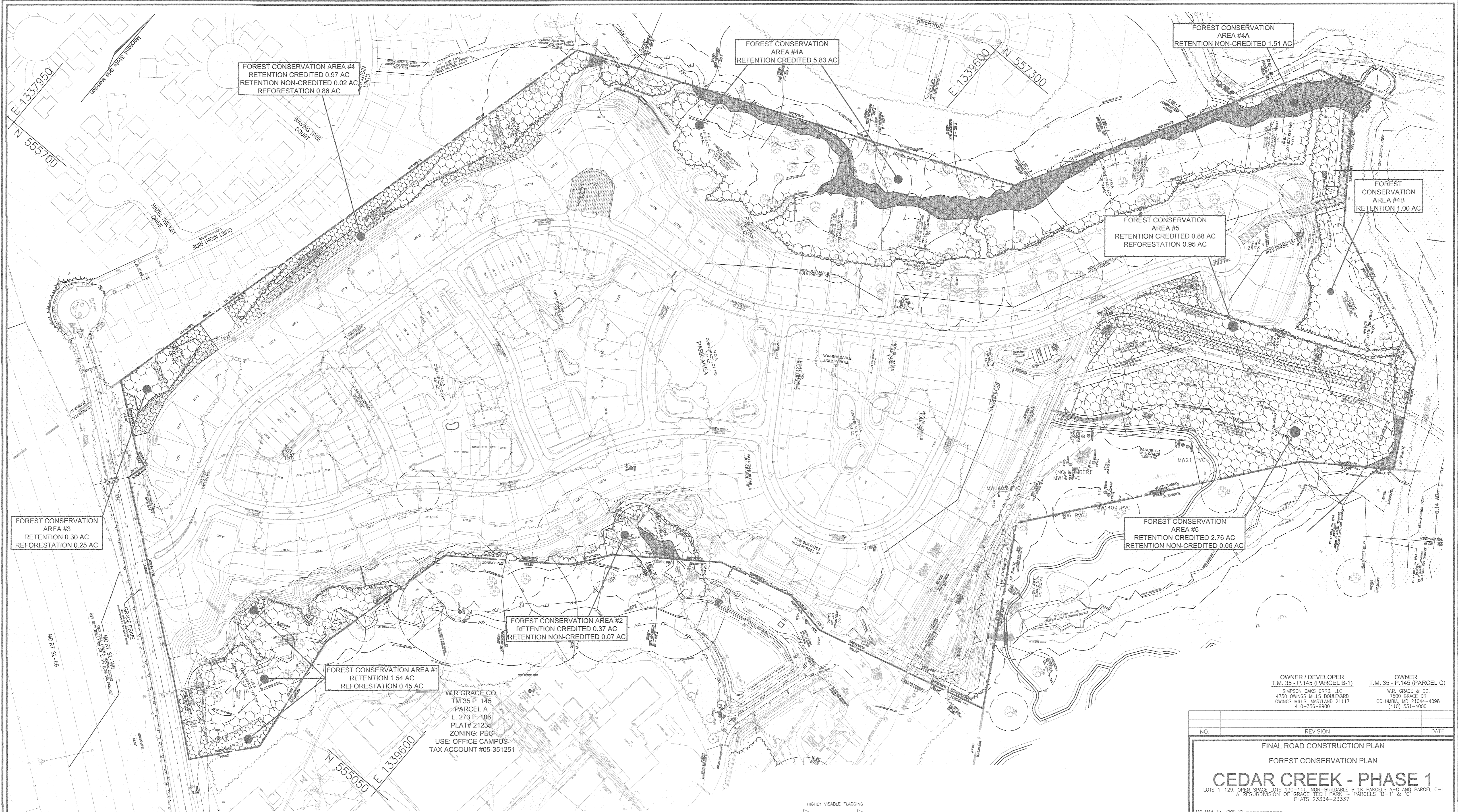
NUMBER	SPECIES	NAME	DBH	CONDITION	COMMENTS
ST-85	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED
ST-86	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	FAIR	TRUNK CAVITY (SMALL) --- TO BE REMOVED
ST-87	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	
ST-88	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-89	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	FAIR	OLD TRUNK DAMAGE (HEALING)
ST-90	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-91	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-92	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED
ST-93	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	TO BE REMOVED
ST-94	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	POOR	TREE IS HALF DEAD --- TO BE REMOVED
ST-95	LIRIODENDRON TULIPIFERA	TULIPTREE	40"	GOOD	TO BE REMOVED
ST-96	LIRIODENDRON TULIPIFERA	TULIPTREE	42"	GOOD	TO BE REMOVED
ST-97	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	TO BE REMOVED
ST-98	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-99	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED
ST-100	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-101	LIRIODENDRON TULIPIFERA	TULIPTREE	38"	FAIR	
ST-102	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-103	LIRIODENDRON TULIPIFERA	TULIPTREE	39"	GOOD	
ST-104	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-105	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-106	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-107	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	FAIR	LEANING
ST-108	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-109	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-110	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-111	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-112	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-113	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-114	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED
ST-115	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	TO BE REMOVED
ST-116	LIRIODENDRON TULIPIFERA	TULIPTREE	37"	GOOD	TO BE REMOVED
ST-117	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-118	QUERCUS RUBRA	RED OAK	38"	FAIR	TREE IS MOSTLY DEAD --- TO BE REMOVED
ST-120	QUERCUS RUBRA	RED OAK	37"	FAIR	MODERATE LIMB LOSS --- TO BE REMOVED
ST-121	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-122	QUERCUS RUBRA	RED OAK	31"	POOR	TRUNK CAVITY
ST-123	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-124	QUERCUS RUBRA	RED OAK	39"	GOOD	TO BE REMOVED
ST-125	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	FAIR	TRUNK CAVITY (SMALL) --- TO BE REMOVED
ST-126	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	POOR	TRUNK SPLITTING --- TO BE REMOVED
ST-127	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-128	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-129	QUERCUS ALBA	WHITE OAK	30"	GOOD	
ST-130	QUERCUS RUBRA	RED OAK	31"	GOOD	TO BE REMOVED
ST-131	QUERCUS RUBRA	RED OAK	33"	GOOD	TO BE REMOVED
ST-132	QUERCUS VELUTINA	BLACK OAK	31"	GOOD	TO BE REMOVED
ST-133	QUERCUS RUBRA	RED OAK	31"	GOOD	TO BE REMOVED
ST-134	LIRIODENDRON TULIPIFERA	TULIPTREE	39"	POOR	TRUNK CAVITY
ST-135	QUERCUS RUBRA	RED OAK	34"	GOOD	
ST-136	QUERCUS RUBRA	RED OAK	43"	GOOD	
ST-137	QUERCUS ALBA	WHITE OAK	30"	GOOD	TO BE REMOVED
ST-138	QUERCUS RUBRA	RED OAK	30"	GOOD	
ST-139	QUERCUS RUBRA	RED OAK	31"	GOOD	
ST-140	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	FAIR	
ST-141	QUERCUS ALBA	WHITE OAK	31"	GOOD	OLD TRUNK DAMAGE (HEALING)
ST-142	QUERCUS RUBRA	RED OAK	34"	GOOD	
ST-143	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-144	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-145	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-146	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-147	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-148	QUERCUS ALBA	WHITE OAK	30"	GOOD	
ST-149	LIRIODENDRON TULIPIFERA	TULIPTREE	46"	GOOD	
ST-150	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-151	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	
ST-152	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-153	QUERCUS VELUTINA	BLACK OAK	35"	GOOD	
ST-154	QUERCUS ALBA	WHITE OAK	40"	FAIR	ONE OF TWO TRUNKS DEAD
ST-155	LIRIODENDRON TULIPIFERA	TULIPTREE	32"	GOOD	
ST-156	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	POOR	TRUNK CAVITY / 1 TRUNK DEAD / VINES
ST-157	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	
ST-158	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	
ST-159	LIRIODENDRON TULIPIFERA	TULIPTREE	37"	GOOD	
ST-160	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	
ST-161	QUERCUS VELUTINA	BLACK OAK	37"	GOOD	TO BE REMOVED
ST-162	LIRIODENDRON TULIPIFERA	TULIPTREE	30"	GOOD	TO BE REMOVED
ST-163	LIRIODENDRON TULIPIFERA	TULIPTREE	36"	GOOD	TO BE REMOVED
ST-164	LIRIODENDRON TULIPIFERA	TULIPTREE	35"	GOOD	TO BE REMOVED
ST-165	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-166	LIRIODENDRON TULIPIFERA	TULIPTREE	31"	GOOD	TO BE REMOVED
ST-167	LIRIODENDRON TULIPIFERA	TULIPTREE	33"	GOOD	TO BE REMOVED

SIGNIFICANT TREE LIST: (FOR PARCEL 145, PARCEL 'A' - PLAT# 21234, 22128)

NUMBER	SCIENTIFIC NAME	COMMON NAME	DBH	CONDITION	COMMENT
ST-168	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	38	GOOD	TO REMAIN
ST-169	LIRIODENDRON TULIPIFERA	TULIPTREE	37	GOOD	TO REMAIN
ST-170	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN
ST-171	QUERCUS ALBA	WHITE OAK	33	FAIR	ENTANGLED WITH VINES, LIMB LOSS TO REMAIN
ST-172	QUERCUS RUBRA	RED OAK	37	GOOD	TO REMAIN
ST-173	QUERCUS RUBRA	RED OAK	32	FAIR	LIMB LOSS TO REMAIN
ST-174	QUERCUS ALBA	WHITE OAK	31	GOOD	TO REMAIN
ST-175	QUERCUS ALBA	WHITE OAK	30	GOOD	TO REMAIN
ST-176	LIRIODENDRON TULIPIFERA	TULIPTREE	35	GOOD	TO REMAIN
ST-177	LIRIODENDRON TULIPIFERA	TULIPTREE	31	GOOD	TO REMAIN
ST-178	QUERCUS VELUTINA	BLACK OAK	41	GOOD	TO REMAIN
ST-179	LIRIODENDRON TULIPIFERA	TULIPTREE	33	GOOD	TO REMAIN
ST-180	LIRIODENDRON TULIPIFERA	TULIPTREE	37	FAIR	TRUNK CAVITY, LIMB LOSS TO REMAIN

SPECIMEN TREE LIST: (FOR PARCEL 412, PARCEL 'A' & OPEN SPACE LOT 45 - PLAT# 13640, 19714)

NUMBER	SCIENTIFIC NAME	COMMON NAME	DBH	CONDITION	COMMENT	NUMBER	SCIENTIFIC NAME	COMMON NAME	DBH	CONDITION	COMMENT
ST-1	LIRIODENDRON TULIPIFERA	TULIPTREE	30	GOOD	TO REMAIN	ST-98	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN
ST-2	QUERCUS RUBRA	RED OAK	41	FAIR	HALF DEAD, LIMB LOSS TO REMAIN	ST-99	LIRIODENDRON TULIPIFERA	TULIPTREE	36	GOOD	TO REMAIN
ST-3	QUERCUS RUBRA	RED OAK	51	GOOD	TO REMAIN	ST-100	LIRIODENDRON TULIPIFERA	TULIPTREE	34	GOOD	TO REMAIN
ST-4	QUERCUS ALBA	WHITE OAK	33	GOOD	TO REMAIN	ST-101	LIRIODENDRON TULIPIFERA	TULIPTREE	30	GOOD	TO REMAIN
ST-5	LIRIODENDRON TULIPIFERA	TULIPTREE	33	GOOD	TO REMAIN	ST-102	LIRIODENDRON TULIPIFERA	TULIPTREE	32	FAIR	HALF DEAD, LIMB LOSS TO REMAIN
ST-6	LIRIODENDRON TULIPIFERA	TULIPTREE	34	GOOD	TO REMAIN	ST-103	LIRIODENDRON TULIPIFERA	TULIPTREE	30	FAIR	TRUNK CAVITY TO REMAIN
ST-7	LIRIODENDRON TULIPIFERA	TULIPTREE	38	GOOD	TO REMAIN	ST-104	QUERCUS RUBRA	RED OAK	34	GOOD	TO REMAIN
ST-8	LIRIODENDRON TULIPIFERA	TULIPTREE	30	GOOD	TO REMAIN	ST-105	LIRIODENDRON TULIPIFERA	TULIPTREE	35	GOOD	TO REMAIN
ST-9	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN	ST-106	QUERCUS RUBRA	RED OAK	36	GOOD	TO REMAIN
ST-10	LIRIODENDRON TULIPIFERA	TULIPTREE	31	GOOD	TO REMAIN	ST-107	LIRIODENDRON TULIPIFERA	TULIPTREE	31	GOOD	TO REMAIN
ST-11	QUERCUS VELUTINA	BLACK OAK	33	GOOD	TO REMAIN	ST-108	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN
ST-12	QUERCUS RUBRA	RED OAK	30	GOOD	TO REMAIN	ST-109	LIRIODENDRON TULIPIFERA	TULIPTREE	43	GOOD	TO REMAIN
ST-13	QUERCUS ALBA	WHITE OAK	32	GOOD	TO REMAIN	ST-110	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN
ST-14	LIRIODENDRON TULIPIFERA	TULIPTREE	33	GOOD	TO REMAIN	ST-111	LIRIODENDRON TULIPIFERA	TULIPTREE	40	GOOD	TO REMAIN
ST-15	QUERCUS RUBRA	RED OAK	30	GOOD	TO REMAIN	ST-112	LIRIODENDRON TULIPIFERA	TULIPTREE	32	GOOD	TO REMAIN
ST-16	QUERC										



FOREST CONSERVATION AREA #3  
RETENTION 0.30 AC  
REFORESTATION 0.25 AC

FOREST CONSERVATION AREA #4  
RETENTION NON-CREDITED 0.02 AC  
REFORESTATION 0.86 AC

FOREST CONSERVATION AREA #4A  
RETENTION CREDITED 5.83 AC

FOREST CONSERVATION AREA #4B  
RETENTION NON-CREDITED 1.51 AC

FOREST CONSERVATION AREA #5  
RETENTION CREDITED 0.88 AC  
REFORESTATION 0.95 AC

FOREST CONSERVATION AREA #4B  
RETENTION 1.00 AC

FOREST CONSERVATION AREA #6  
RETENTION CREDITED 2.76 AC  
RETENTION NON-CREDITED 0.06 AC

FOREST CONSERVATION AREA #2  
RETENTION CREDITED 0.37 AC  
RETENTION NON-CREDITED 0.07 AC

FOREST CONSERVATION AREA #1  
RETENTION 1.54 AC  
REFORESTATION 0.45 AC

W.R. GRACE CO.  
TM 35 P. 145  
PARCEL A  
L. 273 P. 186  
PLAT# 21235  
ZONING: PEC  
USE: OFFICE CAMPUS  
TAX ACCOUNT #05-351251

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

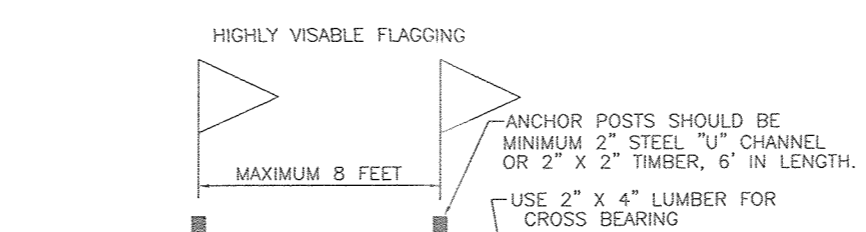
OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR.  
COLUMBIA, MD 21044-4098  
(410) 531-4000

**FOREST CONSERVATION LEGEND:**

- FOREST CONSERVATION EASEMENT (RETENTION)
- FOREST CONSERVATION EASEMENT (NON-CREDITED RETENTION)
- FOREST CONSERVATION EASEMENT (REFORESTATION)

**FOREST CONSERVATION PLAN**

SCALE: 1" = 100'  
SCALE: 1" = 100'



NOTES:  
1. FOREST PROTECTION DEVICE ONLY.  
2. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.  
3. BOUNDARIES OF RETENTION AREA SHOULD BE STAKED AND FLAGGED PRIOR TO INSTALLING DEVICE.  
4. ROOF DAMAGE SHOULD BE AVOIDED.

**BLAZE ORANGE PLASTIC MESH**  
TYPICAL TREE PROTECTION FENCE DETAIL

EASEMENT	RETENTION		REFORESTATION	TOTAL
	CREDITED	NON-CREDITED		
FCE#1	1.54 AC	—	0.45 AC	1.99 AC
FCE#2	0.37 AC	0.07 AC	—	0.44 AC
FCE#3	0.30 AC	—	0.25 AC	0.55 AC
FCE#4	0.97 AC	0.02 AC	0.86 AC	1.85 AC
FCE#4A	5.83 AC	1.51 AC	—	7.34 AC
FCE#4B	1.00 AC	—	—	1.00 AC
FCE#5	0.88 AC	—	0.95 AC	1.83 AC
FCE#6	2.76 AC	0.06 AC	—	2.82 AC
<b>TOTAL</b>	<b>13.65 AC</b>	<b>1.66 AC</b>	<b>2.51 AC</b>	<b>17.82 AC</b>

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.7.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

FOREST STAND DELINEATION PREPARED BY:  
  
**GEO-TECHNOLOGY ASSOCIATES, INC.**  
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS  
 14280 PARK CENTER DRIVE, SUITE: A  
 LAUREL, MARYLAND 20709  
 (410) 792-9446 OR (301) 470-4470  
 FAX: (410) 792-7395  
 GTAENG.COM

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 FOREST CONSERVATION PLAN  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**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 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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

51 SHEET OF 74

**REFORESTATION AND AFFORESTATION PLANTING PLANS**

A. PLANTING PLAN AND METHODS  
 PLANT SPECIES SELECTION WAS BASED ON OUR KNOWLEDGE REGARDING PLANT COMMUNITIES IN MARYLAND'S PIEDMONT PLATEAU AND INFORMATION PROVIDED IN THE SOIL SURVEY ON TYPICAL VEGETATION FOR THE SOIL TYPE ON THE PLANTING SITE. SPECIES SELECTION WAS ALSO BASED ON OUR KNOWLEDGE OF PLANT AVAILABILITY IN THE NURSERY INDUSTRY.

REFORESTATION AND AFFORESTATION WILL BE ACCOMPLISHED THROUGH A MIXED PLANTING OF WHIPS AND BRANCHED TRANSPLANTS. CONTAINER GROWN STOCK IS RECOMMENDED BUT BAREROOT STOCK MAY BE USED TO HELP CONTROL REFORESTATION AND AFFORESTATION COSTS. IF BAREROOT STOCK IS USED THE ROOT SYSTEMS OF ALL PLANTS WILL BE DIPPED IN AN ANTI-DESICCANT GEL PRIOR TO PLANTING TO IMPROVE MOISTURE RETENTION IN THE ROOT SYSTEMS.

PRIOR TO PLANTING THE PROPOSED FOREST CONSERVATION EASEMENTS ALL MULTIFLORA ROSE IN THE PLANTING AREA SHALL BE REMOVED. REMOVAL OF THE ROSE MAY BE PERFORMED WITH MOWING AND HERBICIDE TREATMENTS. PHYSICAL REMOVAL OF ALL TOP GROWTH FOLLOWING BY A PERIODIC HERBICIDE TREATMENT OF STUMP SPROUTS IS RECOMMENDED. NATIVE TREE AND SHRUB SPECIES OCCURRING WITHIN THE ROSE THICKETS SHOULD BE RETAINED WHEREVER POSSIBLE. HERBICIDES TREATMENTS SHALL OCCUR ON 2 MONTH INTERVALS DURING THE FIRST GROWING SEASON AND ONCE EACH IN THE SPRING AND FALL FOR SUBSEQUENT YEARS. HERBICIDE USES SHALL BE MADE SPECIFICALLY TO ADDRESS WOODY PLANT MATERIAL AND SHALL BE APPLIED AS PER MANUFACTURERS SPECIFICATIONS. CARE SHOULD BE TAKEN NOT TO SPRAY PLANTED TREES OR NATURALLY OCCURRING NATIVE TREE/SHRUB SEEDLINGS. IT IS RECOMMENDED THAT INITIATION OF ROSE REMOVAL BEGIN AT LEAST SIX MONTHS PRIOR TO PLANTING.

B. PLANTING AND SOIL SPECIFICATIONS  
 PLANT MATERIAL WILL BE INSTALLED IN ACCORDANCE WITH THE PLANTING DETAIL AND PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN.  
 AMENDMENTS TO EXISTING SOIL WILL BE IN ACCORDANCE WITH THE PLANTING SPECIFICATIONS SHOWN ON THE FOREST CONSERVATION PLAN. SOIL DISTURBANCE WILL BE LIMITED TO INDIVIDUAL PLANTING LOCATIONS.

C. MAINTENANCE OF PLANTINGS  
 FOR INFORMATION REGARDING MAINTENANCE OF THE REFORESTATION AND AFFORESTATION PLANTINGS, SEE SECTION VIII B.  
 D. GUARANTEE REQUIREMENTS  
 A 90 PERCENT SURVIVAL RATE OF THE REFORESTATION AND AFFORESTATION PLANTINGS WILL BE REQUIRED AFTER ONE GROWING SEASON. ALL PLANT MATERIAL BELOW THE 90 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE SECOND GROWING SEASON. AT THE END OF THE SECOND GROWING SEASON, A 75 PERCENT SURVIVAL RATE WILL BE REQUIRED. ALL PLANT MATERIAL BELOW THE 75 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED BY THE BEGINNING OF THE NEXT GROWING SEASON.

E. SECURITY FOR REFORESTATION AND AFFORESTATION  
 SECTION 16-1209 OF THE HOWARD COUNTY FOREST CONSERVATION ACT REQUIRES THAT A DEVELOPER SHALL POST A SECURITY BOND, LETTER OF CREDIT, ETC.) WITH THE COUNTY TO INSURE THAT ALL WORK IS DONE IN ACCORDANCE WITH THE FCP.

**CONSTRUCTION PERIOD PROTECTION PROGRAM**

A. FOREST PROTECTION TECHNIQUES  
 1. SOIL PROTECTION AREA (CRITICAL ROOT ZONE)  
 THE SOIL PROTECTION AREA, OR CRITICAL ROOT ZONE, OF A TREE IS THAT PORTION OF THE SOIL COLUMN WHERE MOST OF A ITS ROOTS MAY BE FOUND. THE MAJORITY OF ROOTS RESPONSIBLE FOR WATER AND NUTRIENT UPTAKE ARE LOCATED JUST BELOW THE SOIL SURFACE. TEMPORARY FENCING SHALL BE PLACED AROUND THE CRITICAL ROOT ZONE OF THE FOREST IN AREAS WHERE THE FOREST LIMITS OCCUR WITHIN 25 FEET OF THE LIMIT OF DISTURBANCE.

2. FENCING AND SIGNAGE  
 EXISTING FOREST LIMITS OCCURRING WITHIN 25 FEET OF THE LIMITS OF DISTURBANCE SHALL BE PROTECTED USING TEMPORARY PROTECTIVE FENCING. PERMANENT SIGNAGE SHALL BE PLACED AROUND THE AFFORESTATION AREA PRIOR TO PLANT INSTALLATION, AS SHOWN ON THE PLAN.

B. PRE-CONSTRUCTION MEETING  
 UPON STAKING OF LIMITS OF DISTURBANCE A PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE DEVELOPER, CONTRACTOR AND APPROPRIATE COUNTY INSPECTOR. THE PURPOSE OF THE MEETING WILL BE TO VERIFY THAT ALL SEDIMENT CONTROL IS IN ORDER, AND TO NOTIFY THE CONTRACTOR OF POSSIBLE PENALTIES FOR NON-COMPLIANCE WITH THE FCP.  
 C. STORAGE FACILITIES/EQUIPMENT CLEANING  
 ALL EQUIPMENT STORAGE, PARKING, SANITARY FACILITIES, MATERIAL STOCKPILING, ETC. ASSOCIATED WITH CONSTRUCTION OF THE PROJECT WILL BE RESTRICTED TO THOSE AREAS OUTSIDE OF THE PROPOSED FOREST CONSERVATION EASEMENT. CLEANING OF EQUIPMENT WILL BE LIMITED TO AREA WITHIN THE LOOP OF THE PROPOSED HOMESITES. WASTEWATER RESULTING FROM EQUIPMENT CLEANING WILL BE CONTROLLED TO PREVENT RUNOFF INTO ENVIRONMENTALLY SENSITIVE AREAS.

D. SEQUENCE OF CONSTRUCTION  
 THE FOLLOWING TIMETABLE REPRESENTS THE PROPOSED TIMETABLE FOR DEVELOPMENT. THE ITEMS OUTLINED IN THE FOREST CONSERVATION PLAN WILL BE ENACTED WITHIN TWO (2) YEARS OF SUBDIVISION APPROVAL.

BELOW FIND A PROPOSED SEQUENCE OF CONSTRUCTION.  
 1. INSTALL ALL SIGNAGE AND SEDIMENT CONTROL DEVICES.  
 2. HOLD PRE-CONSTRUCTION MEETING BETWEEN DEVELOPER, CONTRACTOR AND COUNTY INSPECTOR.  
 3. BUILD ACCESS ROADS, INSTALL UTILITIES, AND CONSTRUCT HOME. STABILIZE ALL DISTURBED AREAS ACCORDINGLY.  
 4. BEGIN MULTIFLORA ROSE REMOVAL, AS NEEDED. INSTALL PERMANENT PROTECTIVE SIGNAGE FOR EASEMENTS AND INITIATE PLANTINGS IN ACCORDANCE WITH FOREST CONSERVATION PLAN. PLANTINGS WILL BE COMPLETED WITHIN TWO (2) YEARS OF SUBDIVISION APPROVAL.  
 5. REMOVE SEDIMENT CONTROL.  
 6. HOLD POST-CONSTRUCTION MEETING WITH COUNTY INSPECTORS TO ASSURE COMPLIANCE WITH FCP. SUBMIT CERTIFICATION OF INSTALLATION.  
 7. MONITOR AND MAINTAIN PLANTINGS FOR 2 YEARS.

E. CONSTRUCTION MONITORING  
 GEO-TECHNOLOGY ASSOCIATES, INC. OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL MONITOR CONSTRUCTION OF THE PROJECT TO ENSURE THAT ALL ACTIVITIES ARE IN COMPLIANCE WITH THE FOREST CONSERVATION PLAN.  
 F. POST-CONSTRUCTION MEETING  
 UPON COMPLETION OF CONSTRUCTION, GEO-TECHNOLOGY ASSOCIATES, INC. OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL NOTIFY THE COUNTY THAT CONSTRUCTION HAS BEEN COMPLETED AND ARRANGE FOR A POST-CONSTRUCTION MEETING TO REVIEW THE PROJECT SITE. THE MEETING WILL ALLOW THE COUNTY INSPECTOR TO VERIFY THAT REFORESTATION / AFFORESTATION PLANTINGS HAVE BEEN INSTALLED.

**POST-CONSTRUCTION MANAGEMENT PLAN**

HOWARD COUNTY REQUIRES A TWO YEAR POST-CONSTRUCTION MANAGEMENT PLAN BE PREPARED AS PART OF THE FOREST CONSERVATION PLAN. THE PLAN GOES INTO EFFECT UPON ACCEPTANCE OF THE CONSTRUCTION CERTIFICATION OF COMPLETION BY THE COUNTY. GEO-TECHNOLOGY ASSOCIATES, INC. OR ANOTHER QUALIFIED PROFESSIONAL DESIGNATED BY THE DEVELOPER, WILL BE RESPONSIBLE FOR IMPLEMENTATION OF THE POST-CONSTRUCTION MANAGEMENT PLAN.

THE FOLLOWING ITEMS WILL BE INCORPORATED INTO THE PLAN:  
 A. FENCING AND SIGNAGE  
 PERMANENT SIGNAGE INDICATING THE LIMITS OF THE RETENTION/REFORESTATION/AFFORESTATION AREA SHALL BE MAINTAINED.  
 B. GENERAL SITE INSPECTIONS/MAINTENANCE OF PLANTINGS  
 SITE INSPECTIONS WILL BE PERFORMED A MINIMUM OF THREE TIMES DURING THE GROWING SEASON. THE PURPOSE OF THE INSPECTIONS WILL BE TO ASSESS THE HEALTH OF THE REFORESTATION/AFFORESTATION PLANTINGS. APPROPRIATE MEASURES WILL BE TAKEN TO RECTIFY ANY PROBLEMS WHICH MAY ARISE.

IN ADDITION, MAINTENANCE OF THE REFORESTATION/AFFORESTATION PLANTINGS WILL INVOLVE THE FOLLOWING STEPS:  
 1. WATERING - ALL PLANT MATERIAL SHALL BE WATERED TWICE A MONTH DURING THE 1ST GROWING SEASON, MORE OR LESS FREQUENTLY DEPENDING ON WEATHER CONDITIONS. DURING THE SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.  
 2. REMOVAL OF INVASIVE EXOTICS AND NOXIOUS WEEDS. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED.  
 3. IDENTIFICATION OF SERIOUS PLANT PESTS AND DISEASES, TREATMENT WITH APPROPRIATE AGENT.  
 4. PRUNING OF DEAD BRANCHES.  
 5. AFTER 12 AND 24 MONTHS, REPLACEMENT OF PLANTS, IF REQUIRED, IN ACCORDANCE WITH THE GUARANTEE REQUIREMENTS SHOWN ON THE FCP.

C. EDUCATION  
 THE DEVELOPER WILL PROVIDE APPROPRIATE MATERIALS TO PROPERTY OWNERS INFORMING THEM OF THE LOCATION AND PURPOSE OF THE REFORESTATION/AFFORESTATION AREA. MATERIALS MAY INCLUDE SITE PLANS AND INFORMATION EXPLAINING THE INTENT OF THE FOREST CONSERVATION LAW.  
 D. FINAL INSPECTION  
 AT THE END OF THE TWO YEAR POST-CONSTRUCTION MANAGEMENT PERIOD, GEO-TECHNOLOGY ASSOCIATES, INC. OR ANOTHER QUALIFIED PROFESSIONAL, WILL SUBMIT TO THE ADMINISTRATOR OF THE HOWARD COUNTY FOREST CONSERVATION PROGRAM CERTIFICATION THAT ALL RETENTION/REFORESTATION REQUIREMENTS HAVE BEEN MET. UPON ACCEPTANCE OF THIS CERTIFICATION, THE COUNTY WILL RELEASE THE DEVELOPER FROM ALL FUTURE OBLIGATIONS AND RELEASE THE DEVELOPER'S BOND.

**HOWARD COUNTY FOREST CONSERVATION WORKSHEET**

ZONED CEF-R  
 NET TRACT AREA: \_\_\_\_\_  
 TOTAL TRACT AREA 66.8 AC.

AREA WITHIN 100 YEAR FLOODPLAIN \_\_\_\_\_ 1.6 AC  
 AREA TO REMAIN IN AGRICULTURAL PRESERVATION \_\_\_\_\_ 0.0 AC  
 NET TRACT AREA \_\_\_\_\_ 65.2 AC

LAND USE CATEGORY  
 INPUT THE NUMBER "1" UNDER THE APPROPRIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY. ZONED CEF-R

ARA	LDR	IDA	HDR	MPD	CIA
0	0	0	1	0	0

AFFOREST THRESHOLD \_\_\_\_\_ 15% X 65.3 = 9.8 AC  
 CONSERVATION THRESHOLD \_\_\_\_\_ 20% X 65.3 = 13.0 AC

EXISTING FOREST COVER:  
 EXISTING FOREST COVER (EXCLUDING FLOODPLAIN) \_\_\_\_\_ = 42.9 AC  
 (4.4 AC ± FSD REPORT - FLOORPLAN) \_\_\_\_\_ = 13.7 AC  
 AREA OF FOREST ABOVE AFFORESTATION THRESHOLD \_\_\_\_\_ = 33.1 AC  
 AREA OF FOREST ABOVE CONSERVATION THRESHOLD \_\_\_\_\_ = 29.9 AC

BREAK EVEN POINT:  
 (2 X 1) + F = BREAK EVEN POINT (0 AC)  
 FOREST RETENTION ABOVE THRESHOLD W/ NO MITIGATION \_\_\_\_\_ = 19.0 AC  
 CLEARING PERMITTED WITHOUT MITIGATION \_\_\_\_\_ = 23.9 AC

PROPOSED FOREST CLEARING:  
 TOTAL AREA OF FOREST TO BE CLEARED \_\_\_\_\_ = 29.2 AC  
 TOTAL AREA OF FOREST TO BE RETAINED \_\_\_\_\_ = 36.6 AC

PLANTING REQUIREMENTS:  
 REFORESTATION FOR CLEARING ABOVE CONSERVATION THRESHOLD (L X 25) \_\_\_\_\_ = 7.3 AC  
 REFORESTATION FOR CLEARING BELOW CONSERVATION THRESHOLD \_\_\_\_\_ = 0.0 AC  
 CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD (M-F) \_\_\_\_\_ = 0.7 AC  
 TOTAL REFORESTATION REQUIRED (N+P-O) \_\_\_\_\_ = 6.6 AC  
 TOTAL AFFORESTATION REQUIRED \_\_\_\_\_ = 0.0 AC  
 TOTAL PLANTING REQUIREMENT (REFORESTATION) \_\_\_\_\_ = 6.6 AC

FOREST CONSERVATION EASEMENTS HAVE BEEN ESTABLISHED TO FULFILL A PORTION OF THE REQUIREMENTS OF SECTION 16.1209 OF THE HOWARD COUNTY FOREST CONSERVATION MANUAL. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE FOREST CONSERVATION EASEMENT ARE ALLOWED.

THE REQUIRED FOREST CONSERVATION SHALL MEET THE INTENT OF SECTION 16.117 OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS. THE REQUIRED FOREST CONSERVATION WILL BE PROVIDED PARTIALLY WITHIN OPEN SPACE LOTS AND PARTIALLY WITHIN THE BANK OF THE PROPOSED ROAD.

TOTAL FOREST CONSERVATION OBLIGATION OF THIS PROJECT TO BE FULFILLED BY:  
 A. 15.31 ACRES OF ONSITE RETENTION (NO SURETY REQ)  
 CREDITED = 13.65 ACRES  
 NON-CREDITED = 1.66 ACRES  
 B. 2.51 ACRES OF ONSITE REFORESTATION  
 C. THE PURCHASE OF **16.98 ACRES OF AFFORESTATION CREDIT** IN THE CATTAL MEADOWS FOREST BANK S0P-16-027.

FINANCIAL SURETY FOR THE REQUIRED REFORESTATION = \$ 54,668 (2.51 AC OR 109,336 SF @ \$0.50/SF) SHALL BE POSTED WITH THE DEVELOPERS AGREEMENT.

PLANTING NOTES:  
 - PLANTING DENSITY BASED SPACING REQUIREMENTS WHIPS WITH SHELTER @ 11' ON CENTER. PLANTING MAY BE MADE IN A CURVILINEAR FASHION ALONG CONTOUR. THE PLANTING SHOULD AVOID A GRID APPEARANCE BUT BE SPACED TO FACILITATE MAINTENANCE  
 - MULTIFLORA ROSE/HEAVY BRUSH REMOVAL/CONTROL MAY BE REQUIRED PRIOR TO INSTALLATION OF PLANTING.  
 - ALL WHIPS ARE REQUIRED TO BE INSTALLED WITH TREE SHELTERS PER HOWARD COUNTY FCA REQUIREMENTS.  
 - PLANTING UNITS DEFINED BY THE SPACING REQUIREMENTS ESTABLISHED IN THE FCA MANUAL. ONE PLANT UNIT IS DEFINED AS 1 SEEDLING OR WHIP WITHOUT SHELTER. THE MANUAL STATES THAT 700 SEEDLINGS/WHIPS WITHOUT SHELTERS ARE REQUIRED PER ACRE, OR 350 WHIPS W/SHELTERS, OR 200 1" CALIPER TREES, OR 100 2" CALIPER TREES. BY CONVERSION IT HAS BEEN DETERMINED THAT A SEEDLING OR WHIP WITHOUT SHELTER = 1 UNIT, WHIP WITH SHELTER = 2 UNITS, 1" CALIPER TREE = 3.5 UNITS AND 2" CALIPER TREE = 7 UNITS. THE USE OF PLANT UNITS SIMPLIFIES THE PLANTING DENSITY CALCULATIONS WHEN MIXING STOCK SIZE.

PLANTING/SOIL SPECIFICATIONS  
 1. INSTALLATION OF BAREROOT/PLUG PLANT STOCK SHALL TAKE PLACE BETWEEN MARCH 15 - APRIL 20; B&B/CONTAINER STOCK MARCH 15 - MAY 30 OR SEPTEMBER 15 - NOVEMBER 15. FALL PLANTING OF B&B STOCK IS NOT RECOMMENDED.  
 2. DISTURBED AREAS SHALL BE SEEDED AND STABILIZED AS PER GENERAL CONSTRUCTION PLAN FOR PROJECT. PLANTING AREAS NOT IMPACTED BY SITE GRADING SHALL HAVE NO ADDITIONAL TOPSOIL INSTALLED.  
 3. BAREROOT PLANTS SHALL BE INSTALLED SO THAT THE TOP OF ROOT MASS IS LEVEL WITH THE TOP OF EXISTING GRADE. ROOTS SHALL BE DIPPED IN AN ANTI-DESICCANT GEL PRIOR TO PLANTING. BACKFILL IN THE PLANTING PITS SHALL CONSIST OF 3 PARTS EXISTING SOIL TO 1 PART FINE FINES OR EQUIVALENT.  
 4. FERTILIZER SHALL CONSIST OF AGRIFORM 22-8-2, OR EQUIVALENT, APPLIED AS PER MANUFACTURER'S SPECIFICATIONS, FOR WOODY PLANTS. HERBACEOUS PLANT SHALL BE FERTILIZED WITH OSMOCOAT 8-8-12.  
 5. PLANT MATERIAL SHALL BE TRANSPORTED TO THE SITE IN A TARPED OR COVERED TRUCK. PLANTS SHALL BE KEPT MOIST UNTIL TO PLANTING.  
 6. REFORESTATION SHALL REMOVE ALL NON-ORGANIC DEBRIS ASSOCIATED WITH THE PLANTING OPERATION FROM THE SITE.

SEQUENCE OF CONSTRUCTION  
 1. SEDIMENT CONTROL SHALL BE INSTALLED IN ACCORDANCE WITH GENERAL CONSTRUCTION PLAN FOR SITE.  
 2. PLANTS SHALL BE INSTALLED AS PER PLANT SCHEDULE AND THE PLANTING/SOIL SPECIFICATIONS FOR THE PROJECT.  
 3. UPON COMPLETION OF THE PLANTING, SIGNAGE SHALL BE INSTALLED AS SHOWN.  
 4. PLANTINGS SHALL BE MAINTAINED AND GUARANTEED IN ACCORDANCE WITH THE MAINTENANCE AND GUARANTEE REQUIREMENTS FOR PROJECT.

MAINTENANCE OF PLANTINGS  
 1. MAINTENANCE OF PLANTINGS SHALL LAST FOR A PERIOD OF TWO YEARS.  
 2. PLANTINGS MUST RECEIVE 2 GALLONS OF WATER, EITHER THROUGH PRECIPITATION OR WATERING, WEEKLY DURING THE 1ST GROWING SEASON, AS NEEDED, DURING SECOND GROWING SEASON, ONCE A MONTH DURING MAY-SEPTEMBER, IF NEEDED.  
 3. INVASIVE EXOTICS AND NOXIOUS WEEDS WILL BE REMOVED, AS REQUIRED, FROM PLANTING AREAS MECHANICALLY AND/OR WITH LIMITED HERBICIDE. OLD FIELD SUCCESSIONAL SPECIES WILL BE RETAINED.  
 4. PLANTS SHALL BE EXAMINED A MINIMUM TWO TIMES DURING THE GROWING SEASON FOR SERIOUS PLANT PESTS AND DISEASES. SERIOUS PROBLEMS WILL BE TREATED WITH THE APPROPRIATE AGENT.  
 5. DEAD BRANCHES WILL BE PRUNED FROM PLANTINGS.  
 6. GUARANTEE REQUIREMENTS  
 1. A 90 PERCENT SURVIVAL RATE OF THE REFORESTATION PLANTINGS WILL BE REQUIRED AFTER ONE GROWING SEASON. ALL PLANT MATERIAL BELOW THE 90 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED AT THE BEGINNING OF THE SECOND GROWING SEASON. AT THE END OF THE SECOND GROWING SEASON, A 75 PERCENT SURVIVAL RATE WILL BE REQUIRED. ALL PLANT MATERIAL BELOW THE 75 PERCENT SURVIVAL THRESHOLD WILL BE REPLACED BY THE BEGINNING OF THE NEXT GROWING SEASON.  
 EDUCATION OF NEW OCCUPANTS  
 1. THE DEVELOPER SHALL PROVIDE EDUCATIONAL INFORMATION TO ALL PROPERTY OWNERS WITHIN THE NEW DEVELOPMENT/HOME ABOUT THE PROPER USE OF FOREST CONSERVATION AREAS. FINAL INSPECTION AND RELEASE OF OBLIGATIONS  
 1. AT THE END OF THE POST-CONSTRUCTION MANAGEMENT AND PROTECTION PERIOD THE DEVELOPER SHALL SUBMIT A CERTIFICATION TO THE COUNTY THAT ALL FOREST CONSERVATION AREAS HAVE REMAINED INTACT OR HAVE BEEN RESTORED TO APPROPRIATE CONDITION, THAT THE STIPULATED SURVIVAL RATES HAVE BEEN ACHIEVED, AND THAT ANY PERMANENT PROTECTION MEASURES REQUIRED BY THE PLAN ARE IN PLACE. UPON REVIEW AND ACCEPTANCE, THE COUNTY WILL INFORM THE DEVELOPER OF THEIR RELEASE THE DEVELOPMENT OF FUTURE OBLIGATIONS RELATED TO THE FOREST CONSERVATION ACT.

**SEQUENCE OF CONSTRUCTION-FOREST CONSERVATION**

1. PRE-CONSTRUCTION MEETING /SITE WALK WITH CONTRACTORS AND OTHER RESPONSIBLE PARTIES TO DEFINE PROTECTION MEASURES TO BE UTILIZED AND TO POINT OUT PARTICULAR TREES TO BE SAVED.
2. STAKE OUT LIMITS OF DISTURBANCE AND TREE PROTECTION FENCING LOCATIONS.
3. INSTALL TREE PROTECTION FENCING: FENCING TO BE INSPECTED BY THE PROJECT ENGINEER OR THE PROJECT ECOLOGIST AND HOWARD COUNTY PLANNING AND ZONING.
4. PROCEED WITH TREE REMOVAL AND SITE IMPROVEMENTS AS PER APPROVED SEDIMENT CONTROL PLAN - TO BE INSPECTED BY HOWARD COUNTY PLANNING AND ZONING.
5. TEMPORARY TREE PROTECTION DEVICES SHALL BE REMOVED AFTER ALL FINISHED GRADING AND UTILITY CONSTRUCTION HAS OCCURRED AND WITH APPROVAL FROM THE HOWARD COUNTY OFFICE OF PLANNING AND ZONING.

**FOREST CONSERVATION EASEMENT TABLE**

EASEMENT	RETENTION		REFORESTATION	TOTAL
	CREDITED	NON-CREDITED		
FCE#1	1.54 AC	-	0.45 AC	1.99 AC
FCE#2	0.37 AC	0.07 AC	-	0.44 AC
FCE#3	0.30 AC	-	0.25 AC	0.55 AC
FCE#4	0.97 AC	0.02 AC	0.86 AC	1.85 AC
FCE#4A	5.83 AC	1.51 AC	-	7.34 AC
FCE#4B	1.00 AC	-	-	1.00 AC
FCE#5	0.88 AC	-	0.95 AC	1.83 AC
FCE#6	2.76 AC	0.06 AC	-	2.82 AC
<b>TOTAL</b>	<b>13.65 AC</b>	<b>1.66 AC</b>	<b>2.51 AC</b>	<b>17.82 AC</b>

REFORESTATION TO BE PROVIDED  
 2.52 ACRES  
 1" CALIPER TREES  
 504 TREES @ 200 TREES PER ACRE OR EQUAL

PLANTING REQUIREMENT WP-16-038  
 THE AREA OF PLANTING ALONG GRACE DRIVE WITHIN EASEMENT 1 (BETWEEN THE EXISTING CURVE AND THE W.R. GRACE PROPERTY) AND THE AREAS OF PLANTING WITHIN EASEMENT 3 AND 4 (W/ALA OPEN SPACE LOT 131 - REAR LOTS 6-14) SHALL BE CULVERT WITH THE REQUIRED 1" CALIPER STOCK.

**REFORESTATION PLANTING SCHEDULE FOREST CONSERVATION EASEMENTS 2.52 ACRES**

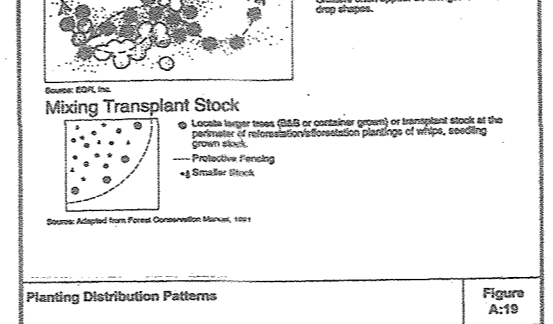
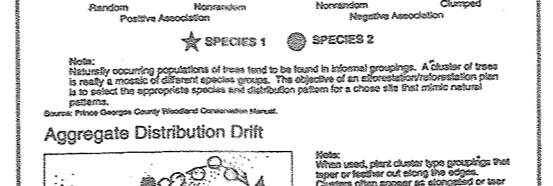
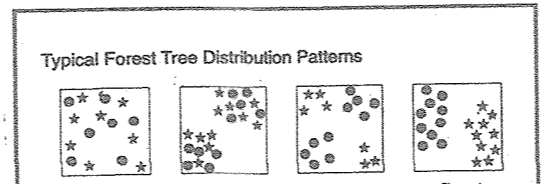
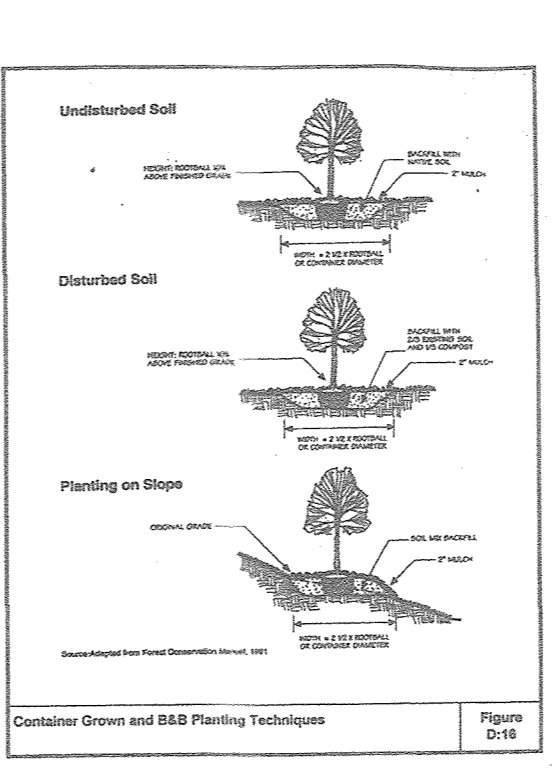
EASEMENT #1: 0.45 AC. (REFORESTATION) @ 200 TREES/AC. = 90 TREES	QTY.	BOTANICAL NAME	SIZE	SPACING
18	BETULA NIGRA RIVER BIRCH	1"	CAL.	15' x 15'
18	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1"	CAL.	15' x 15'
18	NYSSA SYLVATICA BLACK GUM	1"	CAL.	15' x 15'
18	QUERCUS RUBRA RED OAK	1"	CAL.	15' x 15'
18	TAXODIUM DISTICHUM COMMON BALDCYPRESS	1"	CAL.	15' x 15'
EASEMENT #3: 0.25 AC. (REFORESTATION) @ 200 TREES/AC. = 50 TREES	QTY.	BOTANICAL NAME	SIZE	SPACING
10	BETULA NIGRA RIVER BIRCH	1"	CAL.	15' x 15'
10	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1"	CAL.	15' x 15'
10	NYSSA SYLVATICA BLACK GUM	1"	CAL.	15' x 15'
10	QUERCUS RUBRA RED OAK	1"	CAL.	15' x 15'
10	TAXODIUM DISTICHUM COMMON BALDCYPRESS	1"	CAL.	15' x 15'
EASEMENT #4: 0.86 AC. (AFFORESTATION) @ 200 TREES/AC. = 172 TREES	QTY.	BOTANICAL NAME	SIZE	SPACING
34	BETULA NIGRA RIVER BIRCH	1"	CAL.	15' x 15'
34	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1"	CAL.	15' x 15'
34	NYSSA SYLVATICA BLACK GUM	1"	CAL.	15' x 15'
34	QUERCUS RUBRA RED OAK	1"	CAL.	15' x 15'
36	TAXODIUM DISTICHUM COMMON BALDCYPRESS	1"	CAL.	15' x 15'
EASEMENT #5: 0.95 AC. (AFFORESTATION) @ 200 TREES/AC. = 190 TREES	QTY.	BOTANICAL NAME	SIZE	SPACING
38	BETULA NIGRA RIVER BIRCH	1"	CAL.	15' x 15'
38	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	1"	CAL.	15' x 15'
38	NYSSA SYLVATICA BLACK GUM	1"	CAL.	15' x 15'
38	QUERCUS RUBRA RED OAK	1"	CAL.	15' x 15'
38	TAXODIUM DISTICHUM COMMON BALDCYPRESS	1"	CAL.	15' x 15'

SEEDLING SPECIFICATIONS  
 1. SEEDLING SPECIFICATIONS SHALL BE AS FOLLOWS:  
 A. SEEDLING SHALL BE A SEEDLING OR WHIP WITHOUT SHELTER. THE MANUAL STATES THAT 700 SEEDLINGS/WHIPS WITHOUT SHELTERS ARE REQUIRED PER ACRE, OR 350 WHIPS W/SHELTERS, OR 200 1" CALIPER TREES, OR 100 2" CALIPER TREES. BY CONVERSION IT HAS BEEN DETERMINED THAT A SEEDLING OR WHIP WITHOUT SHELTER = 1 UNIT, WHIP WITH SHELTER = 2 UNITS, 1" CALIPER TREE = 3.5 UNITS AND 2" CALIPER TREE = 7 UNITS. THE USE OF PLANT UNITS SIMPLIFIES THE PLANTING DENSITY CALCULATIONS WHEN MIXING STOCK SIZE.

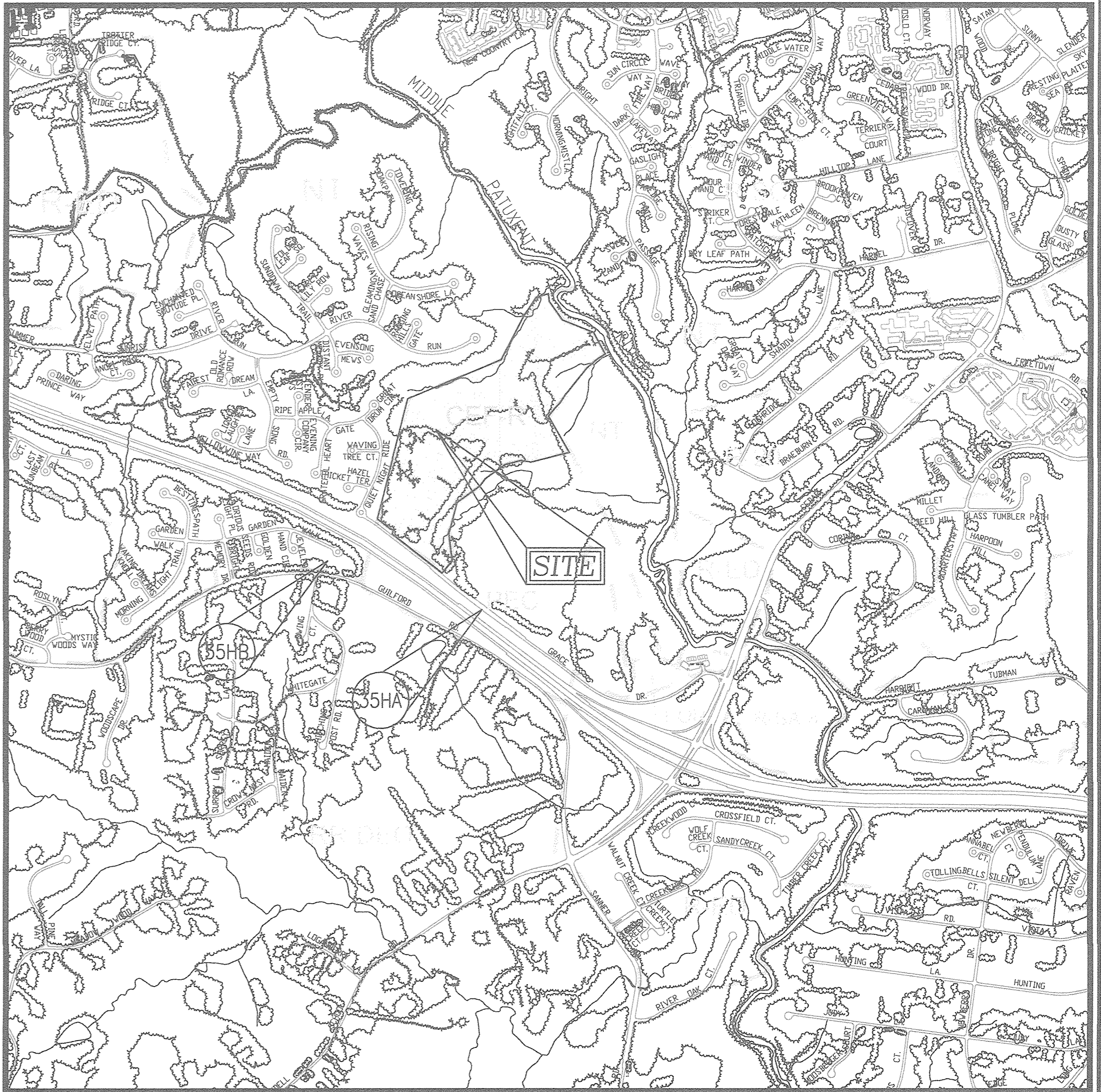
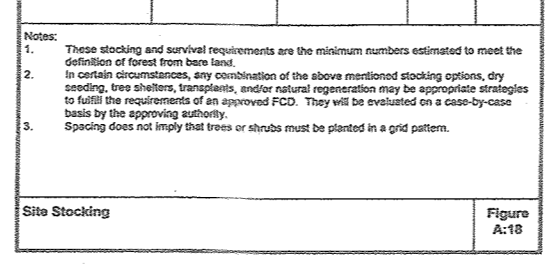
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**FOREST RETENTION AREAS AND NOTES**  
 1. THE WETLANDS AND WETLAND BUFFERS ARE LOCATED AS SHOWN HEREON.  
 2. NO BARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON THIS SITE.  
 3. FORESTED AREAS ADJACENT TO FLOODPLAINS AND STREAM BUFFERS ARE SUBSTANTIALLY RETAINED IN OPEN SPACE LOTS.  
 4. CHANGES IN GRADING AND RUNOFF WITHIN CONSTRUCTION/INSTALLATION AREAS WILL NOT ADVERSELY AFFECT THE SOILS WITHIN THE FOREST RETENTION AREA. SEDIMENT CONTROL MEASURES WILL REDIRECT CONCENTRATED FLOW RUNOFF TO STORMWATER MANAGEMENT FACILITIES, RETAIN SEDIMENT WITHIN THE CONSTRUCTION SITE AND/OR PREVENT CLEAN WATER RUNOFF FROM CONSTRUCTION AREAS.  
 5. THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1209 OF THE HOWARD COUNTY CODE. NO CLEARING, GRADING OR CONSTRUCTION IS PERMITTED WITHIN THE FOREST CONSERVATION EASEMENT, HOWEVER, FOREST MANAGEMENT PRACTICES AS DEFINED IN THE DEED OF FOREST CONSERVATION EASEMENT ARE ALLOWED.



Site	Number Required per Acre	Approximate Results at end of second growing season	Survivability at the end of the second growing season
Open Field Seedlings or Whips	100	8 x 8	60% 100
Container Grown Bare Root Stock (1.5 Caliper)	400	16 x 16	60% 200
Container Grown 1.5 Caliper	100	16 x 16	75% 200
Container Grown 2" Caliper B & B	200	16 x 16	60% 100
Container Grown 1.5-2" Caliper B & B	100	16 x 16	70% 100



**VICINITY MAP**  
 SCALE: 1"=1000'  
 ADC MAP COORDINATE: 32  
 GRID B-3, C-3, B-4 & C-4

**BENCHMARKS**  
 BM 35HA\*  
 N 553,966.7457 E 1,340,476.9524  
 NAD 83 (Adj 07)  
 ELEV. 404.584  
 BEING A STAMPED BRASS OR ALUMINUM DISC SET ON TOP OF A 3 FOOT DEEP COLUMN OF CONCRETE APPROXIMATELY 90'± NORTH OF GRACE DRIVE AND 160'± EAST OF THE EASTERN MOST ENTRY DRIVE FOR THE PROPERTY. (ALSO KNOWN AS "109" AND "0088").  
 BM 35HB\*  
 N 554,835.4156 E 1,337,888.3861  
 NAD 83 (Adj 07)  
 ELEV. 449.699  
 BEING A STAMPED BRASS OR ALUMINUM DISC SET ON TOP OF A 3 FOOT DEEP COLUMN OF CONCRETE AT THE INTERSECTION OF GULFORD ROAD AND WHITEGATE ROAD, APPROXIMATELY 5± NORTH OF GULFORD ROAD.

**GENERAL NOTES**  
 WATERSHED NAME: MIDDLE PATUXENT RIVER  
 WATERSHED NUMBER: 02131106  
 A. GROSS SITE AREA: 66.81 AC. +/-  
 B. AREA OF 100-YEAR FLOODPLAIN: 1.6 AC.  
 C. WETLAND & WETLAND BUFFER AREA: 0.39 AC.  
 D. AREA OF > 25% STEEP SLOPES: 1.63 AC.  
 E. EXISTING FOREST: 44.4 AC. (REFER TO FSD)  
 F. ZONED: CEF-R  
 NT  
 G. EXISTING USE: FOREST, OPEN FIELD, SCRUB SHRUB, LAWN  
 H. PROPOSED USE: RESIDENTIAL OPEN SPACE

OWNER / DEVELOPER  
**T.M. 35 - P.145 (PARCEL B-1)**  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
**T.M. 35 - P.145 (PARCEL C)**  
 W.R. GRACE & CO.  
 7500 GRACE DR.  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
 FOREST CONSERVATION PLAN  
 NOTES AND DETAILS  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23534-23537

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 012 REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-27-2020

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

52 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/1/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-17-19  
 DATE: 6-26-19

FOREST STAND DELINEATION PREPARED BY:  
**GEO**

**LEGEND:**

	EXISTING CONTOUR		EXISTING THREELINE
	PROPOSED CONTOUR		EXISTING STREAM
	EXISTING SPOT ELEVATION		EXISTING STREAM BUFFER
	EXISTING CURB AND GUTTER		EXISTING WETLAND BUFFER
	EXISTING UTILITY POLE		EXISTING FENCE
	EXISTING LIGHT POLE		PROPERTY LINE
	EXISTING MAILBOX		RIGHT-OF-WAY LINE
	EXISTING SIGN		SOILS BOUNDARY
	EXISTING SANITARY MANHOLE		FOREST CONSERVATION AREA (REFORESTATION)
	EXISTING SANITARY LINE		FOREST CONSERVATION AREA (RETENTION)
	EXISTING CLEANOUT		MICRO BORETENTATION BIOSWALE AREA
	EXISTING FIRE HYDRANT		PROPOSED CURB
	EXISTING WATER LINE		EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
	EXISTING STORM DRAIN		EX. MONITORING WELL
	EX. ELECTRIC CONDUIT		MICRO BORETENTATION BIOSWALE AREA

"LOTS 1-9 AND 37-46 HAVE DRY WELLS ON THEM TO MEET ESD PRACTICES. OPERATION AND MAINTENANCE SCHEDULES HAVE BEEN RECORDED WITH THE HOMEOWNERS ASSOCIATION DOCUMENTATION. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL."

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	WETNESS	PERCENT SAND	PERCENT SILT	PERCENT CLAY	K FACTOR	PERCENT ORGANIC MATTER	PERCENT ROCK
SbA	SABLE SILT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	NO	NO	NO	NO
SbB	COARSE & MEDIUM SILT LOAM, 0-3% SLOPES	C	NO	NO	0.28	YES	NO	NO	NO	
SbC	GLENWILE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	NO	NO	NO	NO	
GmB	GLENWILE-IRWIN LAND COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	YES	YES	NO	NO	
GmC	GLENWILE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.43	YES	YES	NO	NO	
GmD	GLENWILE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES	NO	NO	
GmE	GLENWILE-IRWIN LAND COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	NO	NO	NO	
MbD	MANOR LOAM, 5-15% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO	
MbC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO	NO	NO	
MbD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	YES	NO	NO	NO	
MbF	MANOR-BREWSTER COMPLEX, 25-55% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	NO	NO	NO	

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

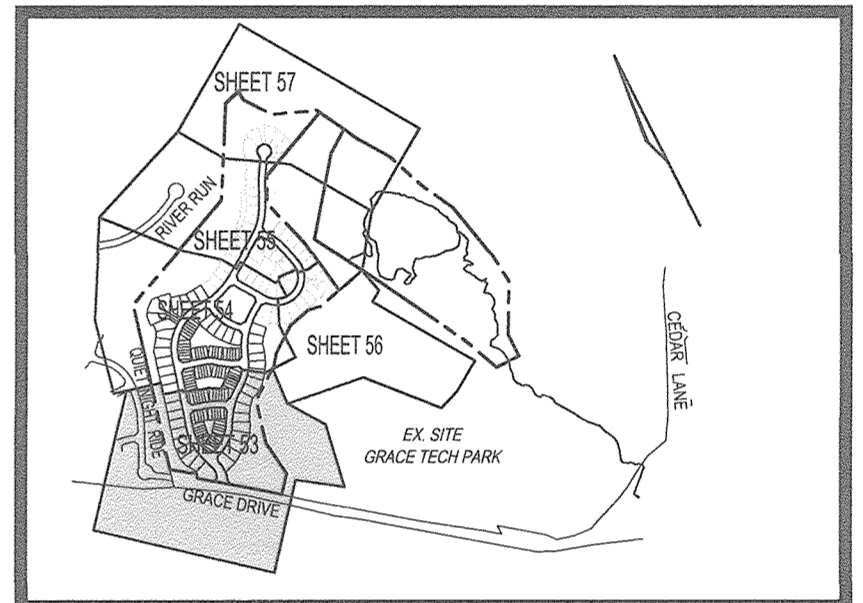
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON OCTOBER 28, 2014. AVAILABLE ONLINE AT: <http://websoilsurvey.sc.egov.usda.gov/>

2. HYDRIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRIC SOILS LIST. AT: <http://soils.usda.gov/soils/hydric/>, CONSULTED ON OCTOBER 28, 2014.

**ESD LEGEND:**

	TEST PIT
	SOIL BORING
	ESD DRAINAGE AREA DIVIDE
	ESD DRAINAGE AREA DESIGNATION
	NON-STRUCTURAL ROOFTOP DISCONNECTION
	MICRO-SCALE PRACTICE (BIO-SWALE (M-8))
	MICRO BORETENTATION (M-6)
	200 CAL RAIN BARREL
	PROPOSED DRYWELL



**KEY MAP**  
NOT TO SCALE

**ENVIRONMENTAL SITE DESIGN (ESD) STORMWATER MANAGEMENT DRAINAGE AREA MAP**

SCALE: 1"=50'

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
ENVIRONMENTAL SITE DESIGN (ESD)  
STORMWATER MANAGEMENT - DRAINAGE AREA MAP  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
SIP REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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, EXPIRES DATE: 09-27-2020

53 SHEET OF 74



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.26.19

**NOTE**  
THE DEPARTMENT OF PLANNING & ZONING HAS DETERMINED THE EXISTING ENCROACHMENT FOR THE STORM DRAIN OUTFALL OCCURRING ALONG GRACE DRIVE A "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.



MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17

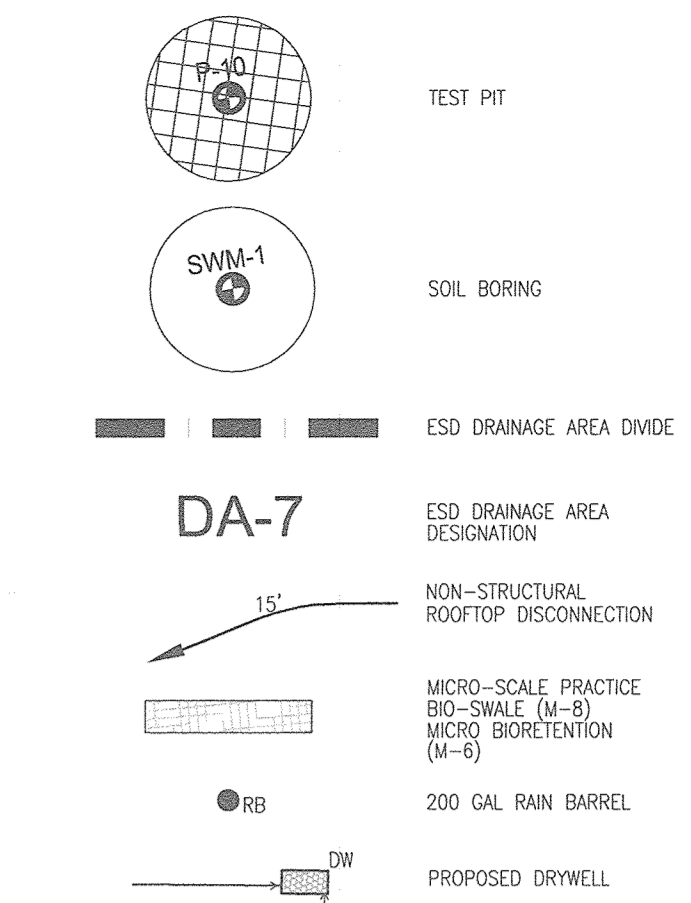
SYMBOL	NAME / DESCRIPTION	GROUP	HYDRO	HYDRO	HYDRO	K FACTOR	PERM	PERM	PERM	PERM	PERM
EA	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EB	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EC	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
ED	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EE	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EF	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EG	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EH	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EI	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EJ	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EK	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EL	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EM	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EN	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EO	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EP	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EQ	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
ER	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
ES	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
ET	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EU	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EV	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EW	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EX	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EY	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO
EZ	BALE Silt LOAM, 0 TO 3 PERCENT SLOPES	C	NO	NO	NO	0.37	NO	NO	NO	NO	NO

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

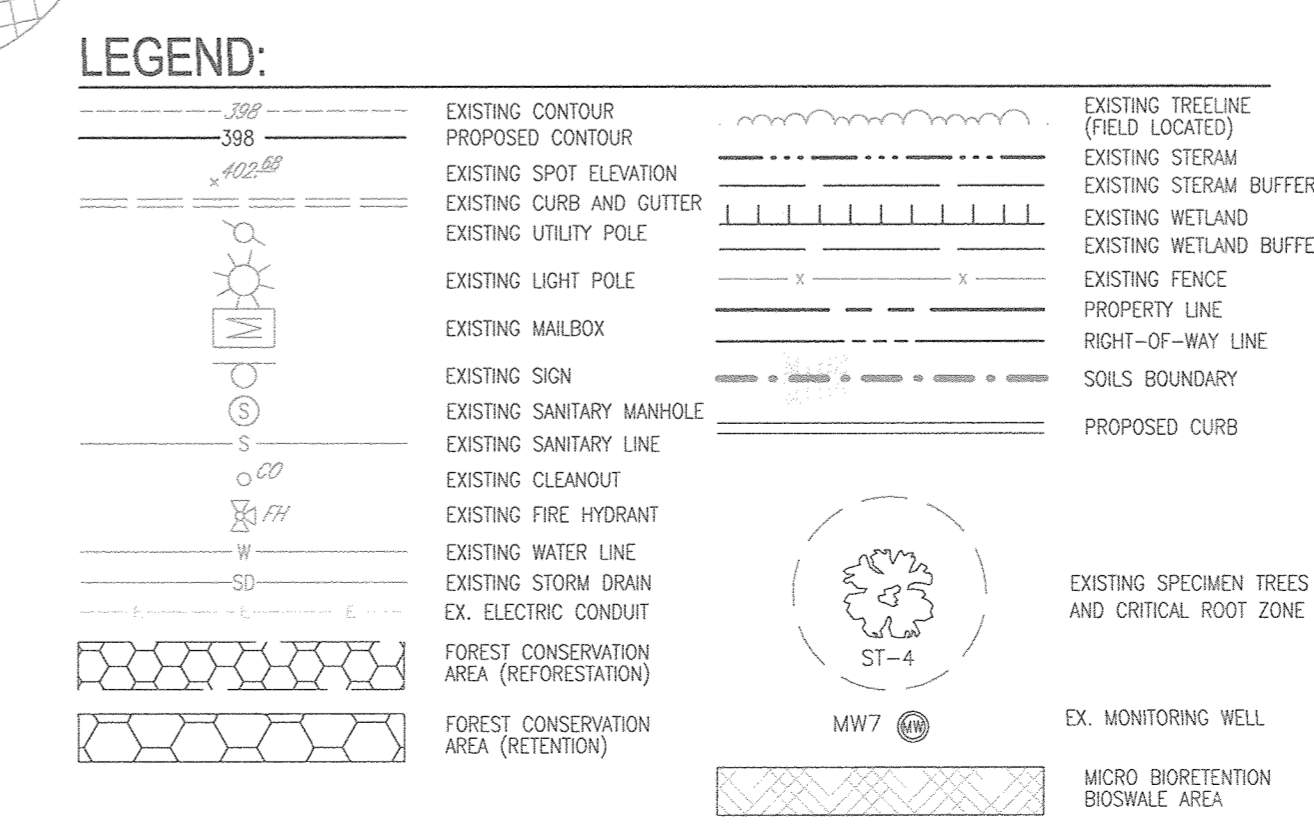
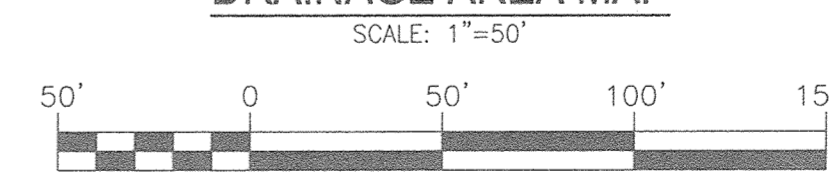
NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON DECEMBER 29, 2014. AVAILABLE ON-LINE AT: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.dsp>

2. HYDRO SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRO SOILS LIST. AT: <http://soils.usda.gov/soils/hydro/>, CONSULTED ON DECEMBER 29, 2014.



ENVIRONMENTAL SITE DESIGN (ESD)  
STORMWATER MANAGEMENT  
DRAINAGE AREA MAP



OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DRIVE  
COLUMBIA, MD 21044-4098  
(410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
ENVIRONMENTAL SITE DESIGN (ESD)  
STORMWATER MANAGEMENT - DRAINAGE AREA MAP  
**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
PLATS 23334-23337

TAX MAP 35 GRID 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

**ROBERT H. VOGEL ENGINEERING, INC.**  
ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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: 09-27-2020

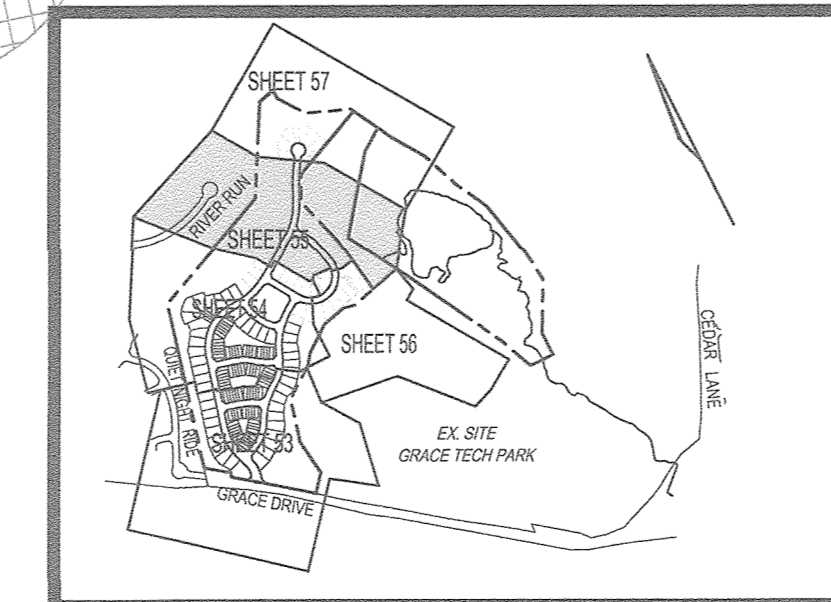
STATE OF MARYLAND  
ROBERT H. VOGEL  
REGISTERED PROFESSIONAL ENGINEER  
5/2/19

55 SHEET OF 74

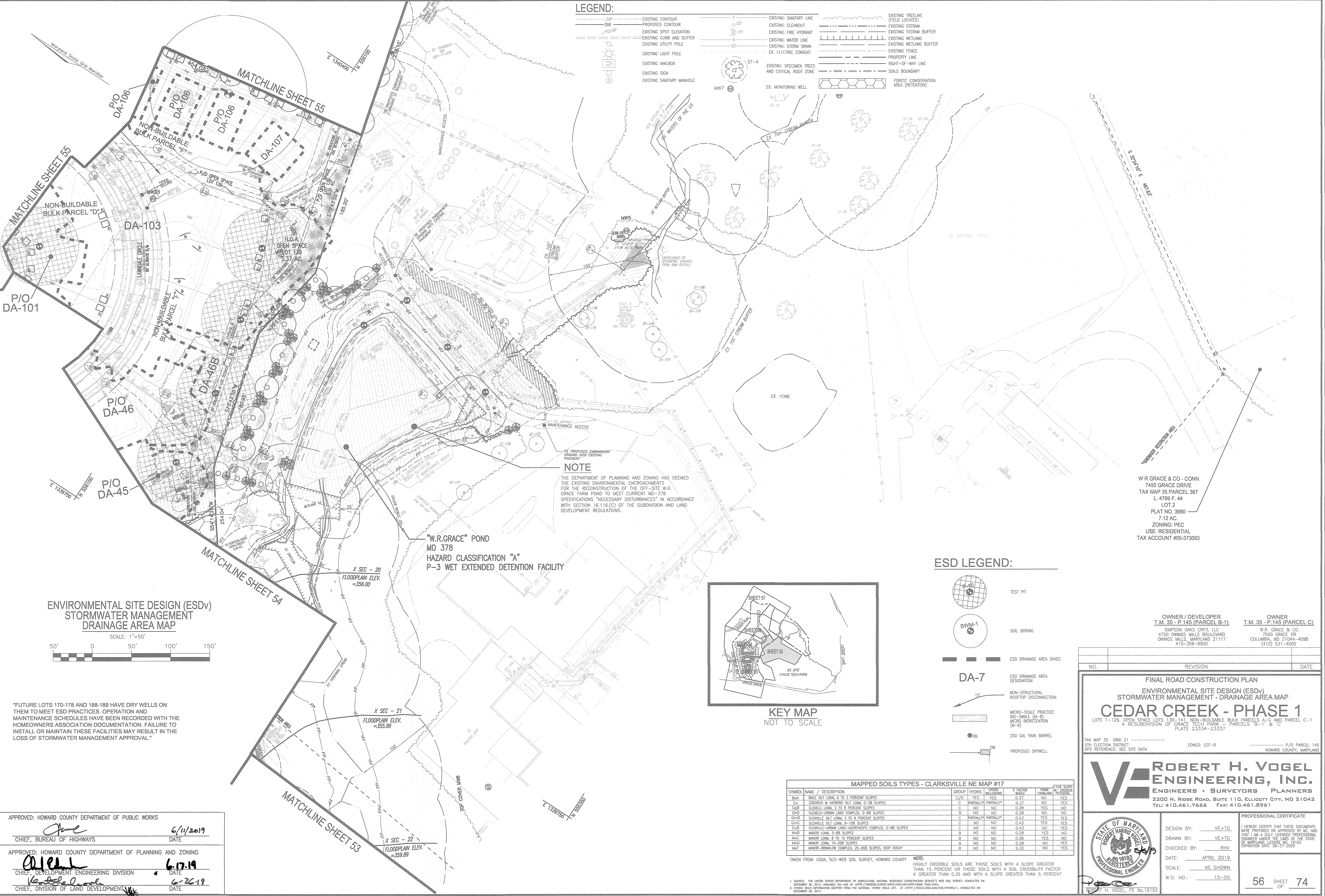
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 6-17-19

"FUTURE LOTS 146-151, 154-157, 164-170, 190-196 HAVE DRY WELLS ON THEM TO MEET ESD PRACTICES. OPERATION AND MAINTENANCE SCHEDULES HAVE BEEN RECORDED WITH THE HOMEOWNERS ASSOCIATION DOCUMENTATION. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL."



KEY MAP  
NOT TO SCALE



**LEGEND:**

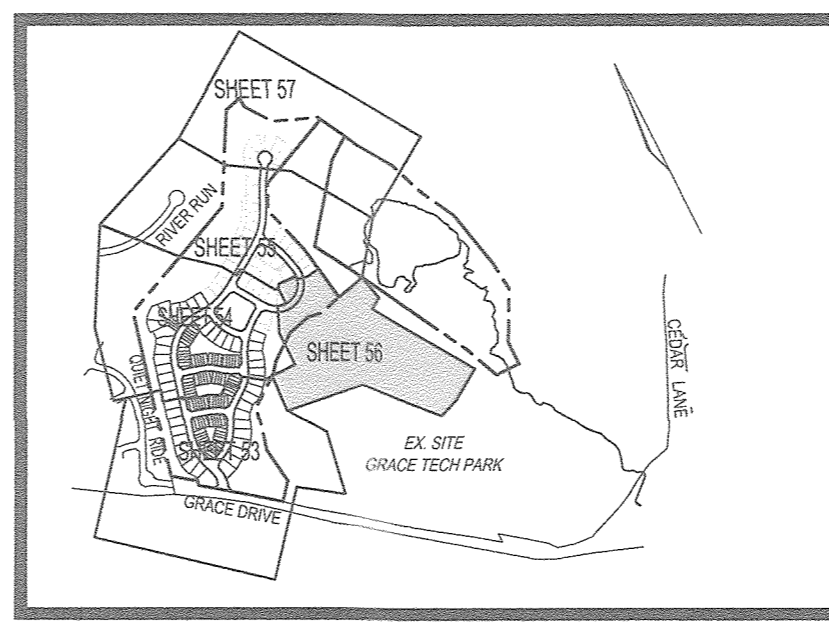
---	EXISTING CONTOUR	---	EXISTING SANITARY LINE	---	EXISTING TREETRUE (FIELD LOCATED)
---	PROPOSED CONTOUR	---	EXISTING CLEANOUT	---	EXISTING STREAM
---	EXISTING SPOT ELEVATION	---	EXISTING FIRE HYDRANT	---	EXISTING STREAM BUFFER
---	EXISTING CURB AND GUTTER	---	EXISTING WATER LINE	---	EXISTING WETLAND
---	EXISTING UTILITY POLE	---	EXISTING STORM DRAIN	---	EXISTING WETLAND BUFFER
---	EXISTING LIGHT POLE	---	EX. ELECTRIC CONDUIT	---	EXISTING FENCE
---	EXISTING MAILBOX	---	---	---	PROPERTY LINE
---	EXISTING SIGN	---	---	---	RIGHT-OF-WAY LINE
---	EXISTING SANITARY MANHOLE	---	---	---	SOILS BOUNDARY
---	---	---	---	---	FOREST CONSERVATION AREA (RETENTION)

**NOTE**  
 THE DEPARTMENT OF PLANNING AND ZONING HAS DEEMED THE EXISTING ENVIRONMENTAL ENCROACHMENTS FOR THE RECONSTRUCTION OF THE OFF-SITE W.R. GRACE FARM POND TO MEET CURRENT MD-378 SPECIFICATIONS "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116.(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

**ENVIRONMENTAL SITE DESIGN (ESD)  
 STORMWATER MANAGEMENT  
 DRAINAGE AREA MAP**  
 SCALE: 1"=50'  
 50' 0 50' 100' 150'

"FUTURE LOTS 170-178 AND 188-189 HAVE DRY WELLS ON THEM TO MEET ESD PRACTICES. OPERATION AND MAINTENANCE SCHEDULES HAVE BEEN RECORDED WITH THE HOMEOWNERS ASSOCIATION DOCUMENTATION. FAILURE TO INSTALL OR MAINTAIN THESE FACILITIES MAY RESULT IN THE LOSS OF STORMWATER MANAGEMENT APPROVAL."

"W.R. GRACE" POND  
 MD 378  
 HAZARD CLASSIFICATION "A"  
 P-3 WET EXTENDED DETENTION FACILITY



**ESD LEGEND:**

⊙	TEST PIT
⊙	SOIL BORING
---	ESD DRAINAGE AREA DIVIDE
---	ESD DRAINAGE AREA DESIGNATION
---	NON-STRUCTURAL ROOFTOP DISCONNECTION
---	MICRO-SCALE PRACTICE BIO-SWALE (M-8) MICRO-BORICENTRATION (M-6)
⊙	200 GAL RAIN BARREL
⊙	PROPOSED DRYWELL

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

SYMBOL	NAME / DESCRIPTION	GROUP	HYDRIC	THREAT INCLUSIONS	K FACTOR	ERODIBLE	EROSION POTENTIAL
Bka	BARE SHLT LOAM, 0 TO 3 PERCENT SLOPES	C/D	YES	YES	0.37	NO	YES
Ca	COGERS & HARBOR SHLT LOAM, 0-2% SLOPES	C	PARTIALLY	PARTIALLY	0.37	NO	YES
GbB	GLENGLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO
GbB	GLENGLE-URBAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO
GcB	GLENGLE SHLT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY	0.43	YES	YES
GcC	GLENGLE SHLT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES
GcB	GLENGLE-URBAN LAND-LOCATIONS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	YES	YES
Mob	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO
Mob	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO
Mob	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES
MkP	MANOR-BANLOW COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY  
 NOTE: 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  
 1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON DECEMBER 28, 2014. AVAILABLE ONLINE AT: <http://websoilsurvey.nrcs.usda.gov/home/home.pl>  
 2. SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDRO SOILS LIST. AT: <http://soils.usda.gov/soils/ndr/>, CONSULTED ON DECEMBER 28, 2014.

W R GRACE & CO - CONN  
 7450 GRACE DRIVE  
 TAX MAP 35 PARCEL 367  
 L. 4799 F. 44  
 LOT 2  
 PLAT NO. 3990  
 7.12 AC.  
 ZONING: PEC  
 USE: RESIDENTIAL  
 TAX ACCOUNT #05-373093

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-8900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

FINAL ROAD CONSTRUCTION PLAN  
 ENVIRONMENTAL SITE DESIGN (ESD)  
 STORMWATER MANAGEMENT - DRAINAGE AREA MAP  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 25334-25337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

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 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHY  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

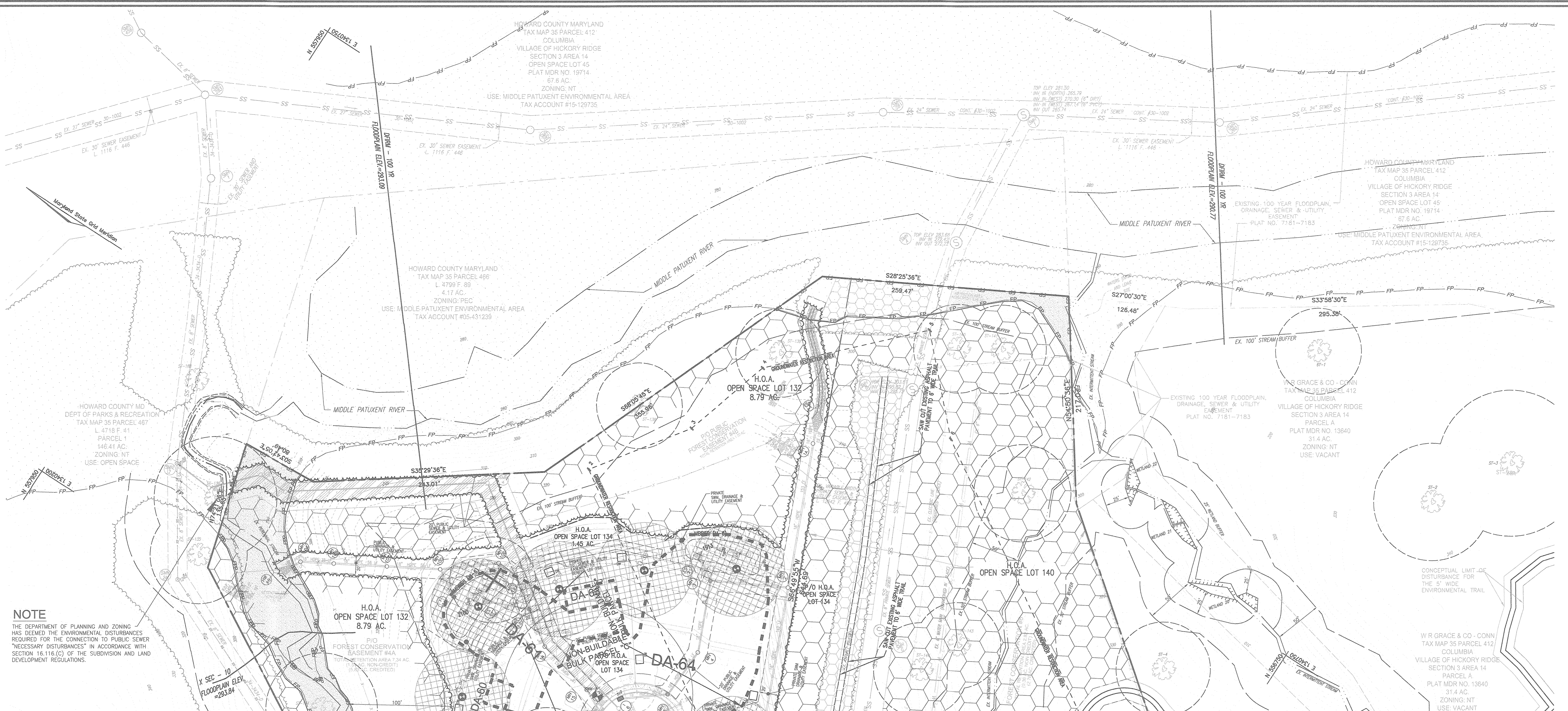
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 EXPIRATION DATE: 03-27-2020

56 SHEET OF 74

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 J. J. ... 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 ... 6-17-19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
 ... 6-20-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE





**NOTE**  
 THE DEPARTMENT OF PLANNING AND ZONING HAS DETERMINED THE ENVIRONMENTAL DISTURBANCES REQUIRED FOR THE CONNECTION TO PUBLIC SEWER "NECESSARY DISTURBANCES" IN ACCORDANCE WITH SECTION 16.116(C) OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

**MAPPED SOILS TYPES - CLARKSVILLE NE MAP #17**

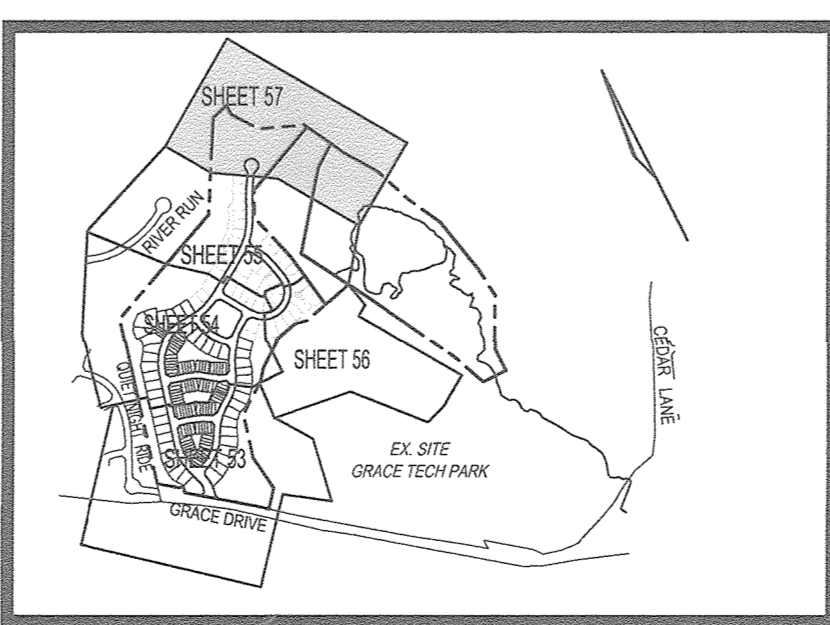
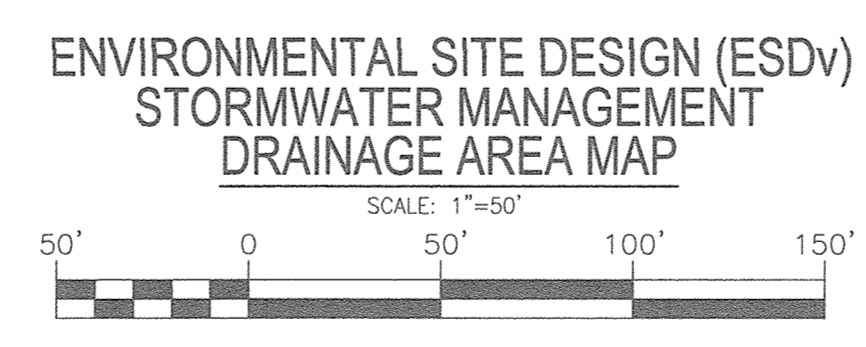
SYMBOL	NAME / DESCRIPTION	GROUP	HYDROIC	INCLUSIONS	% FINE SAND	PERCENT SAND	CLOSE SLOPE
SsA	SHALE SILT LOAM, 0 TO 3 PERCENT SLOPES	C	NO	YES	0.37	NO	YES
Co	COORUGUS & HATERBORO SILT LOAM, 0-3% SLOPES	C	PARTIALLY	PARTIALLY*	0.37	NO	YES
GsB	GLENGLE LOAM, 3 TO 8 PERCENT SLOPES	C	NO	NO	0.28	YES	NO
GsB	GLENGLE-WHELAN LAND COMPLEX, 0-8% SLOPES	B	NO	NO	0.28	NO	NO
GsB	GLENGLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	PARTIALLY	PARTIALLY*	0.43	YES	YES
GsC	GLENGLE SILT LOAM, 8-15% SLOPES	C	NO	NO	0.43	YES	YES
GsB	GLENGLE-URBAN LAND-INDUSTRIALS COMPLEX, 0-8% SLOPES	C	NO	NO	0.43	NO	YES
MsB	MANOR LOAM, 3-8% SLOPES	B	NO	NO	0.28	YES	NO
MsC	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	NO	NO	0.28	YES	NO
MsD	MANOR LOAM, 15-25% SLOPES	B	NO	NO	0.28	NO	YES
MsT	MANOR-BROOKLYN COMPLEX, 25-65% SLOPES, VERY ROCKY	B	NO	NO	0.32	NO	YES

TAKEN FROM: USDA, SCS-WEB SOIL SURVEY, HOWARD COUNTY

**NOTE:** HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL EROSION FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

1. SOURCE: THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCE CONSERVATION SERVICE'S WEB SOIL SURVEY, CONSULTED ON OCTOBER 29, 2018. AVAILABLE ONLINE AT: <http://websoilsurvey.sc.egov.usda.gov>

2. HYDROIC SOILS INFORMATION ADAPTED FROM THE NATIONAL HYDROIC SOILS LIST. ALL <http://soils.usda.gov/soils/hydroic/>, CONSULTED ON OCTOBER 29, 2018.



**MATCHLINE SHEET 55**  
**ESD LEGEND:**

- TEST PIT
- SOIL BORING
- ESD DRAINAGE AREA DIVIDE
- DA-7  
ESD DRAINAGE AREA DESIGNATION
- NON-STRUCTURAL ROOFTOP DISCONNECTION
- MICRO-SCALE PRACTICE BIO-SWALE (M-B)  
MICRO BORETENTMENT (M-B)
- 200 GAL RAIN BARREL
- PROPOSED DRYWELL

**LEGEND:**

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING STORM DRAIN
- EX. ELECTRIC CONDUIT
- FOREST CONSERVATION AREA (RETENTION)
- FOREST CONSERVATION AREA (REFORESTATION)
- EXISTING TREELINE
- EXISTING STREAM BUFFER
- EXISTING WETLAND BUFFER
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- EXISTING FLOOD PLAIN
- PROPOSED CURB
- EXISTING SPECIMEN TREES AND CRITICAL ROOT ZONE
- EXISTING MONITOR WELLS

**OWNER / DEVELOPER**  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

**OWNER (PARCEL C)**  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE

**FINAL ROAD CONSTRUCTION PLAN**  
**ENVIRONMENTAL SITE DESIGN (ESD)  
 STORMWATER MANAGEMENT - DRAINAGE AREA MAP**  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 SPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R

P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

**PROFESSIONAL CERTIFICATE**

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHY  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

57 SHEET OF 74

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 TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DAMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH OR PROVIDE A HYDROBARRIER TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

THE PLANTING SOIL SHALL MEET THE FOLLOWING CRITERIA:  
• SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).  
• ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).  
• CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.  
• PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED 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 TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

3. CONSTRUCTION  
IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION MACHS TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EQUIPATED USING LOGS, THE CONTRACTOR SHOULD USE WIDE TRACK OR WASH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LOGS, 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 PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH 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.

ROTTILL TO 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

4. PLANT MATERIAL  
RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

5. PLANT INSTALLATION  
COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SUBROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE.

ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND COVER BEFORE INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

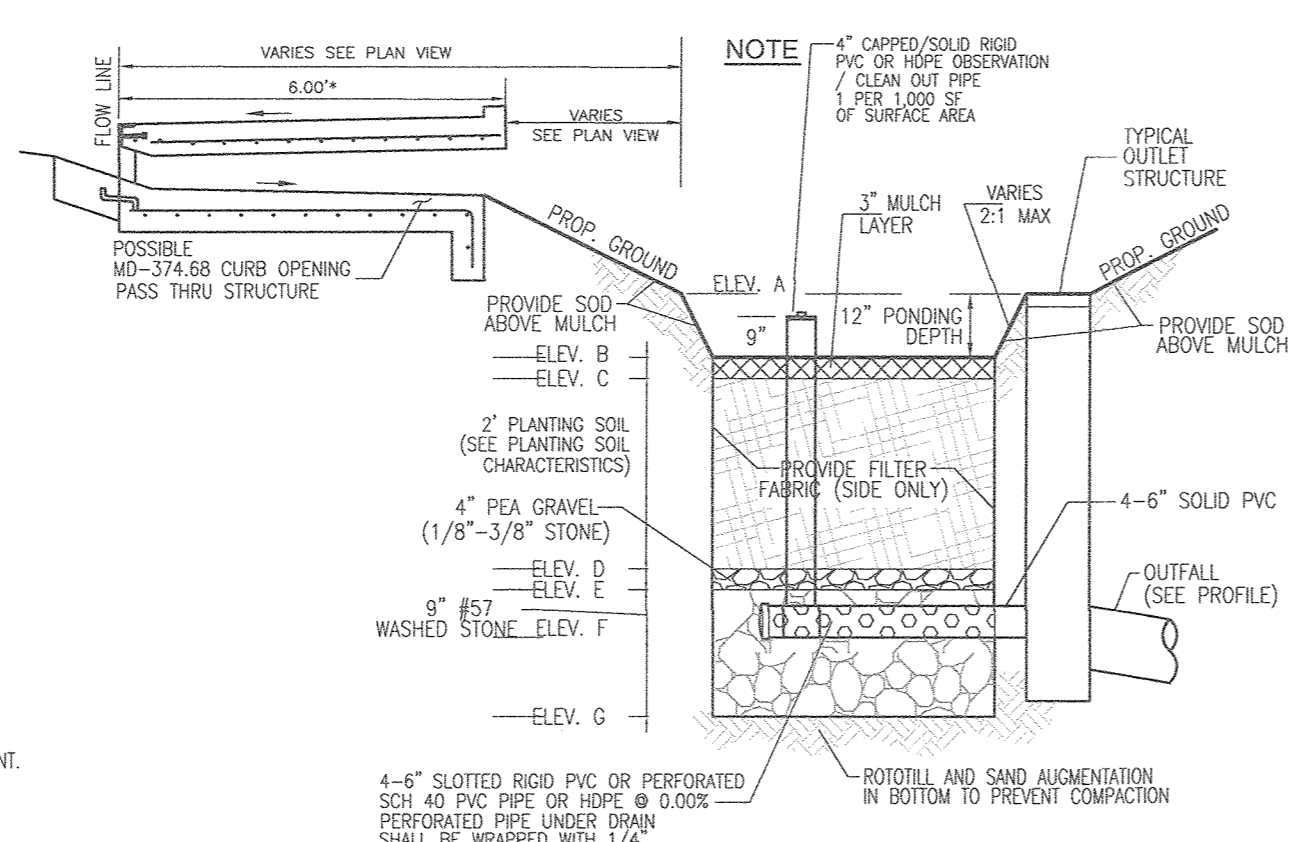
GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS, DEFOLIANTS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER TO WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

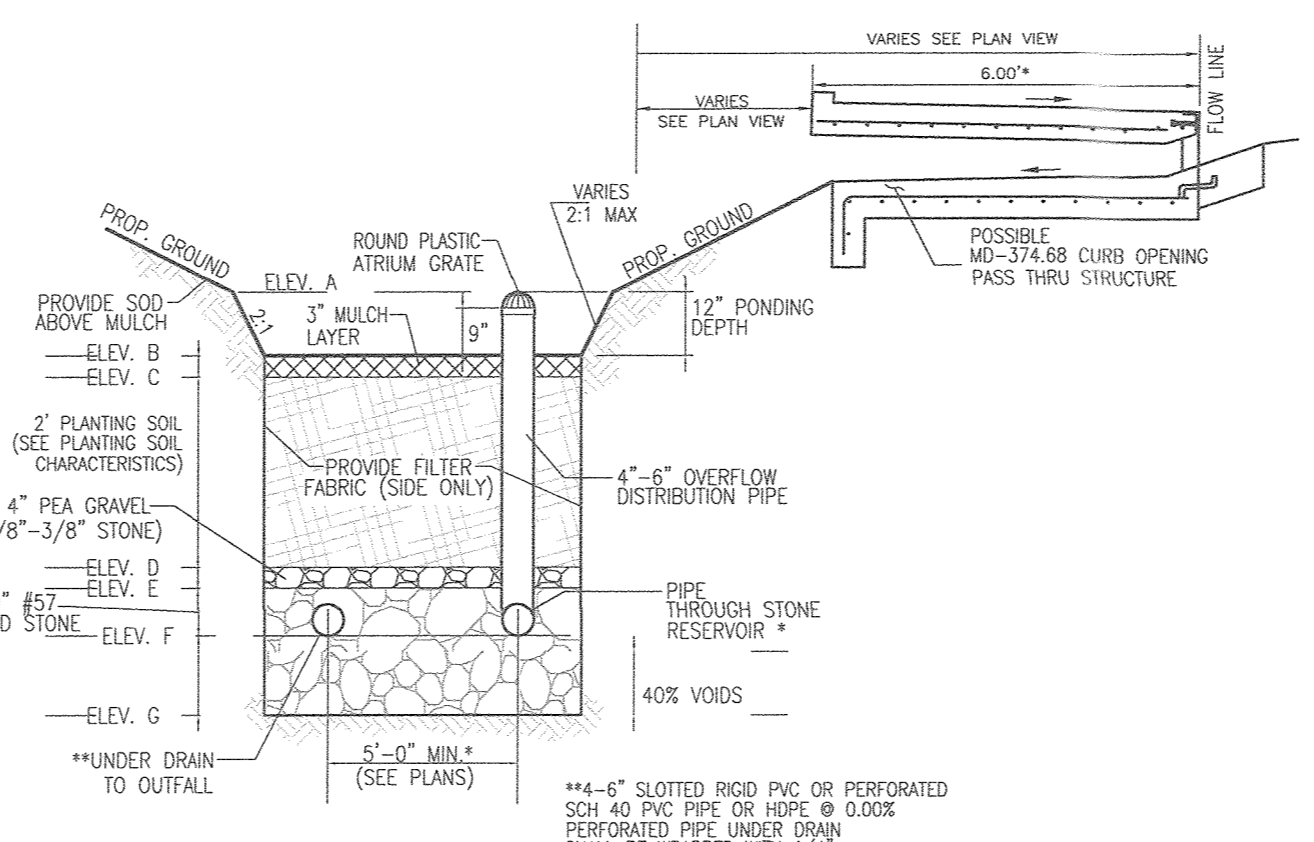
6. UNDERDRAINS  
UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:  
• PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED 4" RIGID PVC OR HDPE (1/8" TO 3/8").  
• PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH 1/4" (NO. 4 OR 4.4) GALVANIZED HARDWARE CLOTH.  
• GRAVEL - THE GRAVEL LAYER (NO. 57 STONE) SHALL BE AT LEAST 1/2" THICK ABOVE AND BELOW THE UNDERDRAIN.  
• THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.  
• A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTERS.  
• A 4" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES IN TO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED THICKNESS EXCESS 2".

THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

7. MISCELLANEOUS  
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

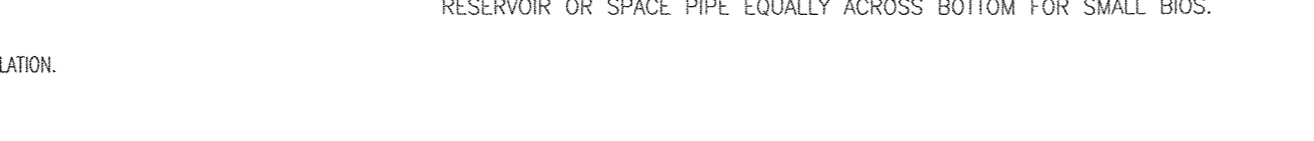


TYPICAL DETAIL MICRO-BIORETENTION (UNDERDRAIN) NOT TO SCALE



TYPICAL DETAIL MICRO-BIORETENTION (OVERFLOW) NOT TO SCALE

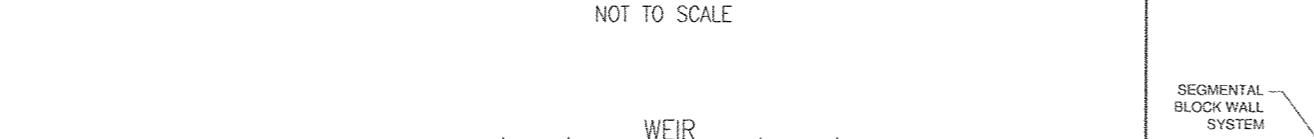
**MICROBIORETENTION NOTES:**  
1. ONLY THE SOIL OF MICROBIORETENTION ARE TO BE WRAPPED IN FILTER FABRIC. FILTER FABRIC BETWEEN LAYER OR AT THE BOTTOM OF THE MICROBIORETENTION WILL CAUSE THE MBR TO FAIL, AND THEREFORE SHALL NOT BE INSTALLED.  
2. WRAP THE PERFORATED UNDERDRAIN PIPE WITH 1/4" MESH (#4) OR SMALLER GALVANIZED HARDWARE CLOTH. SEE APPENDIX B.4.C.  
3. PROVIDE 5" MINIMUM SPACING UNDER DRAIN AND PERFORATED PIPE THROUGH STONE RESERVOIR OR SPACE PIPE EQUALLY ACROSS BOTTOM FOR SMALL BINS.



TYPICAL SPILLWAY SECTION NOT TO SCALE



TYPICAL SPILLWAY PROFILE NOT TO SCALE

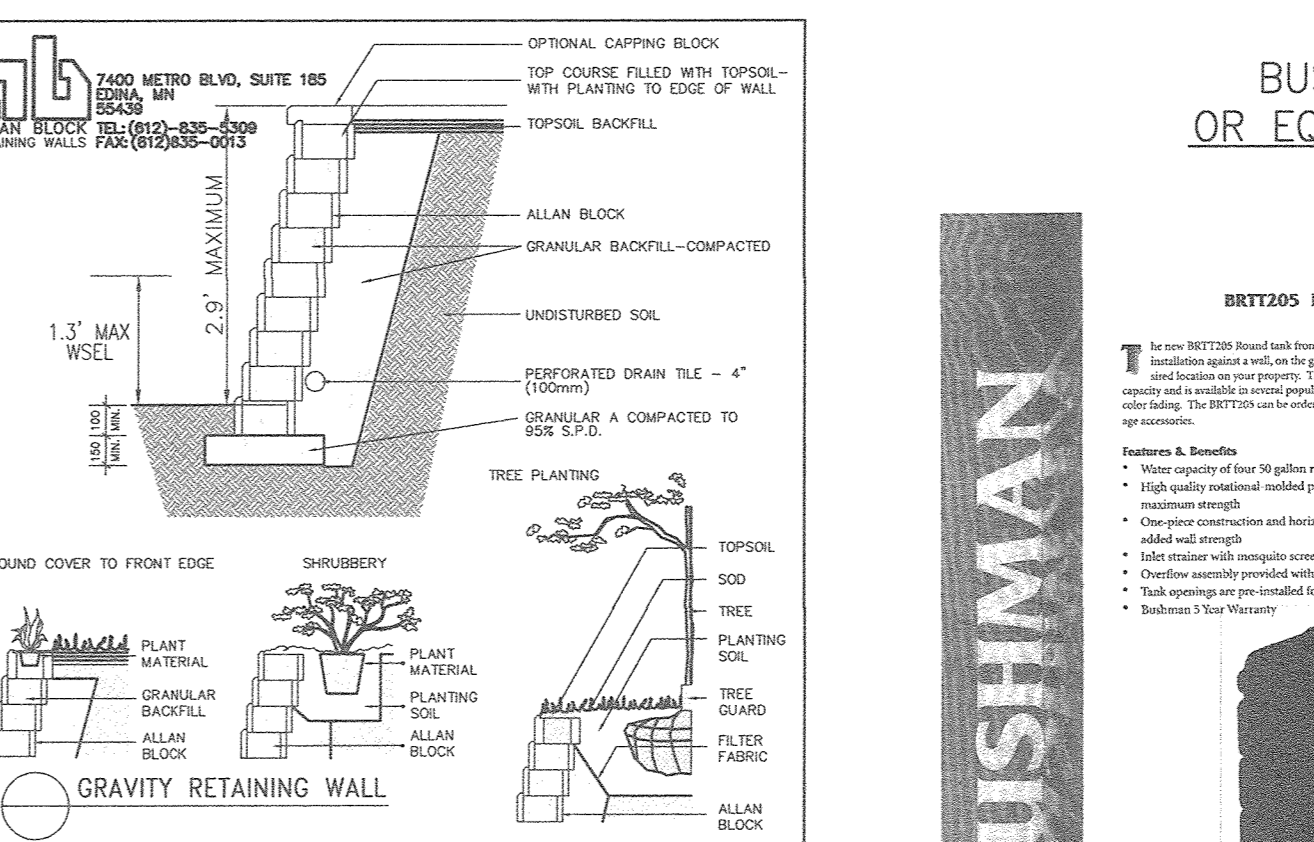


DETAILS OF WEIR OUTLET MICRO-BIORETENTION NOT TO SCALE

**FENCE NOTES:**  
- FENCING IS REQUIRED FOR ALL WALLS WHERE THE WALL HEIGHT IS GREATER THAN 30" (2.5')  
- FENCE DESIGN BY OTHERS

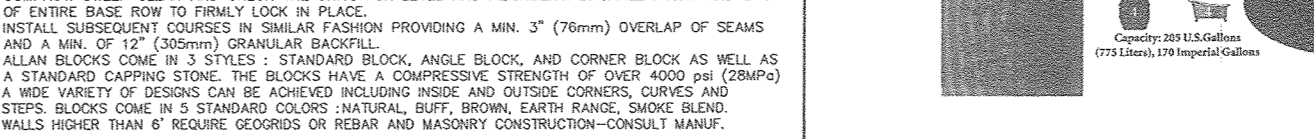


FENCE POST INSTALLATION DETAIL OR EQUAL NOT TO SCALE



DETAIL OF BUSHMAN RAIN HARVESTING SYSTEM OR EQUIVALENT 200 GALLON RAIN BARREL NOT TO SCALE

**GRAVITY WALL OR EQUAL**  
SPECIFICATIONS:  
1. EXCAVATE AREA TO LINE AND GRADES AS SHOWN ON CONSTRUCTION DRAWINGS.  
2. BASE MATERIAL SHALL BE GRANULAR MATERIAL COMPACTED TO 95% S.P.D. AND GRADED TO PROVIDE LEVEL, HARD SURFACE ON WHICH TO PLACE THE FIRST COURSE OF 1/2" (MIN. THICKNESS - 6" (TYPICAL)) PLACE FIRST COURSE A MINIMUM OF 4" (TYPICAL) BELOW FINISHED GRADE, WITH THE RASPED UP FACING OUT AND THE FRONT EDGE OF THAT COURSE. FALL GAUGES WITH SAND OR CLEAR CRUSHED STONE AND COMPACT. SWEET CLEAN AND CHECK THE UNITS FOR LEVEL AND ADJUSTMENT. BACKFILL FRONT AND BACK OF EXISTING BASE ROW TO FINISH GRADE.  
3. INSTALL SUPERSTRESS COURSE IN SIMILAR FASHION PROVIDING A MIN. 3" (TYPICAL) OVERLAY OF SEAS AND A MIN. OF 12" (TYPICAL) GRANULAR BACKFILL. JEWEL BLOCKS AND CORNER BLOCKS AS WELL AS A STANDARD CURBSTONE COURSE. THE BLOCKS HAVE A COMPRESSIVE STRENGTH OF OVER 4000 P.S.I. (28 MPa).  
4. A TREE VARIETY OF CURBSTONE (SUCH AS HOLLAND BROSSE AND OUTSIDE CORNER, CURVES AND SPLITS) BLOCKS CAN BE IN STANDARD COLORS (NATURAL, BUFF, BROWN, EARTH, RED, SAND, SAND) AND 6" WALLS HIGHER THAN 6" REQUIRE GEOTEXTILES OR REINFORCING AND MASTERY CONSTRUCTION-CONSULT M.D.P.



TYP. GRAVITY WALL OR EQUAL NOT TO SCALE



TYPICAL DETAIL MICRO-BIORETENTION W/ GRAVITY WALL NOT TO SCALE

**GRAVITY WALL NOTES:**  
- LOCATION OF FACILITIES REQUIRING WALLS IS SHOWN HEREIN. MAX HEIGHT 2.9'  
- SEE PLAN VIEWS FOR OUTLET STRUCTURE LOCATION  
- PROVIDE FENCING AS REQUIRED  
- STRUCTURAL DESIGN MAY BE REQUIRED DUE TO LOCATION ADJACENT TO MICRO-BIORETENTION FACILITY

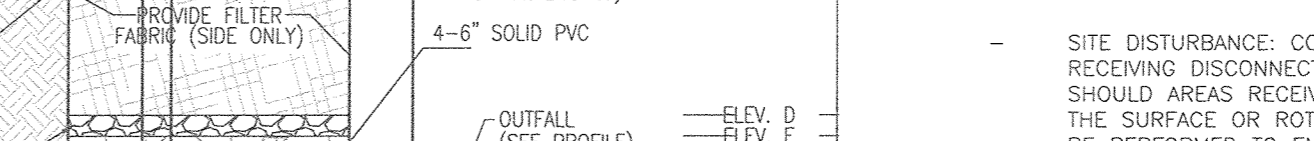
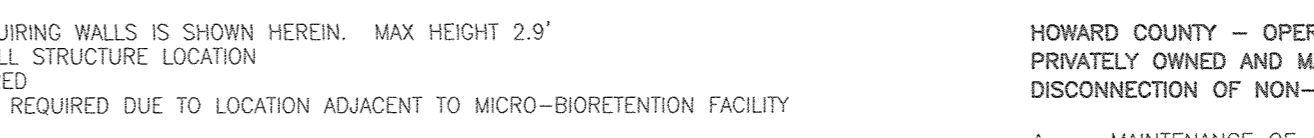


FIGURE 3 STANDARD DRIVEWAY DOWNSPOUT FITTINGS



LAYOUT OPTION 1 AND LAYOUT OPTION 2



TYPICAL SECTION NOT TO SCALE

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

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

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2" to 4" deep)	loamy sand (60-65%) & compost (35-40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)	n/a	shredded hardwood
Mulch	shredded hardwood	n/a	aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile	n/a	n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underdrain pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; $f'_c = 3500$ psi @ 28 days, normal weight, air-entrained, reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 318.0R/89; vertical loading (H-10 or H-20) - allowable horizontal loading (based on soil pressures); and analysis of potential cracking
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonate or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

OPERATION AND MAINTENANCE SCHEDULE FOR (M-6) MICROBIORETENTION AREAS

1. ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 WASHLAND STORMWATER DESIGN MANUAL, VOLUME 8, TABLE 4.4.1 AND 2.

2. SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.

3. MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER EVERY 2 TO 3 YEARS.

4. SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

ON-LOT DRYWELL - SIZING CHART

ESD DA	LOT #	DW LOCATION	NUMBER OF DWS	SURFACE SIZE FT X FT	STONE DEPTH FT	SAND DEPTH FT	OWNER PRIVATE/PUBLIC	MAINTENANCE PRIVATE/PUBLIC
1	1	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	2	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	3	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	4	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	5	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
2A	6	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	7	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	8	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	9	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
2B	10	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	11	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	12	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	13	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
	14	R	2	9.50 X 9.50	4	1	PRIVATE	PRIVATE
3B	2	F	1	10.00 X 11.00	4	1	PRIVATE	PRIVATE
	3	F	1	10.00 X 11.00	4	1	PRIVATE	PRIVATE
	4	F	1	10.00 X 11.00	4	1	PRIVATE	PRIVATE
8	38	R	2	6.00 X 10.00	4	1	PRIVATE	PRIVATE
	39	R	2	6.00 X 10.00	4	1	PRIVATE	PRIVATE
	40	R	2	6.00 X 10.00	4	1	PRIVATE	PRIVATE
12	5	F	1	6.00 X 7.00	4	1	PRIVATE	PRIVATE
	6	F	1	6.00 X 7.00	4	1	PRIVATE	PRIVATE
	7	F	1	6.00 X 7.00	4	1	PRIVATE	PRIVATE
23-A	8	F	1	6.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	9	F	1	6.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	10	F	1	6.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	11	F	1	6.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	12	F	1	6.00 X 10.00	4.67	1	PRIVATE	PRIVATE
35	28	F	1	6.00 X 9.00	4.67	1	PRIVATE	PRIVATE
40	27	F	1	8.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	60	F	1	8.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	28	F	1	8.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	29	F	1	8.00 X 10.00	4.67	1	PRIVATE	PRIVATE
	41	F	1	7.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	42	F	1	7.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	36	R	1	10.00 X 10.00	4	1	PRIVATE	PRIVATE
46-B	177	R	1	7.00 X 10.00	4.67	1	PRIVATE	PRIVATE
24	15	R	2	7.00 X 9.50	4	1	PRIVATE	PRIVATE
	16	R	2	7.00 X 9.50	4	1	PRIVATE	PRIVATE
	17	R	2	7.00 X 9.50	4	1	PRIVATE	PRIVATE
	18	R	2	7.00 X 9.50	4	1	PRIVATE	PRIVATE
	19	R	2	7.00 X 9.50	4	1	PRIVATE	PRIVATE
52	144	R	2	8.00 X 8.00	4	1	PRIVATE	PRIVATE
53	145	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	146	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	147	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
58	154	R	3	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	155	R	3	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
58-A	156	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	157	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
59	158	R	3	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
60	160	R	1	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
62	161	R	2	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
64	159	R	1	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	162	F	1	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE
	163	F	1	8.00 X 9.00	4.67	1	PRIVATE	PRIVATE

ON-LOT DRYWELL - SIZING CHART

ESD DA	LOT #	DW LOCATION	NUMBER OF DWS	SURFACE SIZE FT X FT	STONE DEPTH FT	SAND DEPTH FT	OWNER PRIVATE/PUBLIC	MAINTENANCE PRIVATE/PUBLIC
100	182	R	1	10.00 X 10.00	4.5	1	PRIVATE	PRIVATE
	183	R	2	10.00 X 10.00	4.5	1	PRIVATE	PRIVATE
	184	R	2	10.00 X 10.00	4.5	1	PRIVATE	PRIVATE
	195	R	1	10.00 X 10.00	4.5	1	PRIVATE	PRIVATE
101	185	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	186	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	187	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	188	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	189	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	190	R	2	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
	191	R	1	8.00 X 8.00	4.5	1	PRIVATE	PRIVATE
102	188	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	195	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	196	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	197	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	198	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	199	R	1	8.00 X 8.00	4	1	PRIVATE	PRIVATE
103	187	F	1	7.50 X 9.00	4.5	1	PRIVATE	PRIVATE
	188	F	2	7.50 X 9.00	4.5	1	PRIVATE	PRIVATE
	189	F	2	7.50 X 9.00	4.5	1	PRIVATE	PRIVATE
	174	R	2	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	175	R	2	8.00 X 8.00	4	1	PRIVATE	PRIVATE
	176	R	2	8.00 X 8.00	4	1	PRIVATE	PRIVATE
106	168	R	3	7.50 X 9.50	4.5	1	PRIVATE	

CEDAR CREEK - ESDv COMPUTATIONS												
Rv=0.05+0.009X1 V min=1.0" rainfall Vmax=1yr rainfall=2.6"			(1.0x0.95x)/12 (2.6x0.95x)/12			-AREAS DRAINING TO "GRACE" EXISTING POND SHALL PROVIDE 1.6" ESDv						
AREAS ABOVE EXISTING OFFSITE "WR GRACE WET POND" - 10/100 YR POND - TO BE RECONSTRUCTED TO MD 378 SPECIFICATIONS												
DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0" VOLUME	1.6" VOLUME	2.6" VOLUME	VOLUME PROVIDED*	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
1	29.29	0.3136	23045	0.53	602	964	1566	1444	6750	0.15	0.37	MICROSCALE DRYWELL (M-5) 1444 9.5 9.5 4 DRYWELL 9.5' X 9.5' X 4' DEEP DRYWELL - 2 PER LOT 5 LOTS
2A	26.85	0.2917	20110	0.46	489	782	1271	1155	5400	0.12	0.34	MICROSCALE DRYWELL (M-5) 1155 9.5 9.5 4 DRYWELL 9.5' X 9.5' X 4' DEEP DRYWELL - 2 PER LOT 4 LOTS
2B	25.29	0.2776	26690	0.61	617	988	1605	1444	6750	0.15	0.46	MICROSCALE DRYWELL (M-5) 1444 9.5 9.5 4 DRYWELL 9.5' X 9.5' X 4' DEEP DRYWELL - 2 PER LOT 5 LOTS
3A	42.81	0.4353	26277	0.60	953	1525	2478	SEE BELOW MBR	11250	0.26	0.34	MICROSCALE MICRO-BIO RETENTION SEE BELOW - STORM DRAIN TO MBR 3
3B	44.23	0.4480	18213	0.42	680	1088	1768	568	8055	0.18	0.23	NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 40 ESDv 5 EA
1	43.46	0.4411	3935	0.09	145	231	16	1710	1710	0.04	0.05	MICROSCALE DRYWELL (M-5) 528 10 11 4 DRYWELL 10' X 11' X 4' DEEP DRYWELL - 1 PER LOT 3 LOTS
2	43.06	0.4375	4993	0.11	182	291	184	2150	2150	0.05	0.07	
3	43.79	0.4441	4910	0.11	182	291	184	2150	2150	0.05	0.06	
4	46.74	0.4707	4375	0.10	172	275	2045	2045	2045	0.05	0.05	
3C			7858					2540	0			MICROSCALE MICRO-BIO RETENTION 3 2540 = 1905 SF MICRO BIO
3D	5.50	0.0995	19325	0.44	160	256	416	260	1062	0.02	0.42	MICROSCALE MICRO-BIO RETENTION 1 260 = 195 SF MICRO BIO
4	19.12	0.2221	30850	0.71	571	914	1485	1267	5900	0.14	0.57	EXISTING GRACE DRIVE IMP - NO MANAGEMENT REQ  PROPOSED NEW ONSITE TRAIL & Road Widening 5900 SF NEW IMPERVIOUS MICROSCALE MICRO-BIO RETENTION 4 1267 = 950 SF MICRO BIO
5	20.38	0.3144	29100	0.67	763	1220	1983	1271	8550	0.20	0.47	MICROSCALE MICRO-BIO RETENTION 5 1200 = 730 SF MICRO BIO MICROSCALE RAINBARREL 55 CF 27 CF PER 200 GAL RAIN BARREL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 2 EA 32 ESDv
6A	78.88	0.7599	11600	0.27	735	1175	1910	32	9150	0.21	0.06	MICROSCALE MICRO-BIO RETENTION 6 2950 = 2213 SF MICRO BIO
6B	41.84	0.4266	32000	0.73	1138	1820	2958	3005	13390	0.31	0.43	MICROSCALE RAINBARREL 55 CF 27 CF PER 200 GAL RAIN BARREL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 2 EA 32 ESDv
7	40.29	0.4126	27151	0.62	934	1494	2427	1909	10940	0.25	0.37	MICROSCALE MICRO-BIO RETENTION 7 1830 = 1373 SF MICRO BIO MICROSCALE RAINBARREL 55 CF 27 CF PER 200 GAL RAIN BARREL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 3 EA 24 ESDv
8	100.00	0.9500	4050	0.09	321	513	834	576	4050	0.09	0.00	MICROSCALE DRYWELL (M-5) 576 6 10 4 DRYWELL 6' X 10' X 4' DEEP DRYWELL - 2 PER LOT 2 EA
9	66.64	0.6498	14585	0.33	750	1264	2053	1297	9720	0.22	0.11	MICROSCALE MICRO-BIO RETENTION 9 1265 = 949 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 4 EA 32 ESDv
10	65.65	0.6408	9770	0.22	522	835	1357	851	6414	0.15	0.08	MICROSCALE MICRO-BIO RETENTION 10 835 = 626 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 2 EA 16 ESDv
11	36.13	0.3752	22280	0.51	697	1115	1811	1115	8050	0.18	0.33	MICROSCALE MICRO-BIO RETENTION 11 1020 = 765 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 12 EA 95 ESDv
12	54.10	0.5369	22200	0.51	993	1589	2582	1615	12010	0.28	0.23	MICROSCALE MICRO-BIO RETENTION 12 1350 = 1013 SF MICRO BIO MICROSCALE DRYWELL (M-5) 202 6 7 4 DRYWELL 6' X 7' X 4' DEEP DRYWELL - 1 PER LOT 3 LOTS NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 8 EA 69 ESDv
13	62.62	0.6136	26700	0.61	1365	2184	3550	2195	16720	0.38	0.23	MICROSCALE MICRO-BIO RETENTION 13 1833 = 1375 SF MICRO BIO 275 CF VIA ADDITIONAL STONE W/ 0.4 VOIDS 0.5 FT UNDER MBR UNDERDRAIN NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 11 EA 87 ESDv
14	75.44	0.7289	10850	0.25	659	1055	1714	1064	8185	0.19	0.06	MICROSCALE MICRO-BIO RETENTION 14 1040 = 780 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 3 EA 24 ESDv
15	64.81	0.6333	29580	0.68	1561	2498	4059	2577	19170	0.44	0.24	MICROSCALE MICRO-BIO RETENTION 15 2270 = 1703 SF MICRO BIO 204 CF VIA ADDITIONAL STONE W/ 0.4 VOIDS 0.3 FT UNDER MBR UNDERDRAIN NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 13 EA 103 ESDv

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 \_\_\_\_\_ DATE 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 \_\_\_\_\_ DATE 6-17-19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

\_\_\_\_\_ DATE 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

CEDAR CREEK - ESDv COMPUTATIONS												
Rv=0.05+0.009X1 V min=1.0" rainfall Vmax=1yr rainfall=2.6"			(1.0x0.95x)/12 (2.6x0.95x)/12			-AREAS DRAINING TO "GRACE" EXISTING POND SHALL PROVIDE 1.6" ESDv						
AREAS ABOVE EXISTING OFFSITE "WR GRACE WET POND" - 10/100 YR POND - TO BE RECONSTRUCTED TO MD 378 SPECIFICATIONS												
DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0" VOLUME	1.6" VOLUME	2.6" VOLUME	VOLUME PROVIDED*	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
16	63.82	0.6243	22800	0.52	1186	1898	3084	1911	14550	0.33	0.19	MICROSCALE MICRO-BIO RETENTION 16 1710 = 1285 SF MICRO BIO 154 CF VIA ADDITIONAL STONE W/ 0.4 VOIDS 0.3 FT UNDER MBR UNDERDRAIN NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 6 EA 48 ESDv
17	28.61	0.3075	12235	0.28	313	502	815	554	3500	0.08	0.20	MICROSCALE MICRO-BIO RETENTION 17 506 = 380 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 6 EA 48 ESDv
18	41.15	0.4204	9720	0.22	341	545	885	560	4000	0.09	0.13	MICROSCALE MICRO-BIO RETENTION 18 520 = 390 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
19	34.86	0.3637	13470	0.31	408	653	1061	660	4695	0.11	0.20	MICROSCALE MICRO-BIO RETENTION 19 620 = 465 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
20	32.90	0.3461	15564	0.36	449	718	1167	740	5120	0.12	0.24	MICROSCALE MICRO-BIO RETENTION 20 700 = 525 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
21	37.00	0.3830	10940	0.24	336	538	875	900	3900	0.09	0.15	MICROSCALE MICRO-BIO RETENTION 21 900 = 675 SF MICRO BIO
22	72.98	0.7068	15210	0.35	896	1433	2329	1445	11100	0.25	0.09	MICROSCALE MICRO-BIO RETENTION 22 1333 = 1000 SF MICRO BIO 80 CF VIA ADDITIONAL STONE W/ 0.4 VOIDS 0.2 FT UNDER MBR UNDERDRAIN NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 4 EA 32 ESDv
23-A	70.46	0.6841	10538	0.24	601	961	1562	2973	7425	0.17	0.07	MICROSCALE MICRO-BIO RETENTION 23 2973 = 2290 SF MICRO BIO MICROSCALE DRYWELL (M-5) 550 6 10 4.67 DRYWELL 6' X 10' X 4.67' DEEP DRYWELL - 1 PER LOT NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
23-B	66.67	0.6500	19525	0.45	1058	1692	2750	40	13018	0.30	0.15	NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
28	72.39	0.7015	7080	0.16	414	662	1076	720	5125	0.12	0.04	MICROSCALE MICRO-BIO RETENTION 28 720 = 540 SF MICRO BIO
29	66.12	0.6451	17605	0.40	946	1514	2461	1520	11640	0.27	0.14	MICROSCALE MICRO-BIO RETENTION 29 1480 = 1110 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
32	46.21	0.4659	34408	0.79	1336	2138	3473	2519	15901	0.37	0.42	MICROSCALE MICRO-BIO RETENTION 32 2440 = 1830 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 10 EA 79 ESDv
33	24.21	0.2679	21600	0.50	482	772	1254	866	5230	0.12	0.38	MICROSCALE MICRO-BIO RETENTION 33 826 = 620 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
34	39.58	0.4062	18825	0.43	637	1020	1657	1040	7450	0.17	0.26	MICROSCALE MICRO-BIO RETENTION 34 1000 = 750 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv
35	48.84	0.4895	28585	0.66	1166	1866	3032	1884	13960	0.32	0.34	MICROSCALE MICRO-BIO RETENTION 35 1627 = 1220 SF MICRO BIO MICROSCALE DRYWELL (M-5) 101 9 6 4.67 DRYWELL 101 9 6 4.67 DRYWELL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 7 EA 55 ESDv
36	32.10	0.3389	17290	0.40	488	781	1270	1439	5550	0.13	0.27	MICROSCALE MICRO-BIO RETENTION 36 1360 = 1020 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 10 EA 79 ESDv
37	56.46	0.5581	19950	0.46	928	1485	2412	1704	11263	0.26	0.20	MICROSCALE MICRO-BIO RETENTION 37 1680 = 1260 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 3 EA 24 ESDv
38	60.06	0.5905	33535	0.77	1650	2640	4251	2640	20140	0.46	0.31	MICROSCALE MICRO-BIO RETENTION 38 2600 = 1950 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 5 EA 40 ESDv

CEDAR CREEK - ESDv COMPUTATIONS												
Rv=0.05+0.009X1 V min=1.0" rainfall Vmax=1yr rainfall=2.6"			(1.0x0.95x)/12 (2.6x0.95x)/12			-AREAS DRAINING TO "GRACE" EXISTING POND SHALL PROVIDE 1.6" ESDv						
AREAS ABOVE EXISTING OFFSITE "WR GRACE WET POND" - 10/100 YR POND - TO BE RECONSTRUCTED TO MD 378 SPECIFICATIONS												
DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0" VOLUME	1.6" VOLUME	2.6" VOLUME	VOLUME PROVIDED*	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
40	46.66	0.4700	38900	0.89	1524	2438	3961	2473	18152.5	0.42	0.48	MICROSCALE MICRO-BIO RETENTION 40 1953 = 1465 SF MICRO BIO MICROSCALE DRYWELL (M-5) 448 8 10 4.67 DRYWELL 8' X 10' X 4.67' DEEP DRYWELL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 9 EA 71 ESDv
41	100.00	0.9500	2700	0.06	214	342	556	353	2700	0.06	0.00	MICROSCALE DRYWELL (M-5) 353 7 9 4.67 DRYWELL 7' X 9' X 4.67' DEEP DRYWELL - 3 ON LOT 1 LOTS
42	61.58	0.6043	42700	0.96	2155	3448	5602	3525	26352	0.60	0.38	MICROSCALE MICRO-BIO RETENTION 42 3110 = 2333 SF MICRO BIO MICROSCALE DRYWELL (M-5) 320 10 10 4 DRYWELL 10' X 10' X 4' DEEP DRYWELL NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 12 EA 95 ESDv
43	34.27	0.3585	25850	0.59	772	1236	2008	1420	8860	0.20	0.39	MICROSCALE MICRO-BIO RETENTION 43 1306 = 980 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 4 EA 32 ESDv MICROSCALE RAINBARREL 82 CF 27 CF PER 200 GAL RAIN BARREL 3
45	20.45	0.2340	24450	0.56	477	763	1240	1320	5000	0.11	0.45	MICROSCALE MICRO-BIO RETENTION 45 1387 = 890 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 3 EA 24 ESDv MICROSCALE RAINBARREL 110 CF 27 CF PER 200 GAL RAIN BARREL 4
46	42.98	0.4368	31815	0.73	1158	1853	3011	1856	13675	0.31	0.42	MICROSCALE MICRO-BIO RETENTION 46 1800 = 1350 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15' DISCONNECT 7 EA 56 ESDv
46B	100.00	0.9500	1000	0.02	79	127	206	131	1000	0.02	0.00	MICROSCALE DRYWELL (M-5) 131 7 10 4.67 DRYWELL 7' X 10' X 4.67' DEEP DRYWELL 1
47	30.18	0.3216	28825	0.66	773	1236	2009	1267	8700	0.20	0.46	MICROSCALE MICRO-BIO RETENTION 47 1267 = 950 SF MICRO BIO
48	16.55	0.1989	40275	0.92	668	1068	1736	1080	6665	0.15	0.77	MICROSCALE MICRO-BIO RETENTION 48 1080 = 810 SF MICRO BIO
TOTAL ESD VOLUME								REQUIRED 60638 CUFT	PROVIDED 64319 CUFT			

SUBAREA SUMMARY FOR AREAS DRAINING TO OFFSITE W.R.GRACE POND FACILITY  
 REQUIRED ESDv = 60638 CUFT Pe = 1.6"  
 PROVIDED ESDv = 64319 CUFT Pe = 1.65"  
 REFER TO SHEET 6B FOR Q 10 & Q 100 SUMMARY

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

NO.	REVISION	DATE
FINAL ROAD CONSTRUCTION PLAN STORMWATER MANAGEMENT ESD COMPUTATIONS <b>CEDAR CREEK - PHASE 1</b> LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C" PLATS 23334-23337		
TAX MAP 35 GRID 21 5TH ELECTION DISTRICT DPZ REFERENCE: SEE SITE DATA		
ZONED: CEF-R P/O PARCEL 145 HOWARD COUNTY, MARYLAND		
<b>ROBERT H. VOGEL ENGINEERING, INC.</b> ENGINEERS • SURVEYORS • PLANNERS 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043 TEL: 410.461.7666 FAX: 410.461.8961		
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: 09-27-2020		
DESIGN BY: _____	VE+TG	
DRAWN BY: _____	VE+TG	
CHECKED BY: _____	RHV	
DATE: _____	APRIL 2019	
SCALE:		

**CEDAR CREEK - ESDv COMPUTATIONS**

Rv=0.05+0.009X1  
V min=1.0' rainfall  
Vmax=1yr rainfall=2.6'

(1.0x0.95xA)/12  
(2.6x0.95xA)/12

**"UNCONTROLLED AREA / REAR LOTS" FOR 10/100 YR CONTROL TOWARD SITE OUTFALL #4**

DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0' VOLUME	1.6' VOLUME	2.6' VOLUME	VOLUME PROVIDED	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
24	25.03	0.2753	19975	0.46	458	733	1191	745	5000	0.11	0.34	MICROSCALE DRYWELL (M-5) 745 7' 9.5" X 4' DEEP DRYWELL - 2 PER LOT 7
25	36.54	0.3788	22280	0.51	703	1125	1829	1196	8140	0.19	0.32	MICROSCALE MICRO-BIO RETENTION 25 1145 = 899 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 16 ESDv 8 CF - EACH 30" DISCONNECT 1 EA NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 1 EA MICROSCALE RAINBARREL 27 CF 27 CF PER 200 GAL RAIN BARREL 1
26	69.22	0.6730	6125	0.14	344	550	893	560	4240	0.10	0.04	MICROSCALE MICRO-BIO RETENTION 25 560 = 420 SF MICRO BIO MICROSCALE MICRO-BIO RETENTION 50 1553 = 1240 SF MICRO BIO
27	58.35	0.5752	21260	0.49	1019	1630	2649	1653	12406	0.28	0.20	MICROSCALE MICRO-BIO RETENTION 50 1553 = 1240 SF MICRO BIO
49	28.68	0.3081	27650	0.63	710	1136	1846	1400	7930	0.18	0.45	MICROSCALE BIO SWALE 49 1400 = 1050 SF 6'0" X 12'
50	20.90	0.2381	19975	0.44	384	615	1000	700	4050	0.09	0.35	MICROSCALE MICRO-BIO RETENTION 50 700 = 525 SF MICRO BIO
51	17.96	0.2117	31175	0.72	550	880	1430	975	5600	0.13	0.59	MICROSCALE BIO SWALE 51 975 = 731 SF MICRO BIO 6' X 12'
52	100.00	0.9500	1500	0.03	119	190	309	205	1500	0.03	0.00	MICROSCALE DRYWELL (M-5) 205 8' X 8' 4" DEEP DRYWELL - 2 PER LOT
53	100.00	0.9500	3000	0.07	238	380	618	403	3000	0.07	0.00	MICROSCALE DRYWELL (M-5) 403 8' X 9' 4.67" DEEP DRYWELL - 3 PER LOT
56	30.92	0.3283	30558	0.70	836	1338	2174	1463	9450	0.22	0.48	MICROSCALE MICRO-BIO RETENTION 55 1353 = 1015 SF MICRO BIO MICROSCALE RAINBARREL 110 CF 27 CF PER 200 GAL RAIN BARREL 4
57	38.21	0.3939	18320	0.42	601	962	1563	976	7000	0.16	0.26	MICROSCALE MICRO-BIO RETENTION 57 976 = 732 SF MICRO BIO
58	100.00	0.9500	3000	0.07	238	380	618	403	3000	0.07	0.00	MICROSCALE DRYWELL (M-5) 403 8' X 9' 4.67" DEEP DRYWELL - 3 PER LOT
58A	100.00	0.9500	2000	0.05	158	253	412	269	2000	0.05	0.00	MICROSCALE DRYWELL (M-5) 269 8' X 9' 4.67" DEEP DRYWELL - 2 PER LOT
59	100.00	0.9500	3000	0.07	238	380	618	403	3000	0.07	0.00	MICROSCALE DRYWELL (M-5) 403 8' X 9' 4.67" DEEP DRYWELL - 3 PER LOT
60	100.00	0.9500	1000	0.02	79	127	206	134	1000	0.02	0.00	MICROSCALE DRYWELL (M-5) 134 8' X 9' 4.67" DEEP DRYWELL - 1 PER 1/2 HOUSE
61	39.03	0.4013	26775	0.61	895	1433	2328	2800	10450	0.24	0.37	MICROSCALE MICRO-BIO RETENTION 58 2800 = 2100 SF MICRO BIO
62	18.72	0.2185	22415	0.51	408	653	1061	1186	4196	0.10	0.42	MICROSCALE MICRO-BIO RETENTION 60 1186 = 890 SF MICRO BIO
63	100.00	0.9500	2000	0.05	158	253	412	269	2000	0.05	0.00	MICROSCALE DRYWELL (M-5) 269 8' X 9' 4.67" DEEP DRYWELL - 2 PER LOT
64	49.13	0.4922	41000	0.94	1682	2691	4372	2953	20145	0.46	0.48	MICROSCALE MICRO-BIO RETENTION 59 2550 1913 SF MICRO BIO MICROSCALE DRYWELL (M-5) 403 8' X 9' 4.67" DEEP DRYWELL - WHERE SHOWN

DRAINAGE AREAS TO SITE OUTFALL #4 - PROVIDED FULL PE OF 1.6" WITHIN INDIVIDUAL SUBAREAS

REQUIRED 15709 CUFT  
PROVIDED 18694 CUFT

**SUBAREA SUMMARY FOR AREAS DRAINING TOWARD VILLAGE OF RIVER HILL VALLEY**

REQUIRED ESDv = 15709 CUFT Pe = 1.6"  
PROVIDED ESDv = 18694 CUFT Pe = 1.9"

CPV - REQUIREMENT MET BY SUCCESSFUL USE OF ESD PRACTICES

**CEDAR CREEK - ESDv COMPUTATIONS**

Rv=0.05+0.009X1  
V min=1.0' rainfall  
Vmax=1yr rainfall=2.6'

(1.0x0.95xA)/12  
(2.6x0.95xA)/12

**AREAS ABOVE PROPOSED SWMF #2 - 10/100 YR POND**

DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0' VOLUME	1.6' VOLUME	2.6' VOLUME	VOLUME PROVIDED	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
100	51.13	0.5102	62640	1.44	2663	4261	6924	4600	32030	0.74	0.70	MICROSCALE MICRO-BIO RETENTION 100 3400 = 2550 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 15 EA 120 ESDv MICROSCALE DRYWELL (M-5) 1080 10' X 10' 4.5" DEEP DRYWELL 6
101	39.79	0.4081	56320	1.29	1915	3065	4980	3538	22410	0.51	0.78	MICROSCALE MICRO-BIO RETENTION 101 2000 = 1500 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 5 EA 40 ESDv MICROSCALE DRYWELL (M-5) 1498 8' X 8' 4.5" DEEP DRYWELL 13
102	38.38	0.3954	42617	0.98	1404	2247	3651	2528	16357	0.38	0.60	MICROSCALE MICRO-BIO RETENTION 102 2000 = 1500 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 2 EA 16 ESDv MICROSCALE DRYWELL (M-5) 512 8' X 8' 4" DEEP DRYWELL 5
103	44.13	0.4471	87950	2.02	3277	5244	8521	5270	38810	0.89	1.13	MICROSCALE MICRO-BIO RETENTION 103 4000 = 3000 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 6 EA 48 ESDv MICROSCALE DRYWELL (M-5) 608 7.5' X 9' 4.5" DEEP DRYWELL 5 MICROSCALE DRYWELL (M-5) 614 8' X 8' 4" DEEP DRYWELL 6
106	100.00	0.9500	2700	0.06	214	342	556	385	2700	0.06	0.00	MICROSCALE DRYWELL (M-5) 385 9.5' X 7.5' 4.5" DEEP DRYWELL - 3 PER LOT 3 DW
107	100.00	0.9500	3000	0.07	238	380	618	403	3000	0.07	0.00	MICROSCALE DRYWELL (M-5) 385 7.5' X 9.5' X 4.5" DEEP DRYWELL - 3 PER LOT 3 DW
TOTALS								16906				18244

**SUBAREA SUMMARY FOR AREAS DRAINING TOWARD SWMF#2 EXTENDED DETENTION FACILITY**

REQUIRED ESDv = 16906 CUFT Pe = 1.6"  
PROVIDED ESDv = 18244 CUFT Pe = 1.72"

REFER TO SHEET 69 FOR Q 10 & Q 100 SUMMARY

**CEDAR CREEK - ESDv COMPUTATIONS**

Rv=0.05+0.009X1  
V min=1.0' rainfall  
Vmax=1yr rainfall=2.6'

(1.0x0.95xA)/12  
(2.6x0.95xA)/12

AREAS SHALL PROVIDE 1.6" ESDv

**AREAS BETWEEN SWMF #2 & #3 - NO QUANTITY MANAGEMENT**

DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0' VOLUME	1.6' VOLUME	2.6' VOLUME	VOLUME PROVIDED	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
104	44.91	0.4542	40670	0.93	1539	2463	4002	3076	18265	0.42	0.51	MICROSCALE MICRO-BIO RETENTION 104 5000 = 1875 SF MICRO BIO NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 8 EA 63 ESDv MICROSCALE DRYWELL (M-5) 128 7.5' X 9.5' X 4.5" DEEP DRYWELL - 2 PER LOT 4
105	28.51	0.3066	47221	1.08	1207	1931	3137	2160	13465	0.31	0.77	MICROSCALE MICRO-BIO RETENTION 105 2020 = 1515 SF MICRO BIO MICROSCALE RAINBARREL 108 CF 27 CF PER 200 GAL RAIN BARREL 4 NON STRUCTURAL PRACTICE - ROOFTOP DISCONNECT 8 CF - EACH 15" DISCONNECT 4 EA
TOTALS								4394				5236

**"CEDAR CREEK - ESD SAND FILTER #3 & 10/100 YR QUANTITY MANAGEMENT SAND FILTER (SMALL FACILITY - SIZED FOR Pe = 1")**

DA #	% IMPERV	Rv	DA (SF)	DA (AC)	1.0' VOLUME	1.6' VOLUME	2.6' VOLUME	VOLUME PROVIDED	IMPERV (SF)	IMPERV (AC)	GREEN AREA	REMARKS
SWMF 3	42.47	0.4322	87120	2.00	3138	5021	8159	3150	37000	0.85	1.15	SAND FILTER #2 3150 = 2363 MIN. SF SAND FOOTPRINT 2395 SF - PROVIDED

**SUBAREA SUMMARY FOR AREAS DRAINING TOWARD MIDDLE PATUXENT RIVER**

REQUIRED ESDv = 4394 CUFT Pe = 1.6"  
PROVIDED ESDv = 5236 CUFT Pe = 1.90"

CPV - REQUIREMENT MET BY SUCCESSFUL USE OF ESD PRACTICES

**SUBAREA SUMMARY FOR AREAS DRAINING TOWARD SWMF#3 - SAND FILTER FACILITY**

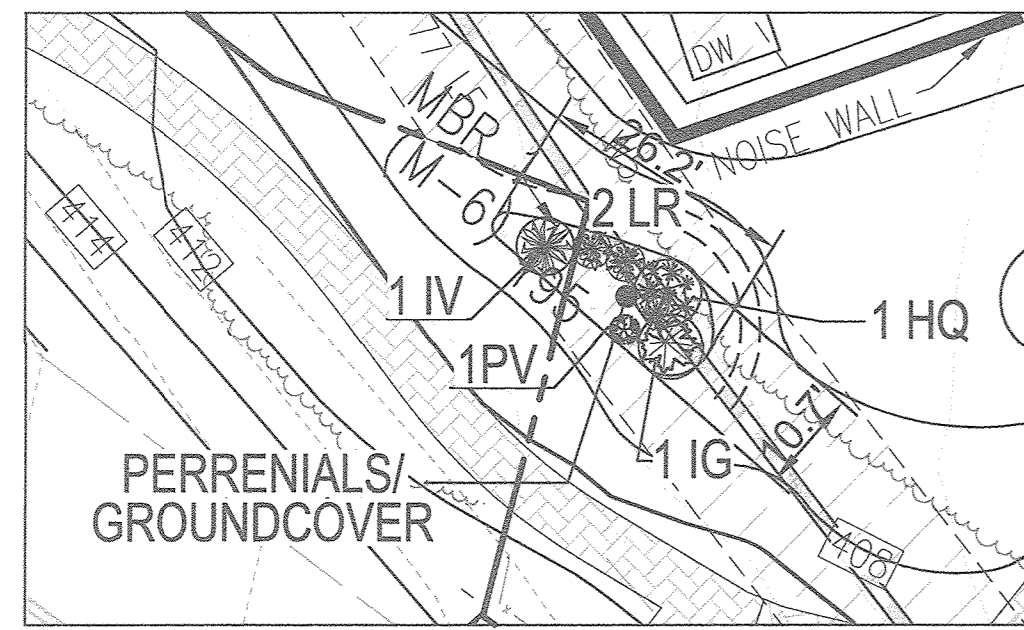
REQUIRED ESDv = 3138 CUFT Pe = 1.0"  
PROVIDED ESDv = 3150 CUFT Pe = 1.0"

REFER TO SHEET 70 FOR CPV, Q 10 & Q 100 SUMMARY

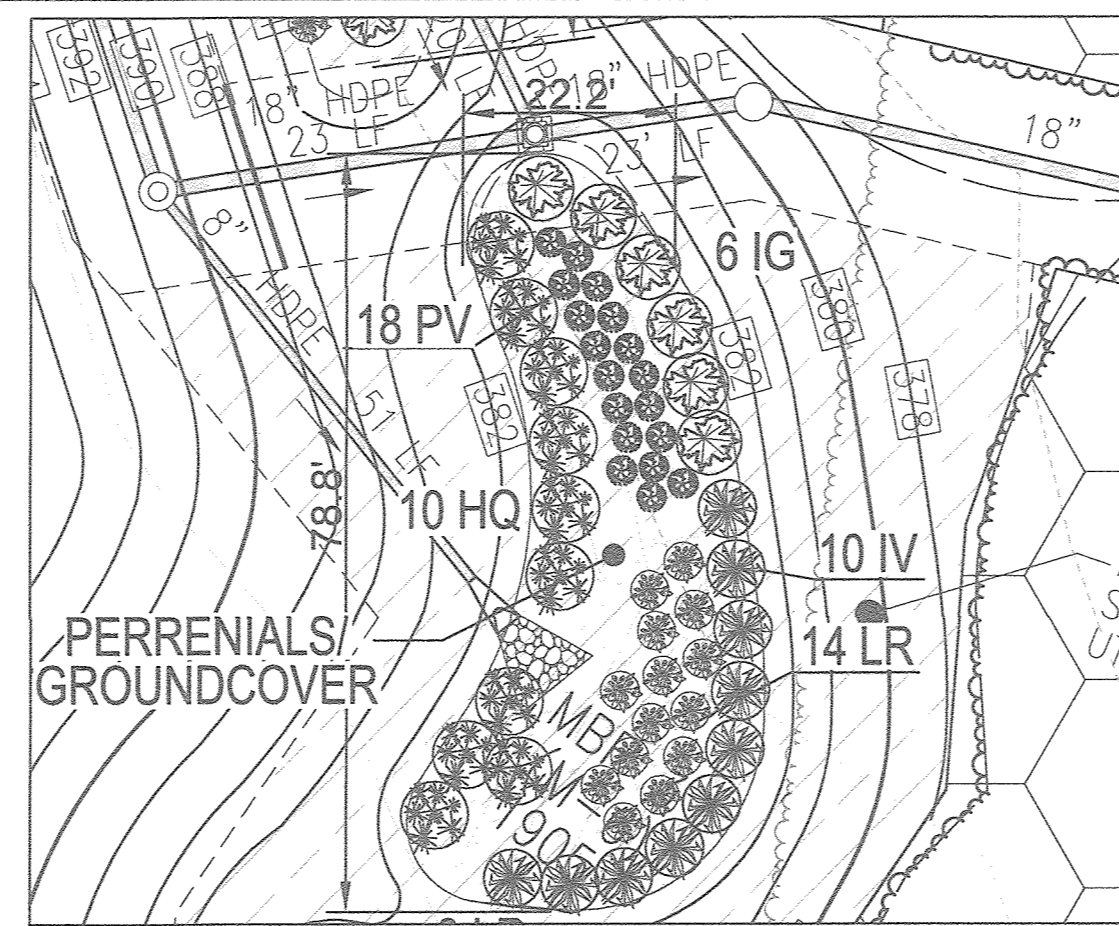
**Stormwater Management Information**

Lot/Parcel Number	Facility Name & Number	Practice Type (Quantity)	Public	Private	HMA	Maintain	Misc.
Open Space Lot 130	MBR 3	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 4	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 5	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 6	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 7	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 14	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 23	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 40	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 42	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 43	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 45	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 46	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 103	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 131	MBR 24	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 25	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 27	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	BIO SWALE 1	M-8 BIO SWALE (1)	-	YES	YES		
	BIO SWALE 2	M-8 BIO SWALE (1)	-	YES	YES		
Open Space Lot 132	MBR 56	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 57	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 134	MBR 58	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 59	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 60	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 104	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 105	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	SWMF #1	SURFACE SAND FILTER (1)	-	YES	YES		
Open Space Lot 135	MBR 38	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 47	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 48	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 136	MBR 29	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 32	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 33	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 34	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 35	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 36	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 37	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 137	MBR 15	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 16	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 17	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 18	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 19	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 20	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 21	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 22	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 28	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 138	MBR 9	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 10	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 11	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 12	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 13	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
Open Space Lot 139			-	-	-	Owned & Maintained by H.O.A.	
Open Space Lot 140			-	-	-	Owned & Maintained by H.O.A.	
Open Space Lot 141	MBR 100	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 101	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
	MBR 102	M-6 MICRO-BIORETENTION (1)	-	YES	YES		
LOTS 18-20	MBR 26	M-6 MICRO-BIORETENTION (1)	-	YES	YES	Private Easement across Lots 18-20	
WR GRACE - PAR C-1	SWMF #1	P-3 EXTENDED DETENTION	-	NO	NO	Owned & Maintained by W.R. Grace	
WR GRACE - PAR A	SWMF #2	QUANTITY DETENTION	-	NO	NO	Owned & Maintained by W.R. Grace	

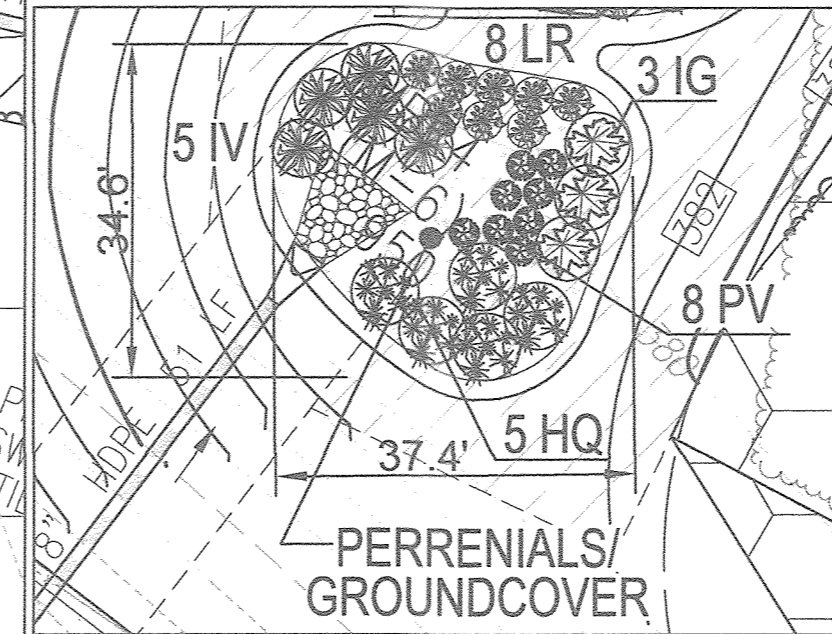
\* MBR 40, 45, 46, 59, 60 AND 100-105, LOCATED WITHIN THE "GROUNDWATER RESTRICTION AREA" SHALL BE PRIVATELY OWNED



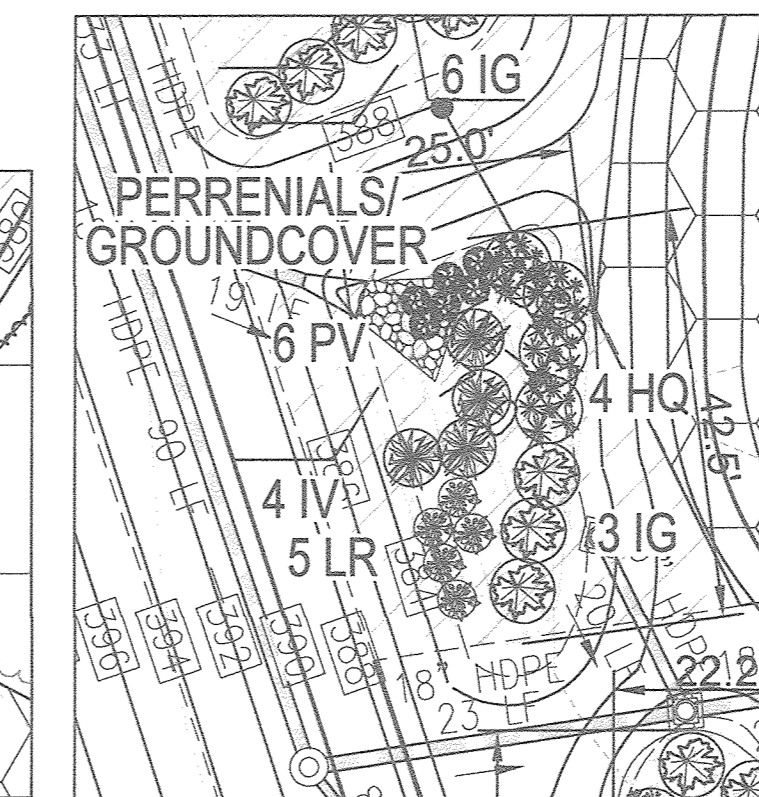
DETAILED BIO AND PLANTING PLAN (SWM #1)  
SCALE: 1" = 20'



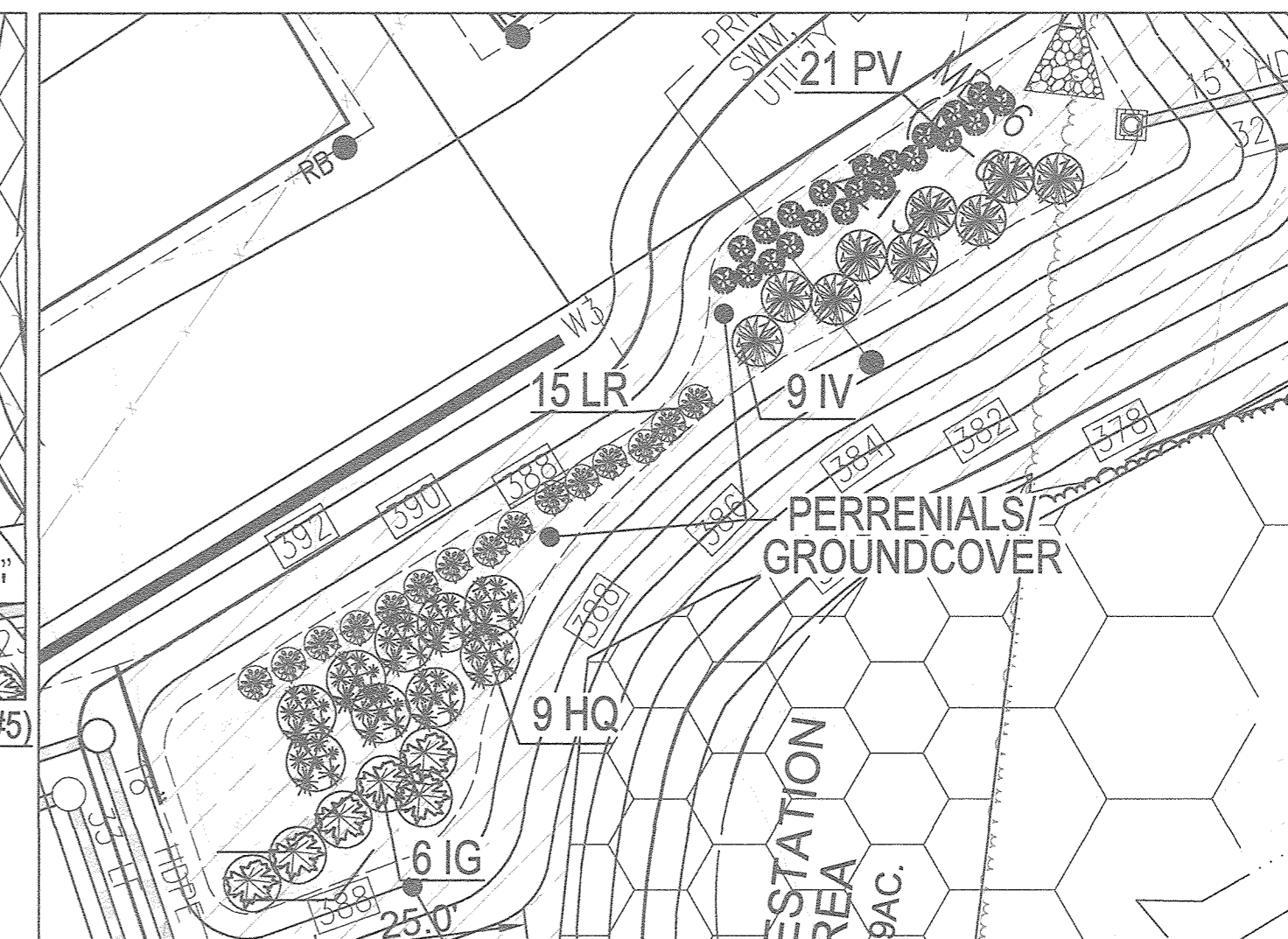
DETAILED BIO AND PLANTING PLAN (SWM #3)  
SCALE: 1" = 20'



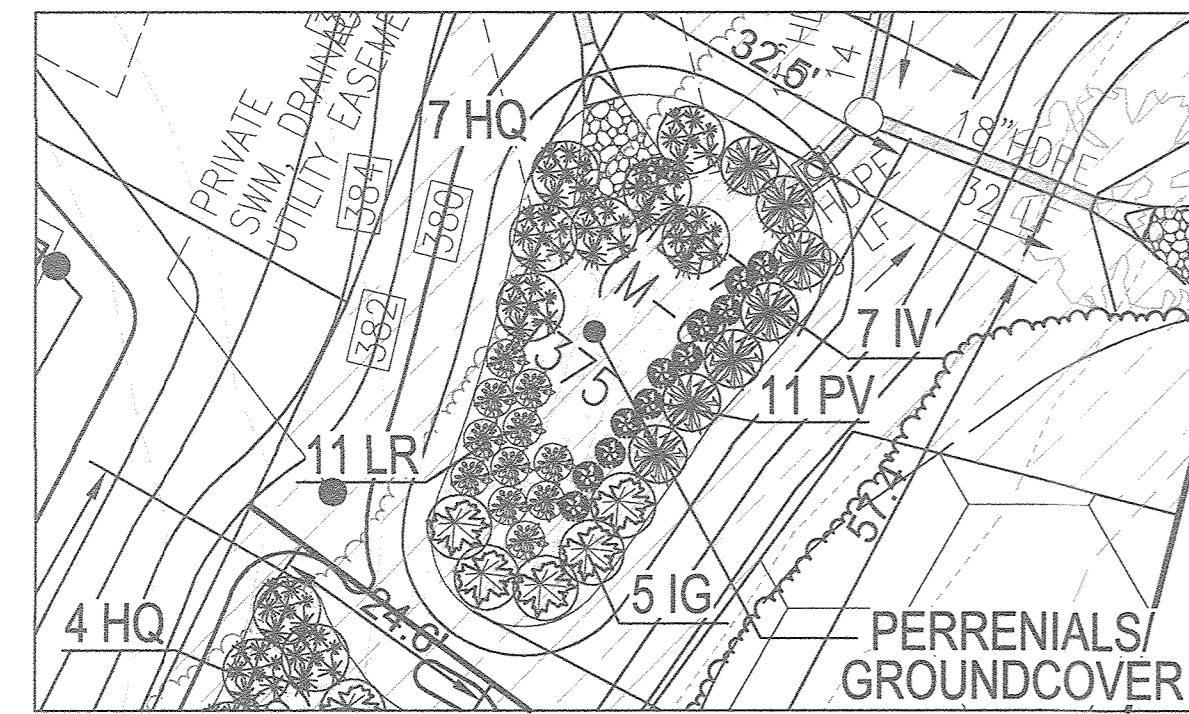
DETAILED BIO AND PLANTING PLAN (SWM #4)  
SCALE: 1" = 20'



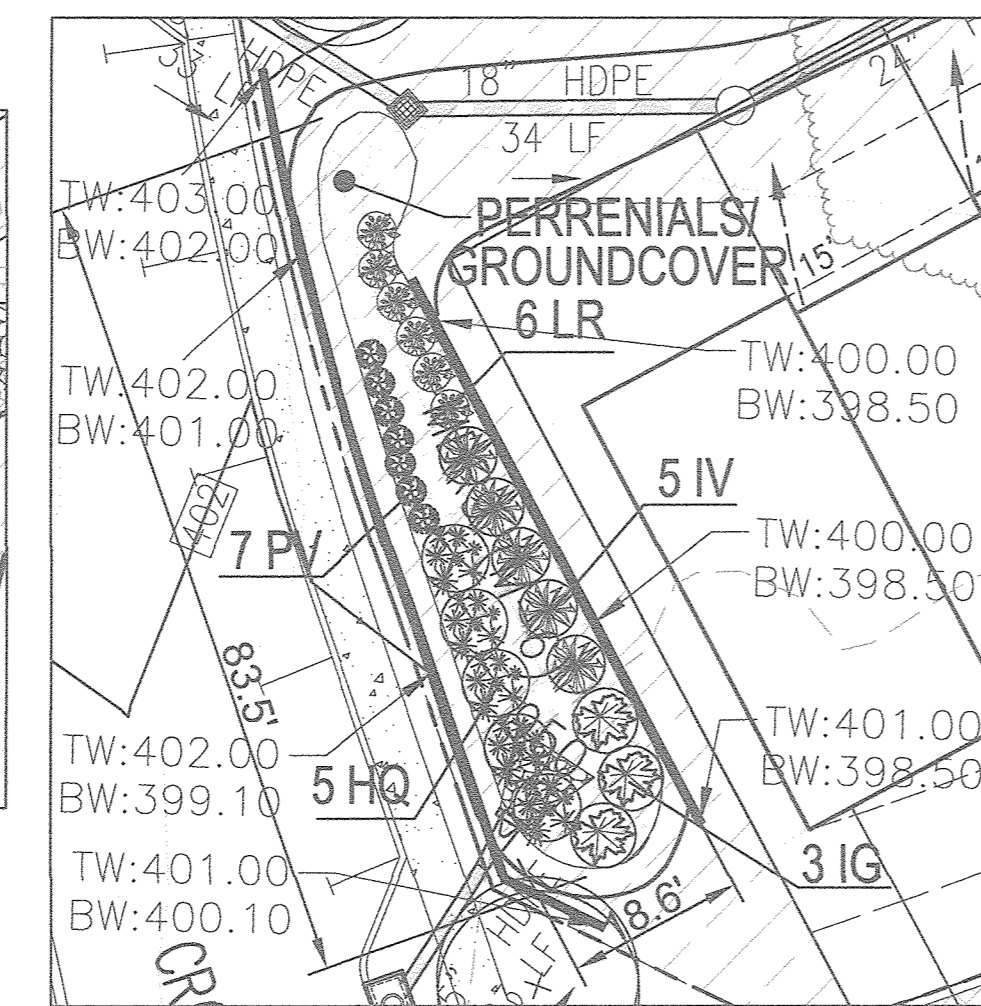
DETAILED BIO AND PLANTING PLAN (SWM #5)  
SCALE: 1" = 20'



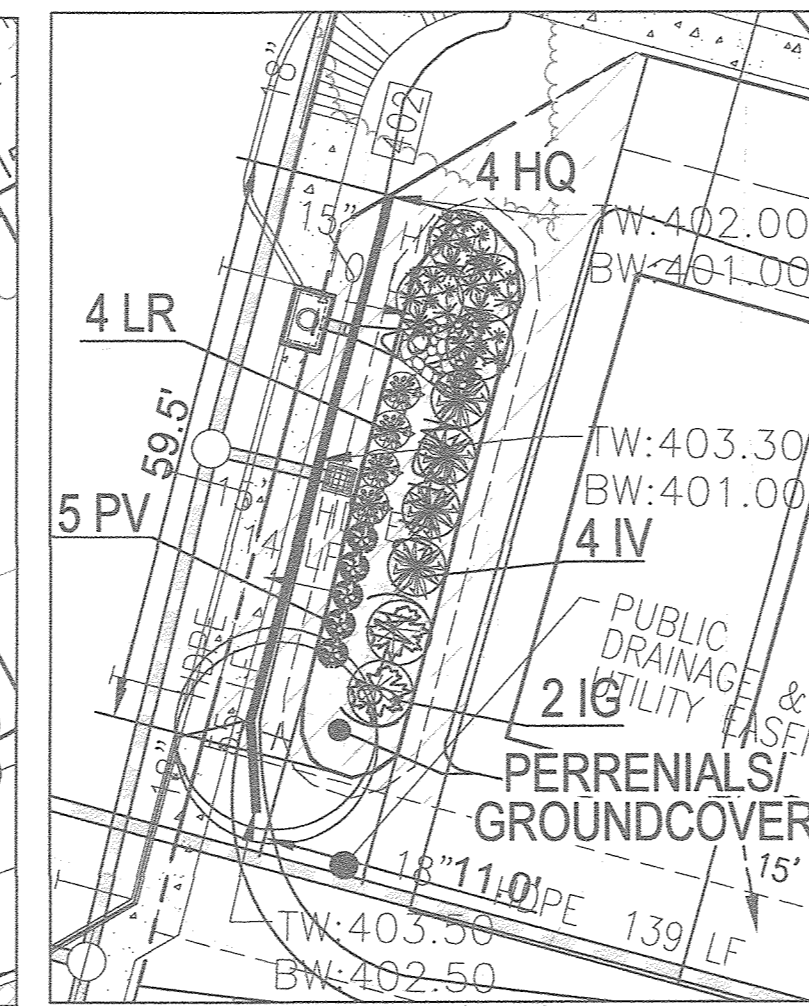
DETAILED BIO AND PLANTING PLAN (SWM #6)  
SCALE: 1" = 20'



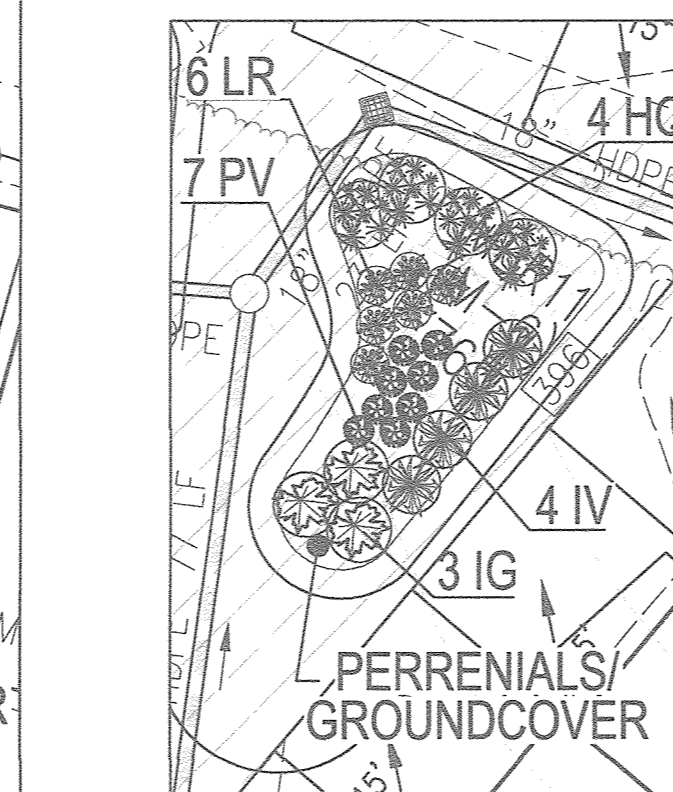
DETAILED BIO AND PLANTING PLAN (SWM #7)  
SCALE: 1" = 20'



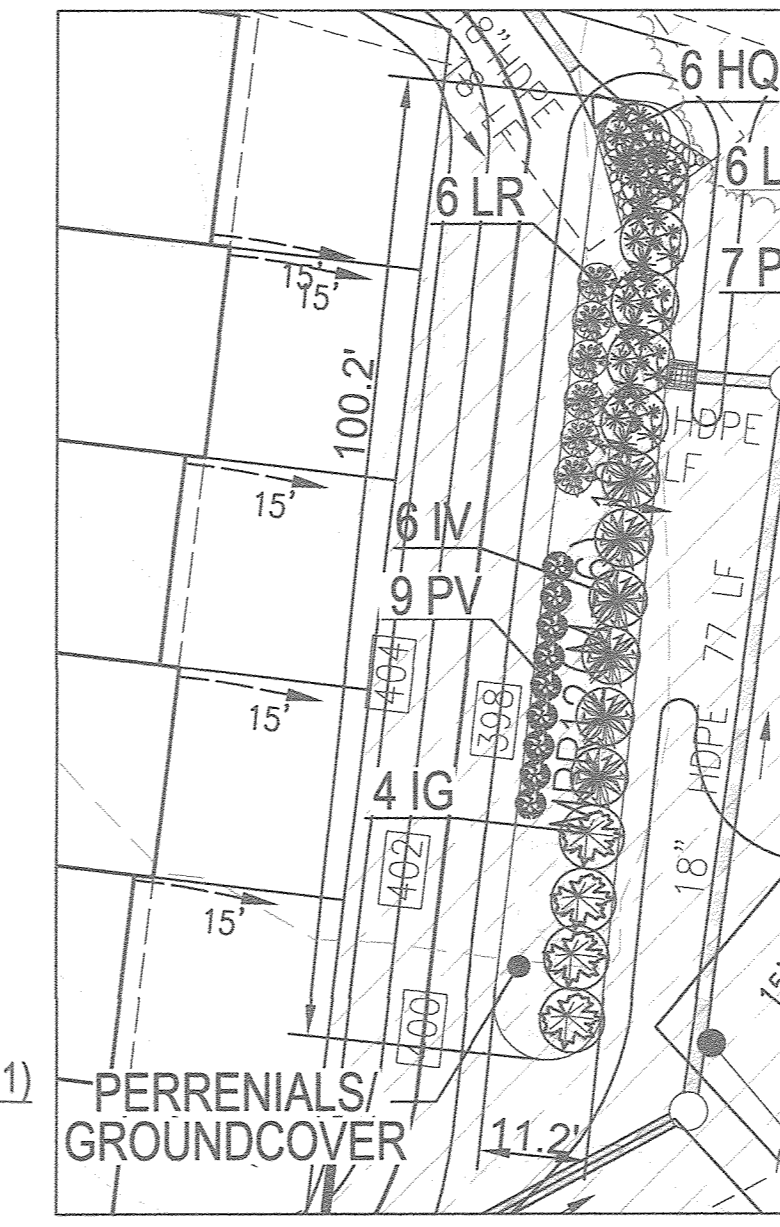
DETAILED BIO AND PLANTING PLAN (SWM #9)  
SCALE: 1" = 20'



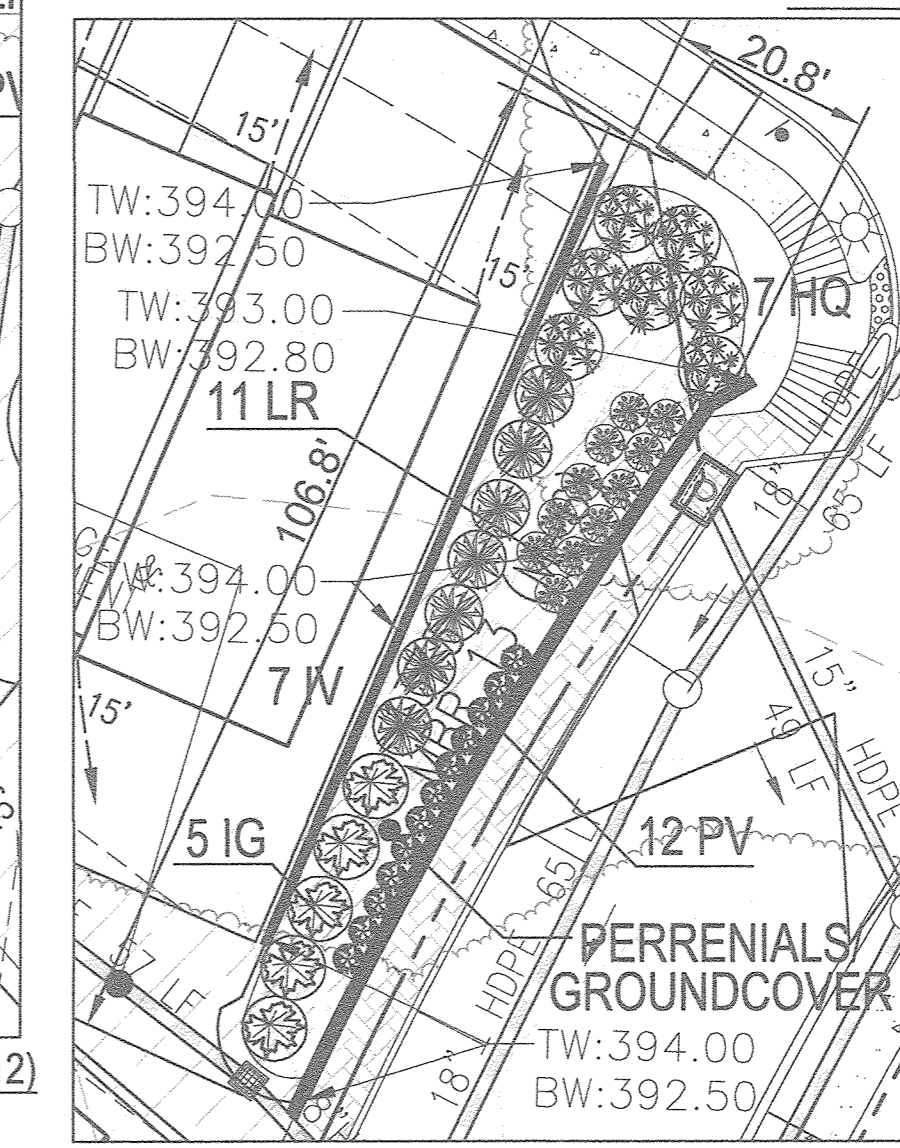
DETAILED BIO AND PLANTING PLAN (SWM #10)  
SCALE: 1" = 20'



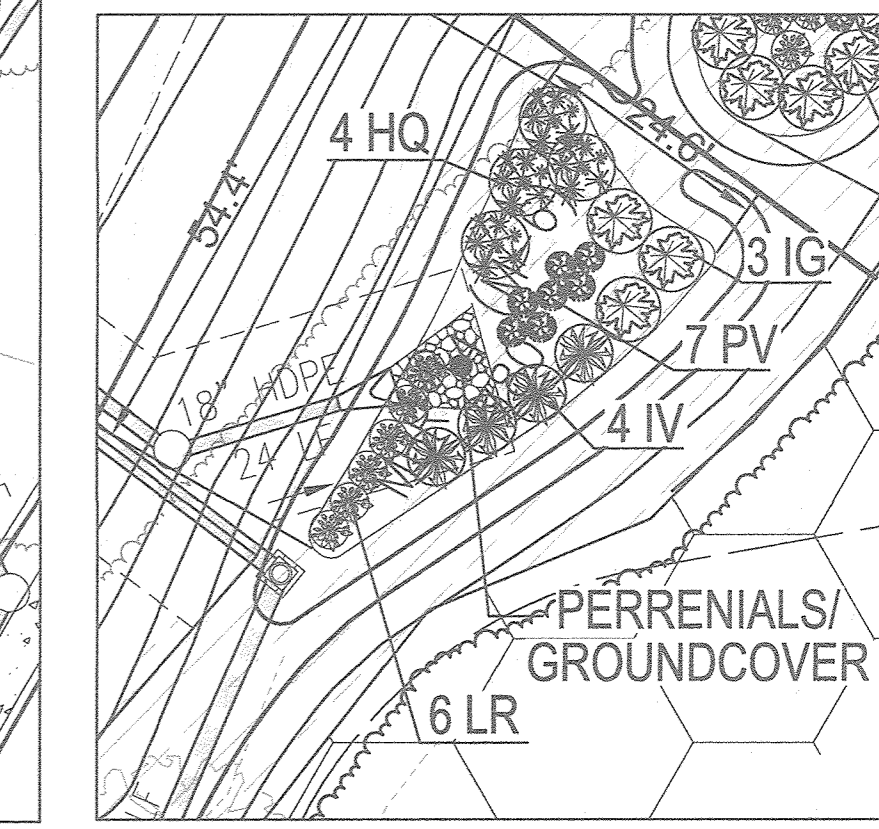
DETAILED BIO AND PLANTING PLAN (SWM #11)  
SCALE: 1" = 20'



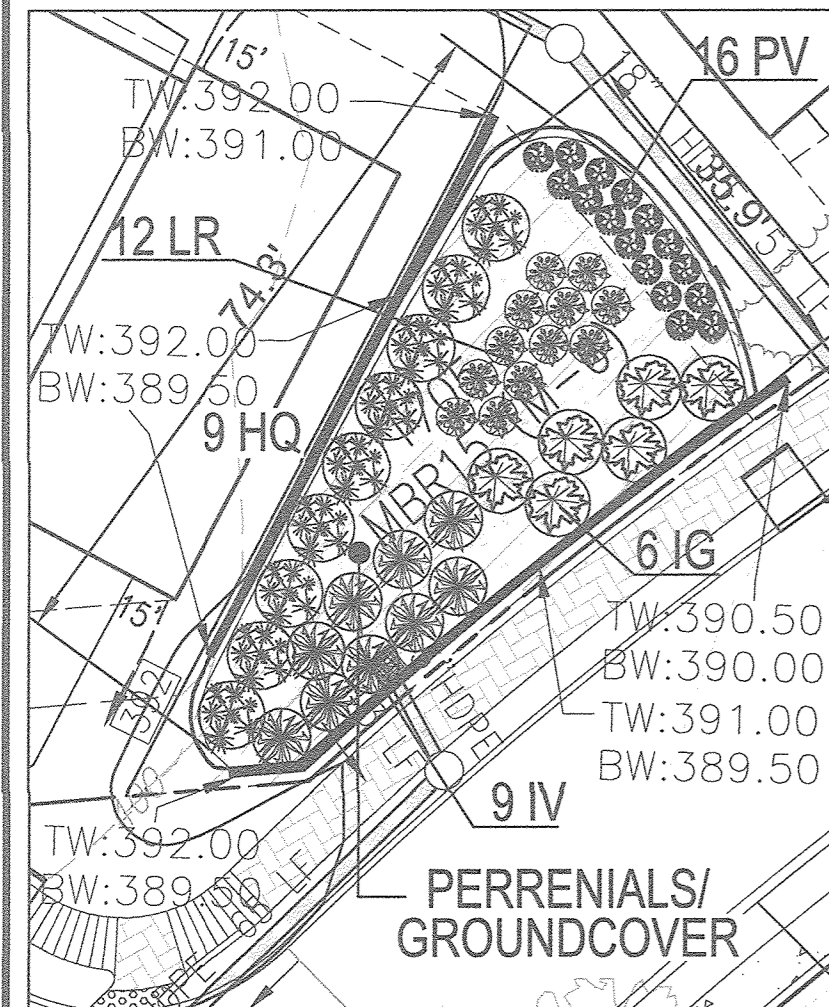
DETAILED BIO AND PLANTING PLAN (SWM #12)  
SCALE: 1" = 20'



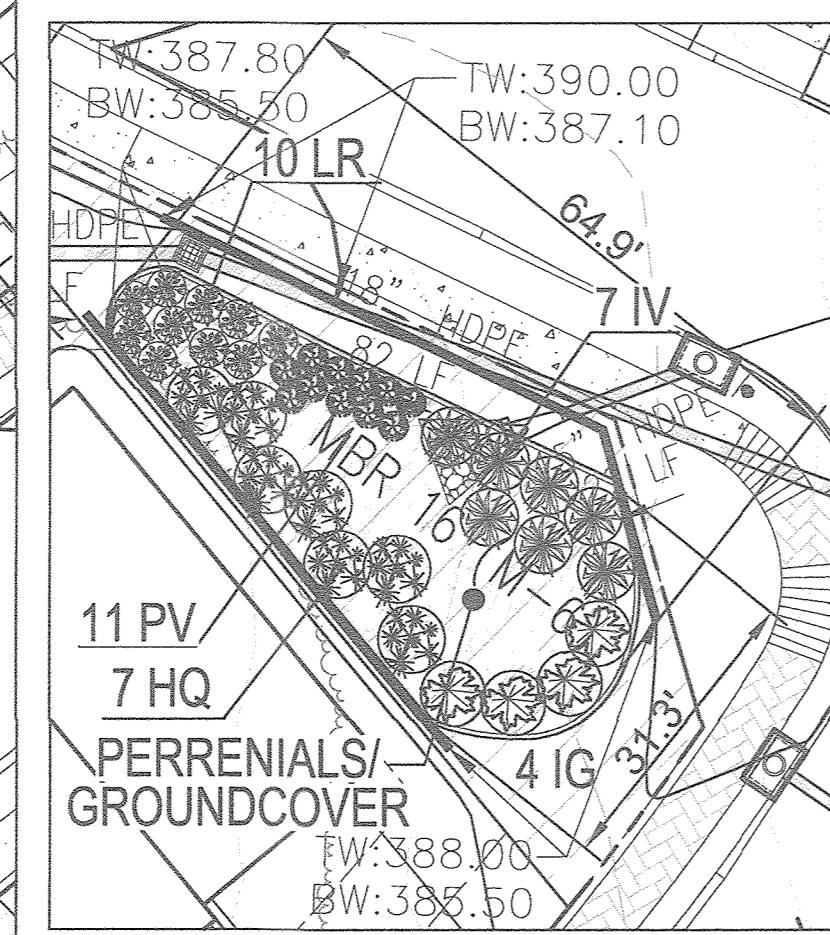
DETAILED BIO AND PLANTING PLAN (SWM #13)  
SCALE: 1" = 20'



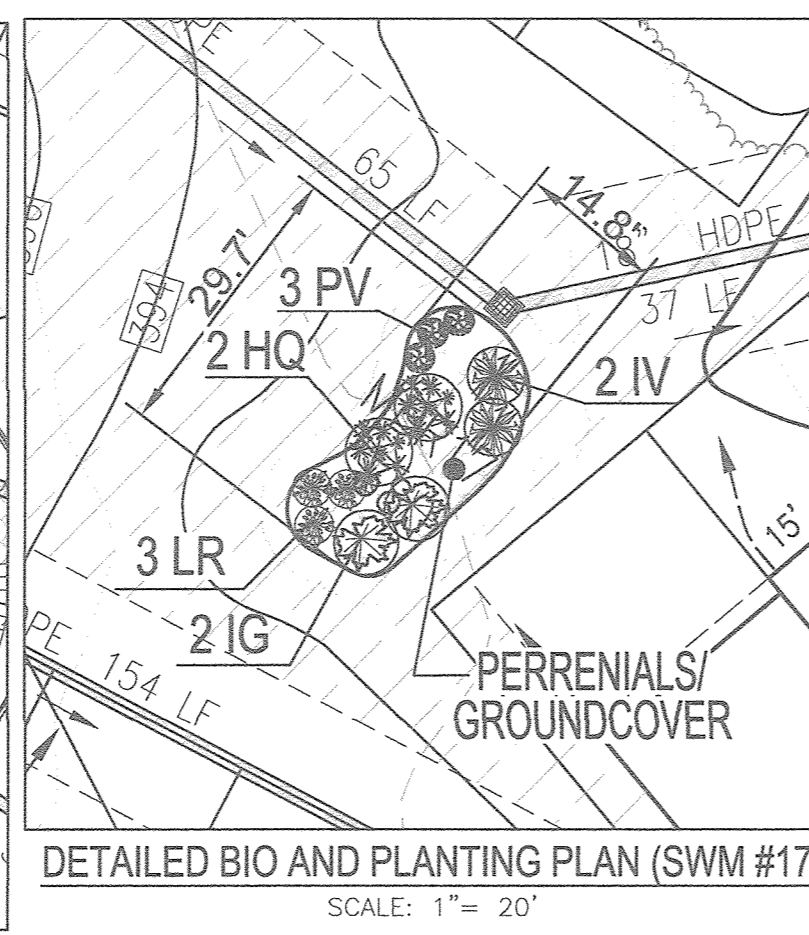
DETAILED BIO AND PLANTING PLAN (SWM #14)  
SCALE: 1" = 20'



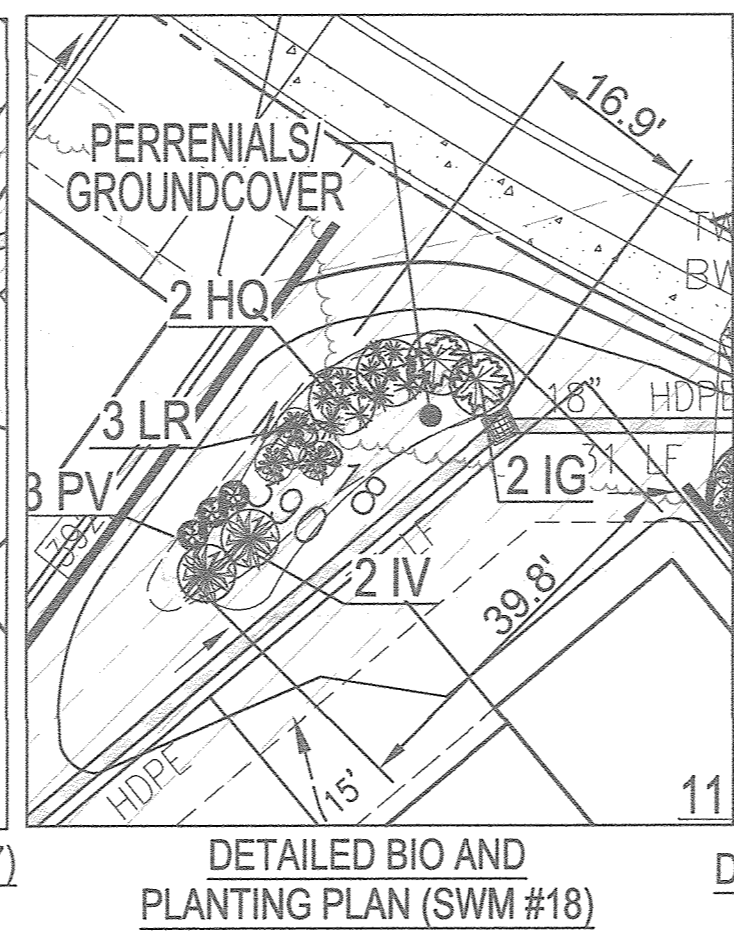
DETAILED BIO AND PLANTING PLAN (SWM #15)  
SCALE: 1" = 20'



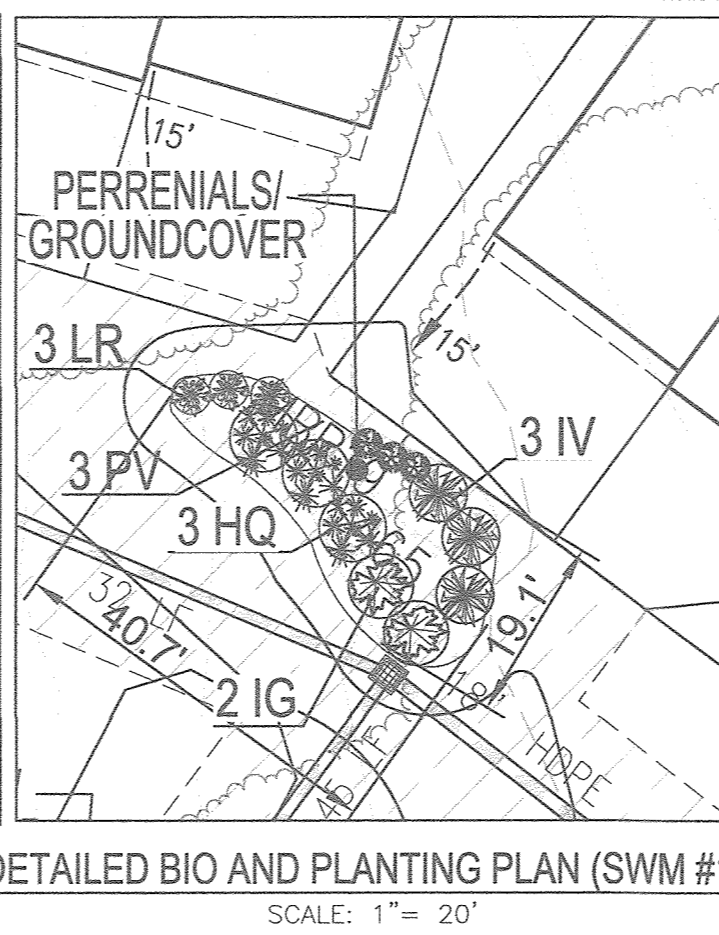
DETAILED BIO AND PLANTING PLAN (SWM #16)  
SCALE: 1" = 20'



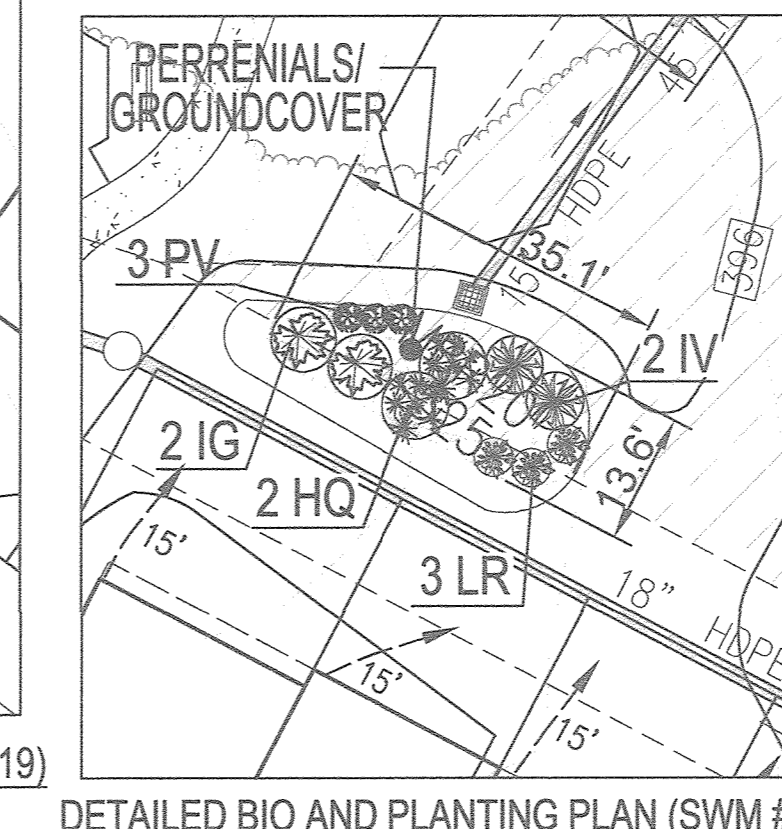
DETAILED BIO AND PLANTING PLAN (SWM #17)  
SCALE: 1" = 20'



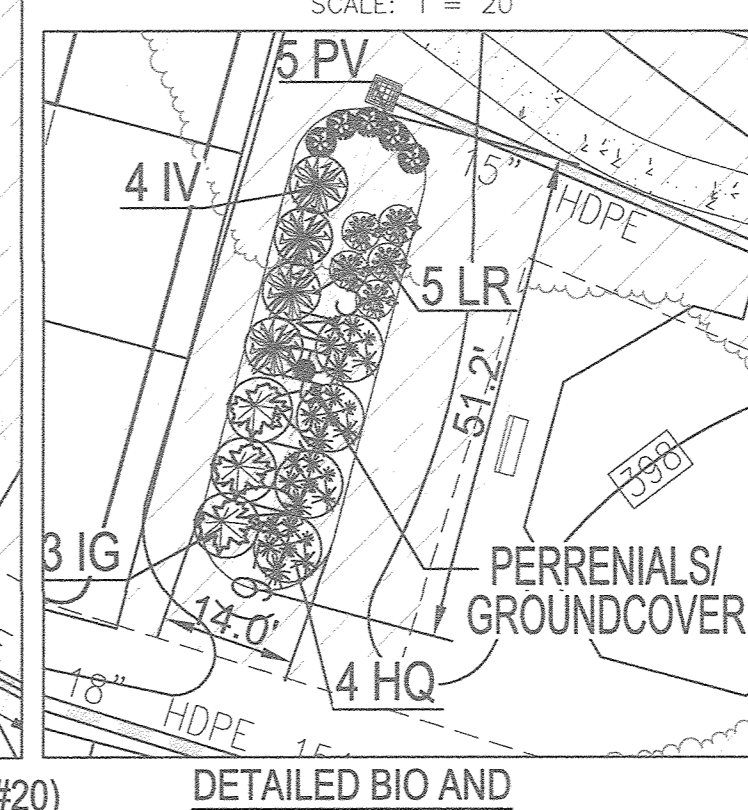
DETAILED BIO AND PLANTING PLAN (SWM #18)  
SCALE: 1" = 20'



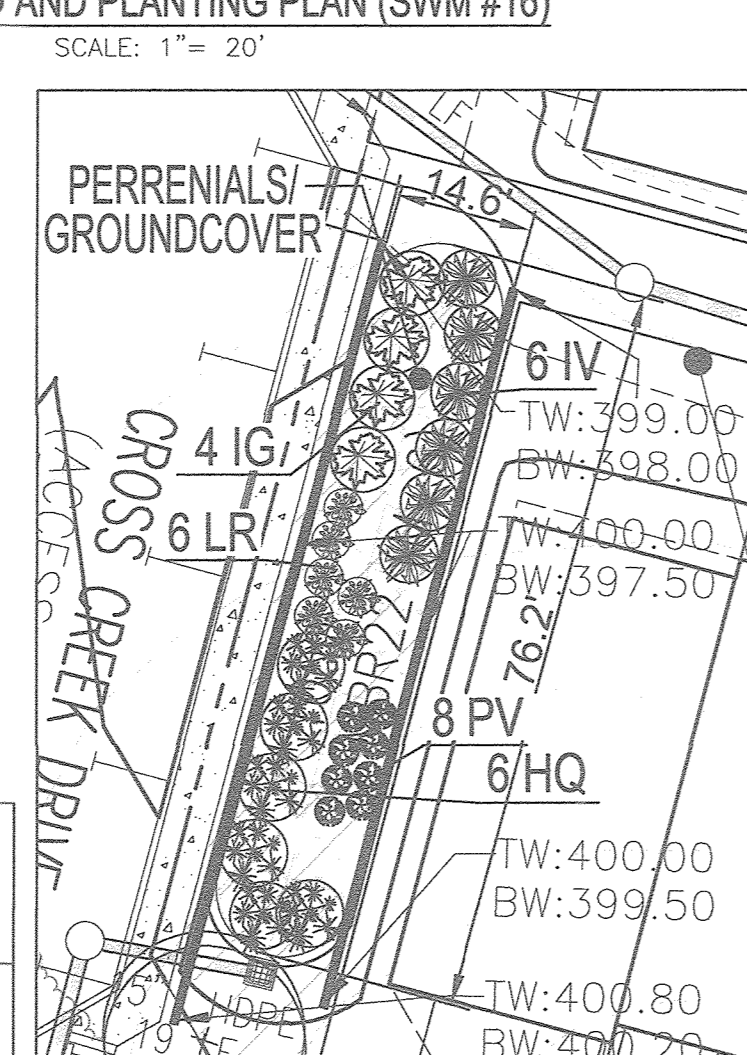
DETAILED BIO AND PLANTING PLAN (SWM #19)  
SCALE: 1" = 20'



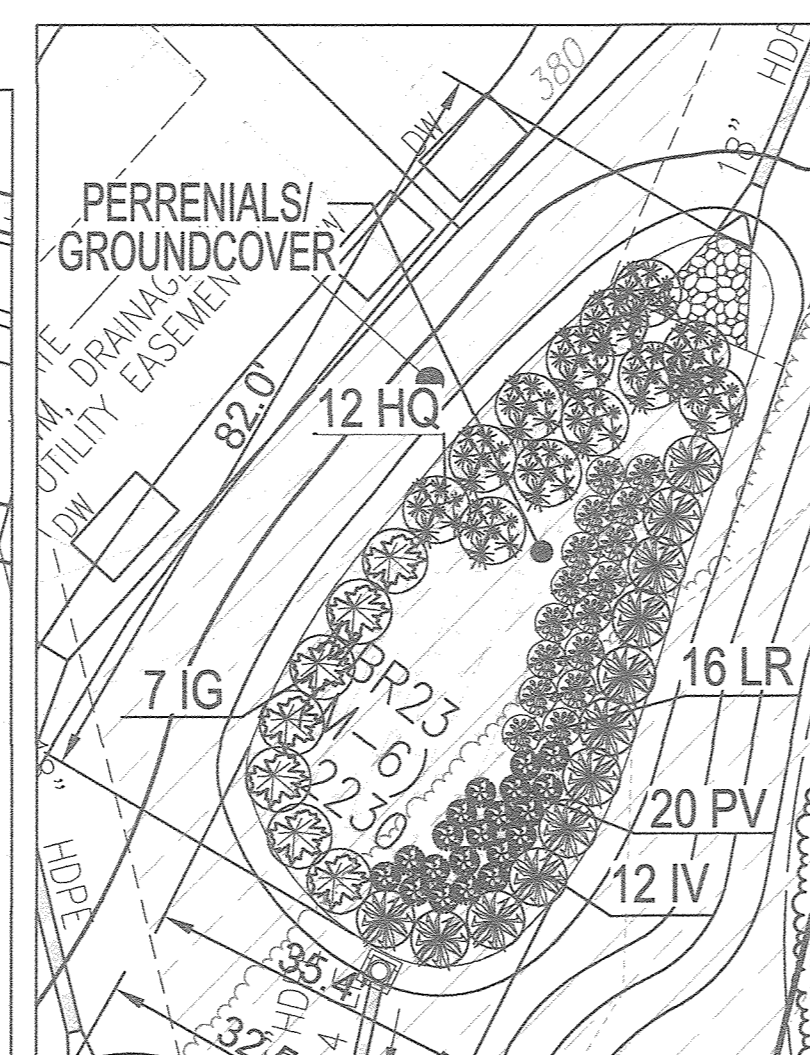
DETAILED BIO AND PLANTING PLAN (SWM #20)  
SCALE: 1" = 20'



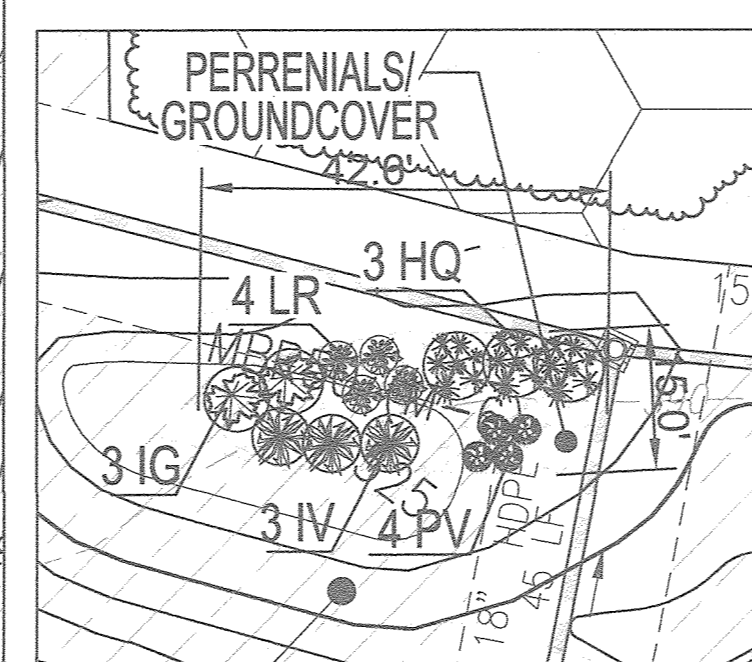
DETAILED BIO AND PLANTING PLAN (SWM #21)  
SCALE: 1" = 20'



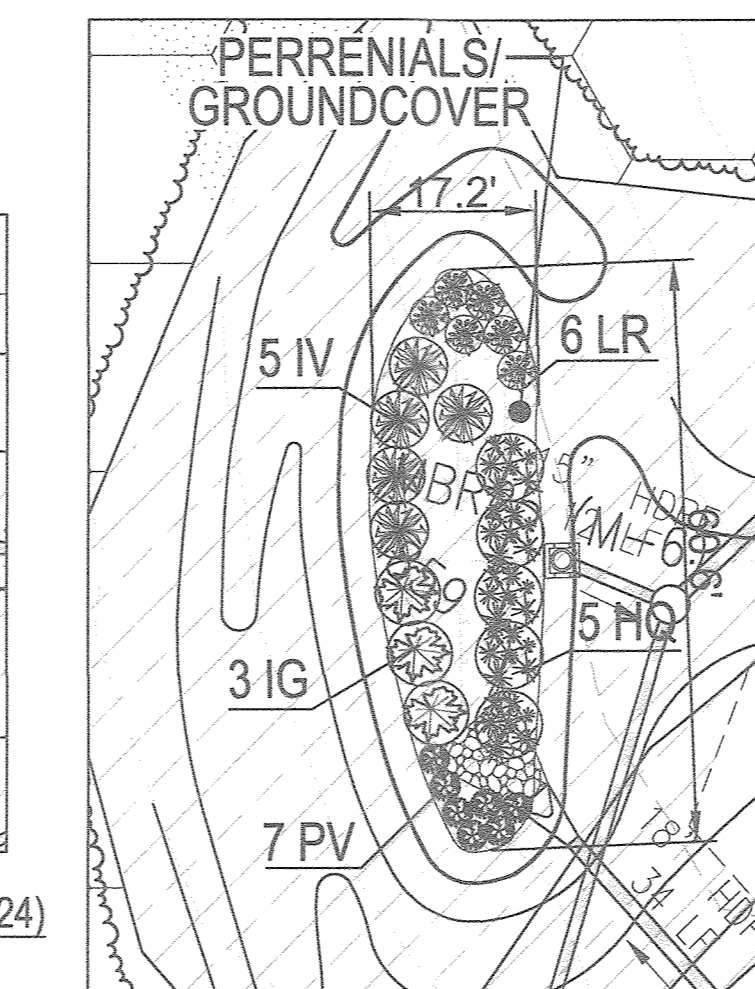
DETAILED BIO AND PLANTING PLAN (SWM #22)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #23)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #24)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #25)  
SCALE: 1" = 20'

MBR #	LF	AREA	STEMS REQUIRED (0.0299)	STEMS PROVIDED	PLANTINGS PROVIDED										PERENNIALS/GROUND COVER PROVIDED
					IG	IV	HQ	LR	PV	BA	AG	TOTAL			
1	61	196	5	6	1	1	1	2	1	6	6	12			
2	187	930	22	28	3	5	5	7	8	32	32	64			
3	198	1009	44	58	6	10	10	14	18	66	66	132			
4	113	562	22	29	3	5	5	8	8	33	33	66			
5	109	725	17	22	3	4	4	5	6	25	25	50			
6	325	2218	51	67	7	12	12	15	21	77	77	154			
7	148	1371	32	41	5	7	7	11	11	47	47	94			
9	183	854	20	26	3	5	5	6	7	29	29	58			
10	131	627	15	19	2	4	4	4	5	21	21	42			
11	121	771	18	24	3	4	4	6	7	26	26	52			
12	212	1024	24	31	4	6	6	6	9	35	35	70			
13	219	1375	32	42	5	7	7	11	12	48	48	96			
14	134	780	18	24	3	4	4	6	7	27	27	54			
15	182	1721	40	52	6	9	9	12	16	60	60	120			
16	156	1285	30	39	4	7	7	10	11	44	44	88			
17	80	380	9	12	2	2	2	3	3	13	13	26			
18	93	389	9	12	2	2	2	3	3	13	13	26			
19	99	468	11	14	2	3	3	3	3	16	16	32			
20	83	390	9	12	2	2	2	3	3	13	13	26			
21	119	676	16	21	3	4	4	5	5	23	23	46			
22	168	1002	23	30	4	6	6	6	8	35	35	70			
23	198	2231	52	67	7	12	12	16	20	78	78	156			
24	99	528	13	16	2	3	3	4	4	18	18	36			
25	134	860	20	26	3	5	5	6	7	30	30	60			
TOTALS:	3491	23476	547	712	84	128	128	170	202	809	809	1618			

BIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0299 STEMS PER SQUARE FOOT).

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
6/11/2019  
DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
6-17-19  
DATE

APPROVED: 6-26-19  
DATE

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN  
ENVIRONMENTAL SITE DESIGN (ESD)  
MICRO-BIORETENTION - PLANTING DETAILS

## CEDAR CREEK - PHASE 1

LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS 'B-1' & 'C'  
PLATS 23334-23337

TAX MAP 35, GRID 21  
5TH ELECTION DISTRICT  
SPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
P/O PARCEL 145  
HOWARD COUNTY, MARYLAND

### ROBERT H. VOGEL ENGINEERING, INC.

ENGINEERS • SURVEYORS • PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHY  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

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. 16183 EXPIRATION DATE: 09-27-2026

61 SHEET OF 74



MICRO-BIORETENTION FACILITY - DESIGN ELEVATION CHART

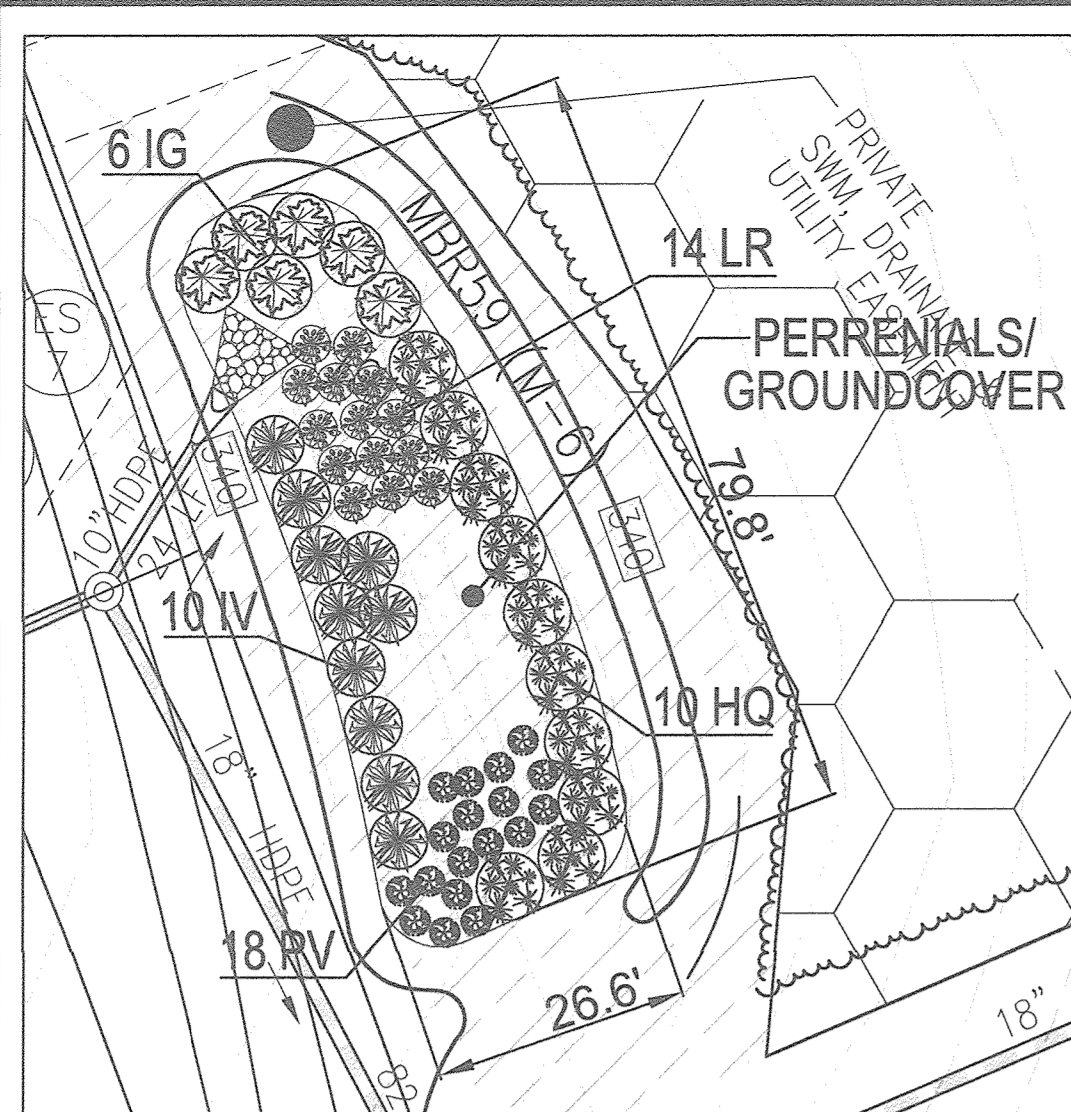
MBR FACILITY #	ESD WSEL A	TOP MULCH B	TOP PLANT SOIL C	BOTTOM PLANT SOIL D	BOTTOM PEA GRAVEL E	INV PIPE (1) F	INV STONE G	SURFACE AREA SF	APPROX DIM	OWNER PUBLIC	MAINTENANCE PRIVATE/PUBLIC/JOINT
1	406.80	405.80	405.55	403.55	403.22	402.47	402.22	195	SEE PLAN	PRIVATE	PRIVATE HOA
3	381.50	380.50	380.25	378.25	377.92	377.17	376.92	1905	SEE PLAN	PRIVATE	PRIVATE HOA
4	381.50	380.50	380.25	378.25	377.92	377.17	376.92	950	SEE PLAN	PRIVATE	PRIVATE HOA
5	383.50	382.50	382.25	380.25	379.92	379.17	378.92	730	SEE PLAN	PRIVATE	PRIVATE HOA
6	387.50	386.50	386.25	384.25	383.92	383.17	382.92	2213	SEE PLAN	PRIVATE	PRIVATE HOA
7	377.50	376.50	376.25	374.25	373.92	373.17	372.92	1375	SEE PLAN	PRIVATE	PRIVATE HOA
9	399.50	398.50	398.25	396.25	395.92	395.17	394.92	950	SEE PLAN	PRIVATE	PRIVATE HOA
10	401.00	400.00	399.75	397.75	397.42	396.67	396.42	626	SEE PLAN	PRIVATE	PRIVATE HOA
11	396.50	395.50	395.25	393.25	392.92	392.17	391.92	765	SEE PLAN	PRIVATE	PRIVATE HOA
12	397.50	396.50	396.25	394.25	393.92	393.17	392.92	1013	SEE PLAN	PRIVATE	PRIVATE HOA
13	393.50	392.50	392.25	390.25	389.92	389.17	388.92	1375	SEE PLAN	PRIVATE	PRIVATE HOA
14	379.50	378.50	378.25	376.25	375.92	375.17	374.92	780	SEE PLAN	PRIVATE	PRIVATE HOA
15	390.50	389.50	389.25	387.25	386.92	386.17	385.92	1705	SEE PLAN	PRIVATE	PRIVATE HOA
16	386.50	385.50	385.25	383.25	382.92	382.17	381.92	1283	SEE PLAN	PRIVATE	PRIVATE HOA
17	390.70	389.70	389.45	387.45	387.12	386.37	386.12	380	SEE PLAN	PRIVATE	PRIVATE HOA
18	387.00	386.00	385.75	383.75	383.42	382.67	382.42	390	SEE PLAN	PRIVATE	PRIVATE HOA
19	393.50	392.50	392.25	390.25	389.92	389.17	388.92	465	SEE PLAN	PRIVATE	PRIVATE HOA
20	395.00	394.00	393.75	391.75	391.42	390.67	390.42	525	SEE PLAN	PRIVATE	PRIVATE HOA
21	397.40	396.40	396.15	394.15	393.82	393.07	392.82	675	SEE PLAN	PRIVATE	PRIVATE HOA
22	398.50	397.50	397.25	395.25	394.92	394.17	393.92	1000	SEE PLAN	PRIVATE	PRIVATE HOA
23	377.50	376.50	376.25	374.25	373.92	373.17	372.92	2300	SEE PLAN	PRIVATE	PRIVATE HOA
25	389.40	388.40	388.15	386.15	385.82	385.07	384.82	850	SEE PLAN	PRIVATE	PRIVATE HOA
26	405.00	404.00	403.75	401.75	401.42	400.67	400.42	420	SEE PLAN	PRIVATE	PRIVATE HOA
27	385.40	384.40	384.15	382.15	381.82	381.07	380.82	1240	SEE PLAN	PRIVATE	PRIVATE HOA
28	398.10	397.10	396.85	394.85	394.52	393.77	393.52	540	SEE PLAN	PRIVATE	PRIVATE HOA
29	400.80	399.80	399.55	397.55	397.22	396.47	396.22	1110	SEE PLAN	PRIVATE	PRIVATE HOA
32	395.50	394.50	394.25	392.25	391.92	391.17	390.92	1830	SEE PLAN	PRIVATE	PRIVATE HOA
33	394.00	393.00	392.75	390.75	390.42	389.67	389.42	620	SEE PLAN	PRIVATE	PRIVATE HOA
34	394.50	393.50	393.25	391.25	390.92	390.17	389.92	750	SEE PLAN	PRIVATE	PRIVATE HOA
35	392.00	391.00	390.75	388.75	388.42	387.67	387.42	1220	SEE PLAN	PRIVATE	PRIVATE HOA
36	388.70	387.70	387.45	385.45	385.12	384.37	384.12	1020	SEE PLAN	PRIVATE	PRIVATE HOA
37	387.30	386.30	386.05	384.05	383.72	382.97	382.72	1260	SEE PLAN	PRIVATE	PRIVATE HOA
38	388.00	387.00	386.75	384.75	384.42	383.67	383.42	1950	SEE PLAN	PRIVATE	PRIVATE HOA
40	370.50	369.50	369.25	367.25	366.92	366.17	365.92	1465	SEE PLAN	PRIVATE	PRIVATE HOA
42	375.00	374.00	373.75	371.75	371.42	370.67	370.42	2333	SEE PLAN	PRIVATE	PRIVATE HOA
43	369.50	368.50	368.25	366.25	365.92	365.17	364.92	980	SEE PLAN	PRIVATE	PRIVATE HOA
45	361.50	360.50	360.25	358.25	357.92	357.17	356.92	890	SEE PLAN	PRIVATE	PRIVATE HOA
46	369.00	368.00	367.75	365.75	365.42	364.67	364.42	1350	SEE PLAN	PRIVATE	PRIVATE HOA
47	383.50	382.50	382.25	380.25	379.92	379.17	378.92	950	SEE PLAN	PRIVATE	PRIVATE HOA
48	382.00	381.00	380.75	378.75	378.42	377.67	377.42	810	SEE PLAN	PRIVATE	PRIVATE HOA
50	387.40	386.40	386.15	384.15	383.82	383.07	382.82	525	SEE PLAN	PRIVATE	PRIVATE HOA
56	341.40	340.40	340.15	338.15	337.82	337.07	336.82	1015	SEE PLAN	PRIVATE	PRIVATE HOA
57	349.40	348.40	348.15	346.15	345.82	345.07	344.82	732	SEE PLAN	PRIVATE	PRIVATE HOA
58	339.50	338.50	338.25	336.25	335.92	335.17	334.92	2100	SEE PLAN	PRIVATE	PRIVATE HOA
59	339.50	338.50	338.25	336.25	335.92	335.17	334.92	1913	SEE PLAN	PRIVATE	PRIVATE HOA
60	351.00	350.00	349.75	347.75	347.42	346.67	346.42	890	SEE PLAN	PRIVATE	PRIVATE HOA
100	374.50	373.50	373.25	371.25	370.92	370.17	370.17	2550	SEE PLAN	PRIVATE	PRIVATE HOA
101	370.50	369.50	369.25	367.25	366.92	366.17	366.17	1500	SEE PLAN	PRIVATE	PRIVATE HOA
102	366.50	365.50	365.25	363.25	362.92	362.17	362.17	1500	SEE PLAN	PRIVATE	PRIVATE HOA
103	360.00	359.00	358.75	356.75	356.42	355.67	355.67	3000	SEE PLAN	PRIVATE	PRIVATE HOA
104	351.00	350.00	349.75	347.75	347.42	346.67	346.67	1875	SEE PLAN	PRIVATE	PRIVATE HOA
105	349.00	348.00	347.75	345.75	345.42	344.67	344.67	1515	SEE PLAN	PRIVATE	PRIVATE HOA

NOTE

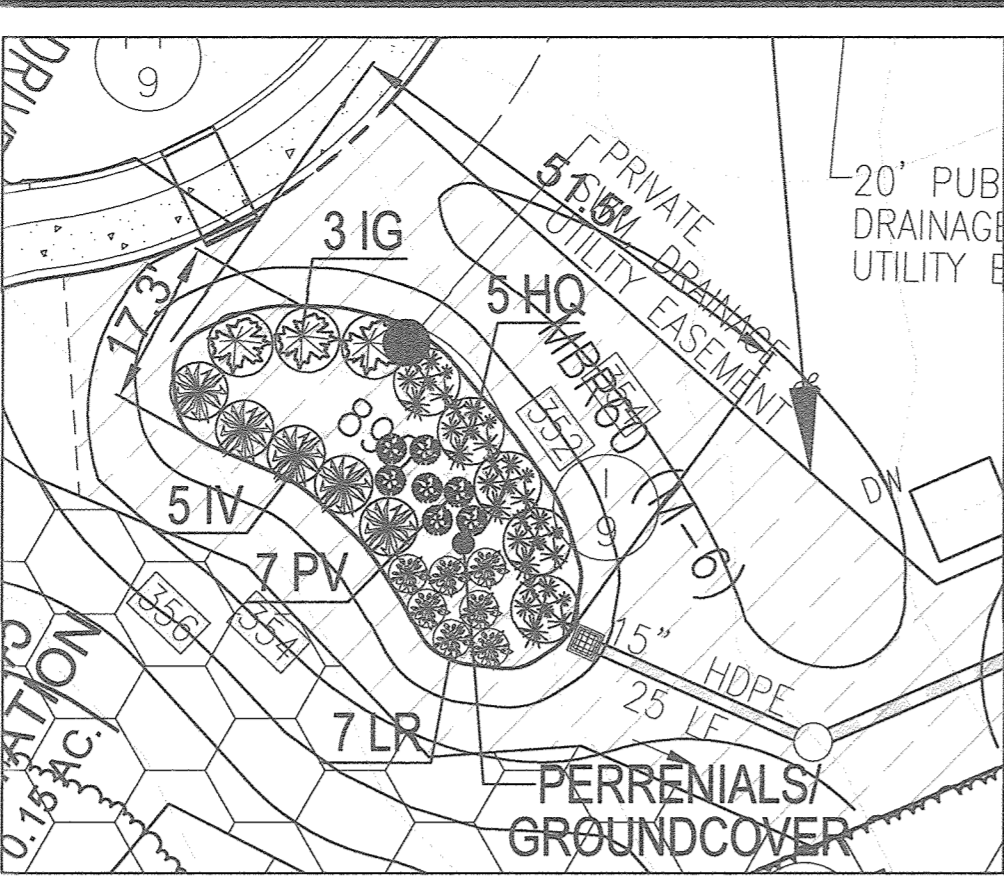
MBR 40, 45, 46, 59, 60 and 100-105, LOCATED WITHIN THE "GROUNDWATER RESTRICTION AREA" SHALL BE PRIVATELY OWNED AND PRIVATELY MAINTAINED AND SHALL BE UNDERDRAINED SUCH THAT RECHARGE IS NOT PROVIDED.

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

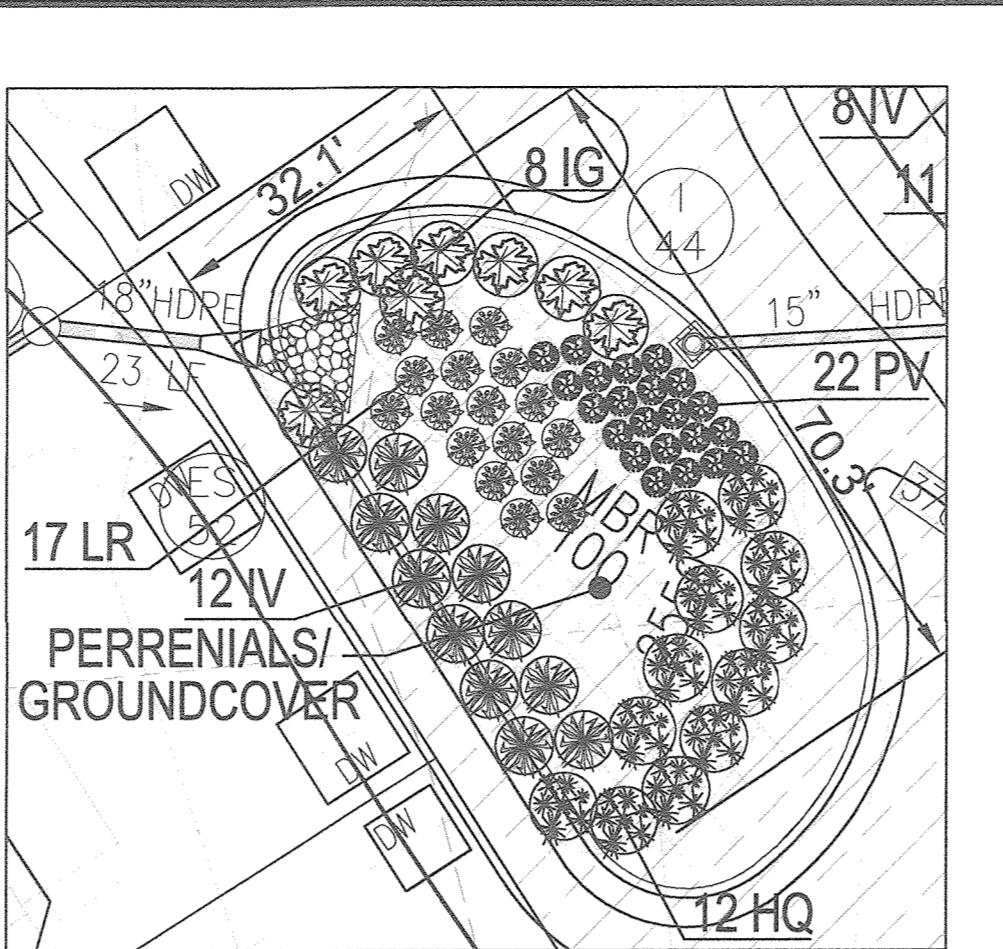
OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000



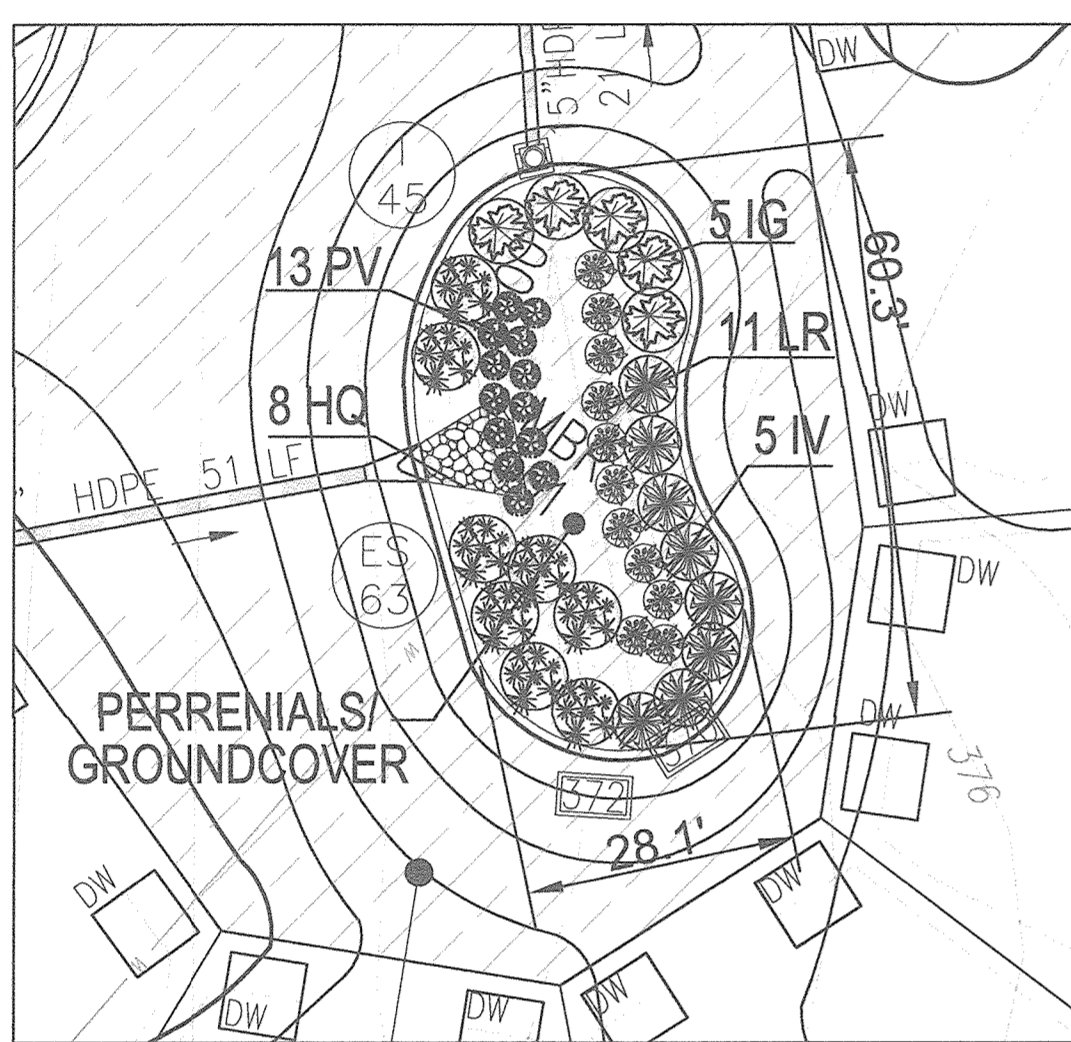
DETAILED BIO AND PLANTING PLAN (SWM #59)  
SCALE: 1" = 20'



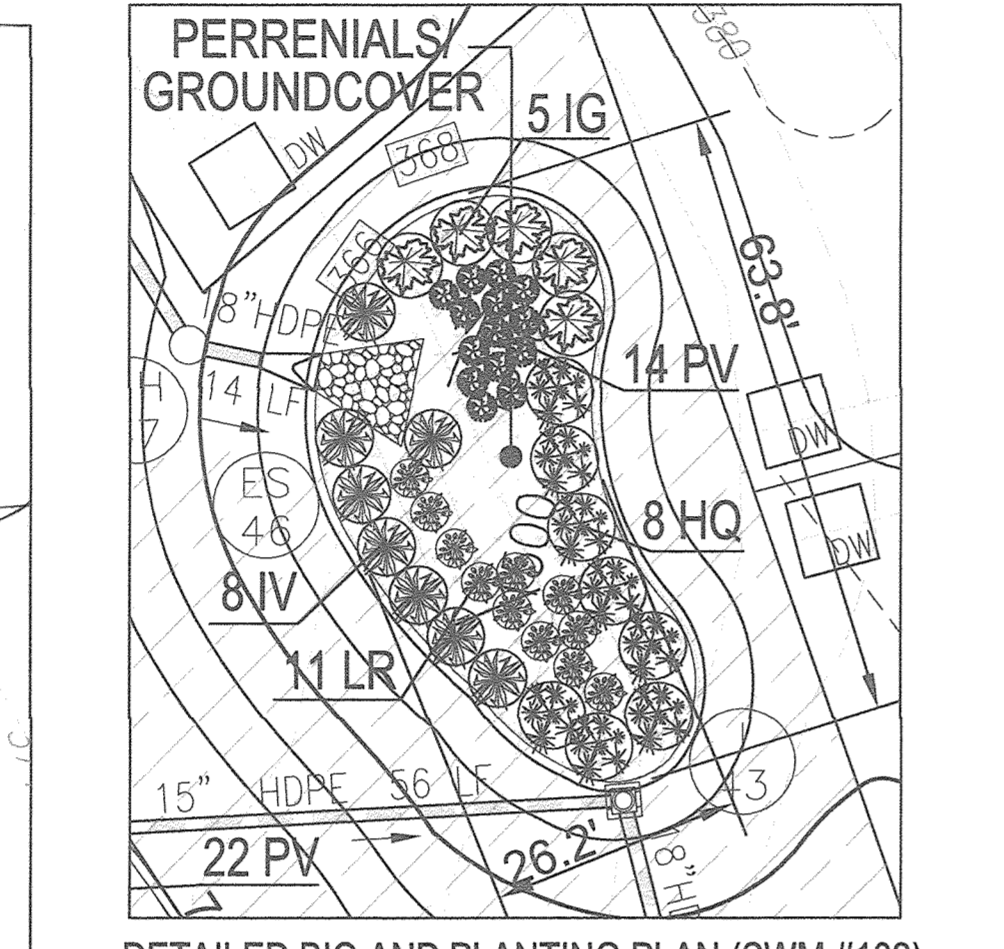
DETAILED BIO AND PLANTING PLAN (SWM #60)  
SCALE: 1" = 20'



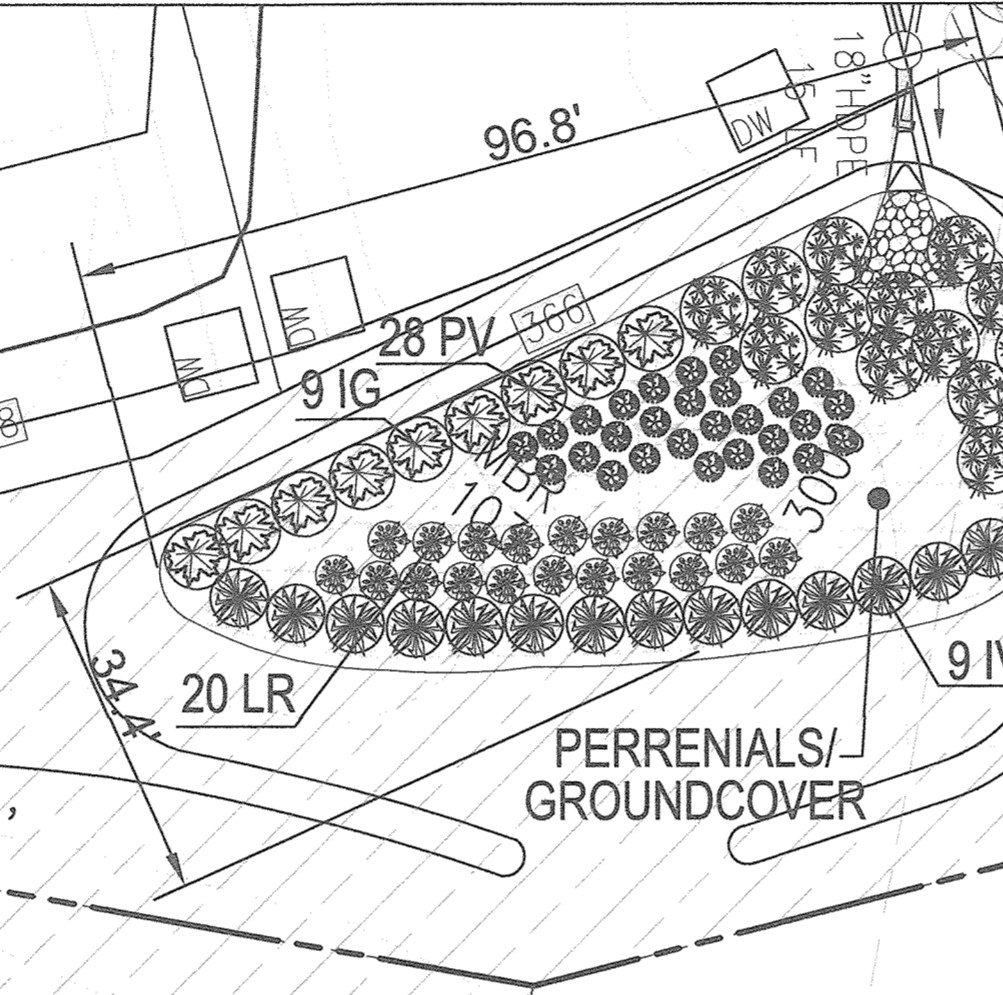
DETAILED BIO AND PLANTING PLAN (SWM #100)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #101)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #102)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #103)  
SCALE: 1" = 20'

MICRO-BIORETENTION PLANTING REQUIREMENTS					PLANTINGS PROVIDED					PERENNIALS/GROUND COVER PROVIDED		
MBR #	LF	AREA	STEMS REQUIRED (0.0299)	STEMS PROVIDED	IG	IV	HQ	LR	PV	BA	AG	TOTAL
59	195	1914	58	58	6	10	10	14	18	66	66	132
60	124	892	27	27	3	5	5	7	7	31	31	62
100	186	2362	71	71	8	12	12	17	22	82	82	164
101	154	1502	45	45	5	8	8	11	13	52	52	104
102	160	1509	46	46	5	8	8	11	14	52	52	104
103	232	2899	87	87	9	15	15	20	28	101	101	202
104	199	1884	57	57	6	10	10	15	16	65	65	130
105	229	1517	46	46	5	8	8	12	13	53	53	106
TOTALS:	1479	14479	437	437	47	76	76	107	131	502	502	1004

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

KEY	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
IG	211	ILEX GLABRA 'SHAMROCK' INKERRY HOLLEY	1 GALLON	18" O.C.
IV	331	IRIS SIBERICA 'BENNERUP BLUE' BENNERUP BLUE SIBERIAN	1 GALLON	18" O.C.
HQ	331	HEMEROCALLIS X 'PRAIRIE BLUE EYES' PRAIRIE BLUE EYES DAYLILY	1 GALLON	30" O.C.
LR	451	LIRIOPE MUSCARI 'BIG BLUE' BIG BLUE LILYTURF	4" HT	18" O.C.
PV	538	CORNUS SERICEA 'FLAVIRAMEA' YELLOW TWIGGED DOGWOOD	18-21" HT	18" O.C.

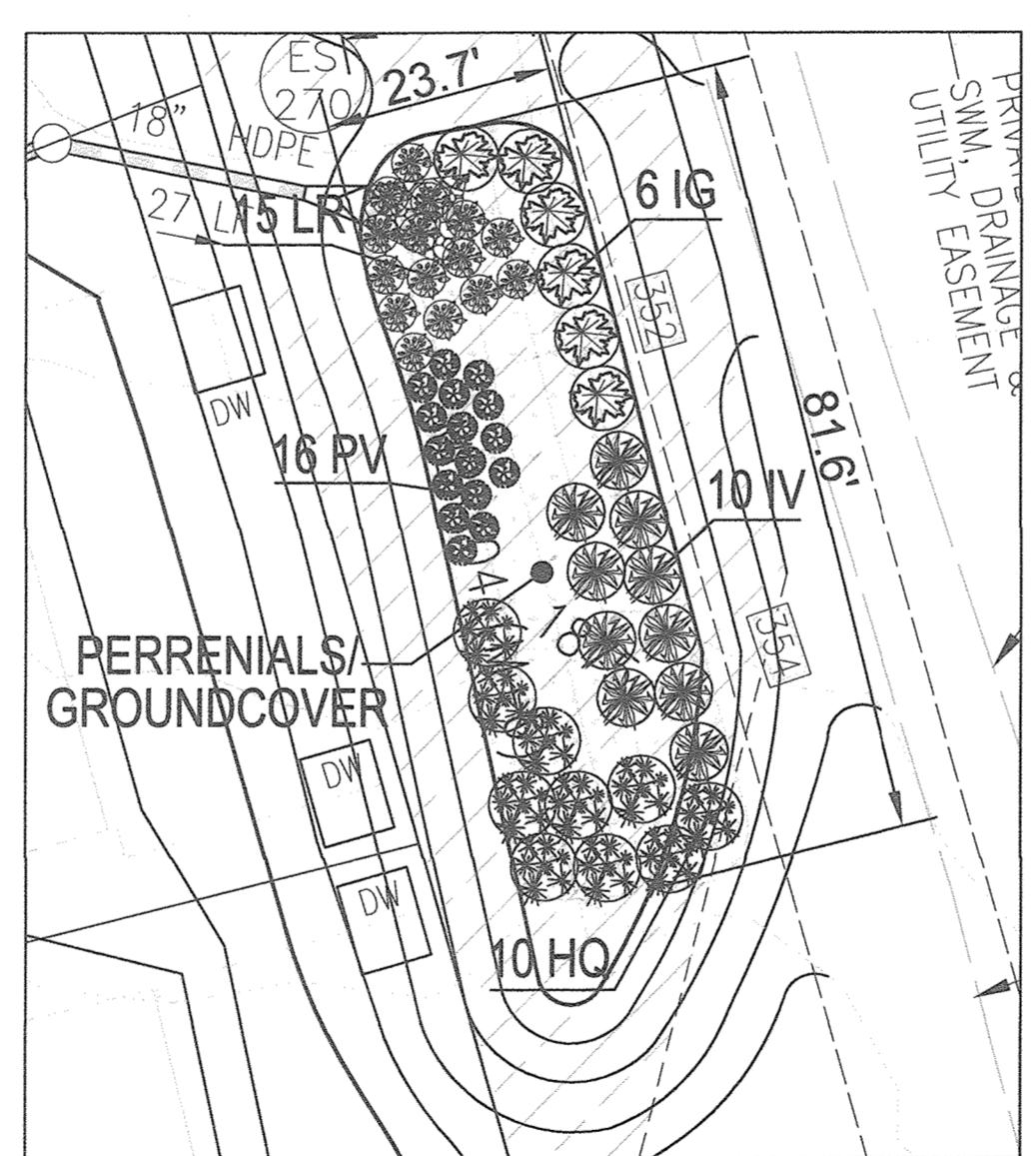
LEGEND	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
	2108	BAPTISIA AUSTRALIS FALSE INDIGO	4" POT	12"-15" O.C. FOR SIDES AND BOTTOM OF MBR. MIX ALL VARIETIES IN A NATURALIZED RANDOM PATTERN THROUGHOUT. PLANT IN GROUPS OF NO LESS THAN 9 PLANTS PER CLUMP.
	2108	ACORUS GRAMINEUS 'OGON' GOLDEN VARIEGATED SWEET FLAG	1 QT.	

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 [Signature] 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS DATE

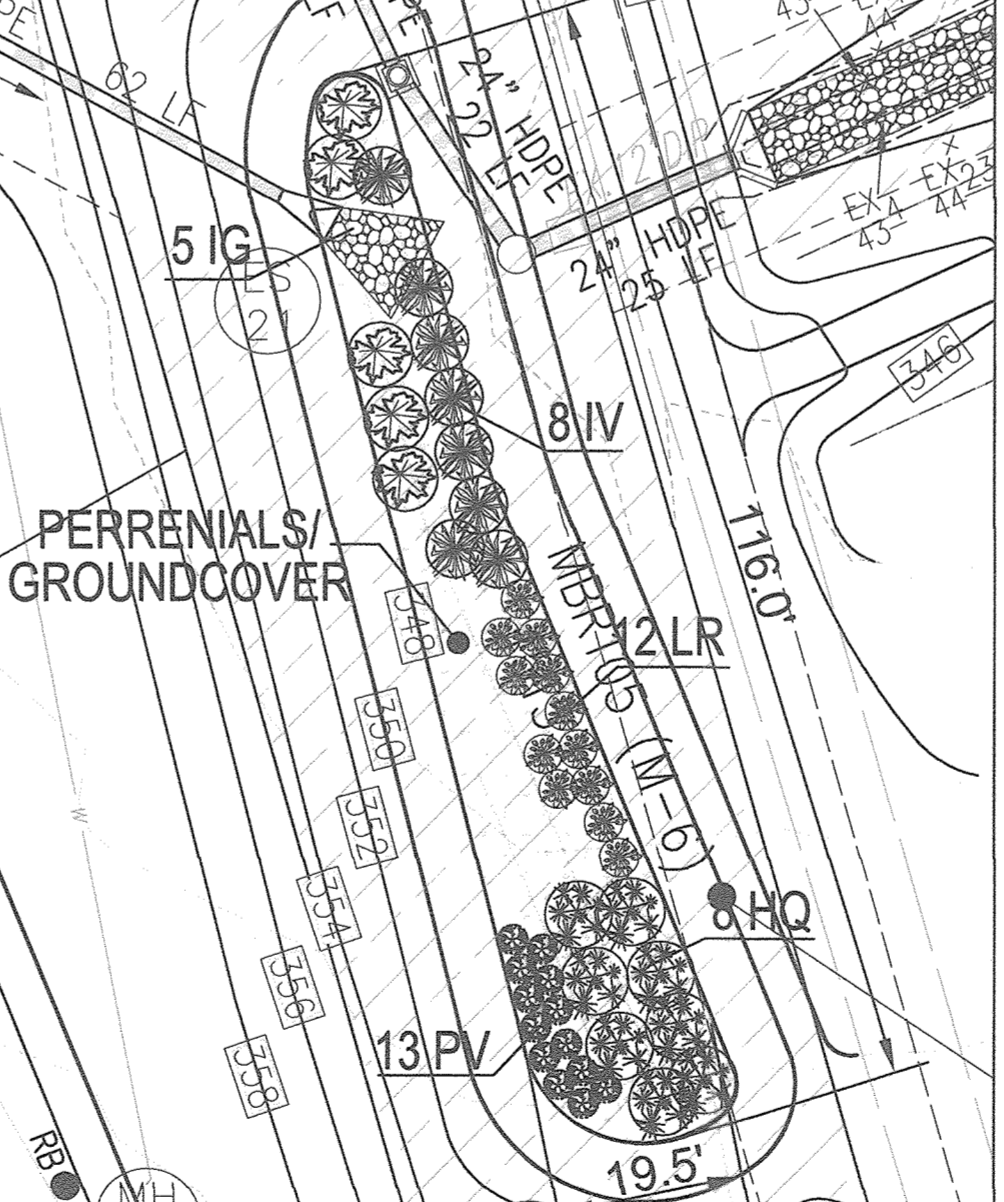
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 [Signature] DATE  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 [Signature] 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

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

Tree	Shrub	Herbaceous Species
<del>Acer rubrum</del>	<del>Azalea parviflora</del>	<del>Andropogon virginicus</del>
<del>Red Maple</del>	<del>Bottlebrush Buckeye</del>	<del>Broomrape</del>
<del>Betula nigra</del>	<del>Cypripedium acaule</del>	<del>Eupatorium purpureum</del>
<del>River Birch</del>	<del>Burns</del>	<del>Joe Pye Weed</del>
<del>Juncus virginicus</del>	<del>Hamamelis virginiana</del>	<del>Scirpus pungens</del>
<del>Eastern Red Cedar</del>	<del>Witch Hazel</del>	<del>Three Square Nuttall</del>
<del>Chionodoxa virginica</del>	<del>Vaccinium corymbosum</del>	<del>Iris versicolor</del>
<del>Fringe-tree</del>	<del>Highbush Blueberry</del>	<del>Blue Flag</del>
<del>Nyssa sylvatica</del>	<del>Alex glabra</del>	<del>Lobelia cardinalis</del>
<del>Black Gum</del>	<del>Indigo</del>	<del>Cardinal Flower</del>
<del>Diostyris virginiana</del>	<del>Ilex verticillata</del>	<del>Panicum virginatum</del>
<del>Perennian</del>	<del>Waterberry</del>	<del>Swatara</del>
<del>Platanus occidentalis</del>	<del>Viburnum dentatum</del>	<del>Dichanthium scoparium</del>
<del>Syringa</del>	<del>Ammannia</del>	<del>Broomrape Grass</del>
<del>Quercus prinus</del>	<del>Lindera benzoin</del>	<del>Rudbeckia lactinosa</del>
<del>Pine Oak</del>	<del>Spiraea</del>	<del>Tall Coneflower</del>
<del>Quercus phellos</del>	<del>Myrica pennsylvanica</del>	<del>Scirpus cypripedus</del>
<del>Willow Oak</del>	<del>Bayberry</del>	<del>Wedgegrass</del>
<del>Saxifraga</del>		<del>Veronica novboracensis</del>
<del>Black Willow</del>		<del>New York Ironweed</del>



DETAILED BIO AND PLANTING PLAN (SWM #104)  
SCALE: 1" = 20'



DETAILED BIO AND PLANTING PLAN (SWM #105)  
SCALE: 1" = 20'

- TABLE A.4 IS TAKEN FROM THE "2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II - APPENDIX A."
- CONTRACTOR SHALL BE FAMILIAR WITH APPENDIX B.4.C. CONSTRUCTION SPECIFICATIONS AND TABLE B.4.1 MATERIAL SPECIFICATIONS. IN ADDITION THE "2000 MARYLAND STORMWATER DESIGN MANUAL - VOLUME II - APPENDIX A OFFERS ADDITIONAL HELPFUL INFORMATION."
- NO TREES SHALL BE PLANTED WITHIN A MICRO-BIORETENTION FACILITY. USE ONLY SHRUB OR HERBACEOUS SPECIES.
- ABOVE TABLE A.4 IS FOR INFORMATIONAL PURPOSES ONLY. LANDSCAPE CONTRACTOR SHALL INSTALL PLANTINGS SPECIFIED OR USE APPROVED EQUAL SPECIES WHICH ARE TOLERANT TO FLUCTUATING WATER LEVELS.
- PLANTINGS SHOWN HEREON ARE THE RESPONSIBILITY OF THE DEVELOPER TO INSTALL DURING THE CONSTRUCTION OF THIS FINAL PLAN.

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN  
 ENVIRONMENTAL SITE DESIGN (ESDv)  
 MICRO-BIORETENTION - PLANTING DETAILS

**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"  
 PLATS 23334-23337

TAX MAP 35, GRID 21  
 5TH ELECTION DISTRICT  
 OPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLIOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHY  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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 09-27-2020

63 SHEET OF 74

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 TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVIDE AN OBSTACLE TO THE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERBERIS, GRASS, SPANXGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05. THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

- \* SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION)
- \* ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (50%), COARSE SAND (30%), AND COMPOST (40%).
- \* CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 0%.
- \* PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMMONIUM (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED INTO THE SOIL TO INCREASE OR DECREASE PH.

THESE 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 TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

3. COMPACTION

IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL, WHEN POSSIBLE. USE OCCASIONAL HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE EXCAVATED USING LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACK OR WASH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TIRE TYPES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LIGHTS, 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 CHESEL FLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH 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 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE. ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/2 INCH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL. GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLANTS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

4. PLANT MATERIAL

RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

5. PLANT INSTALLATION

COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE INVERT AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SUBSURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR ACCEPTANCE. ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/2 INCH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL. GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLANTS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

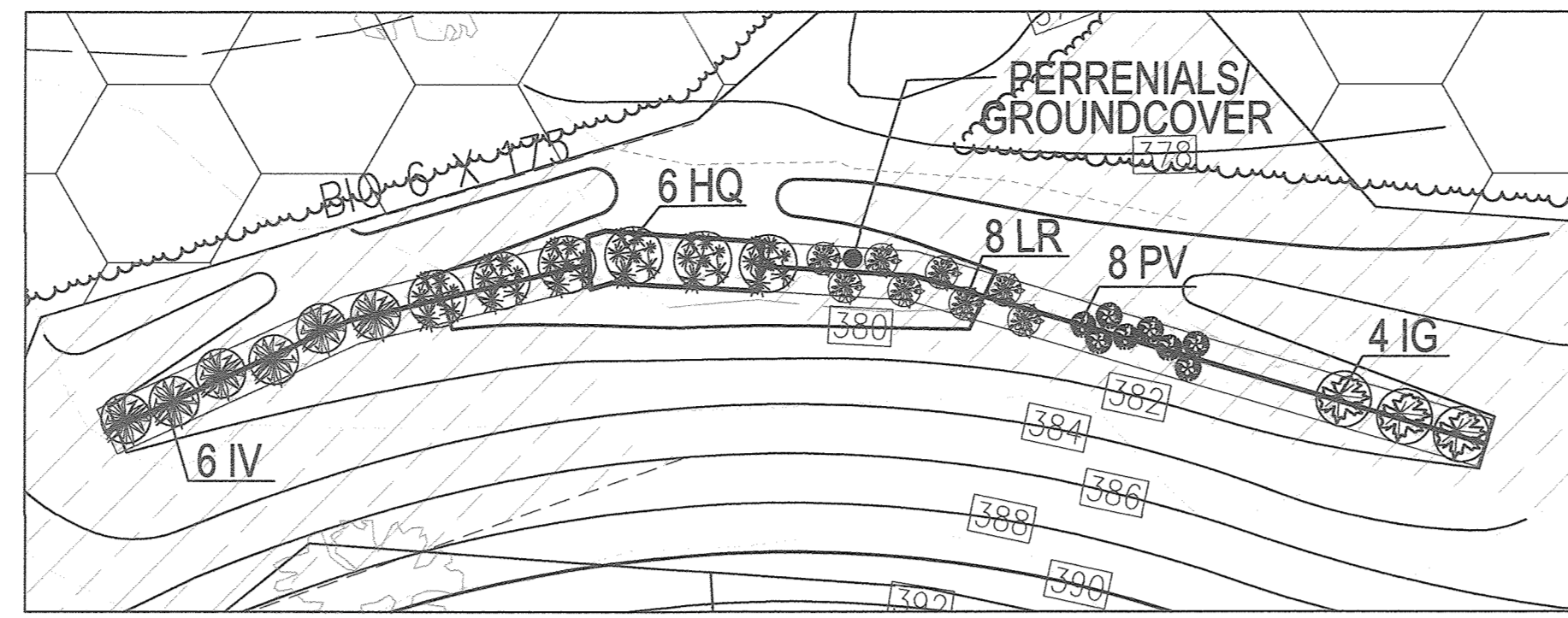
6. UNDERDRAINS

UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:

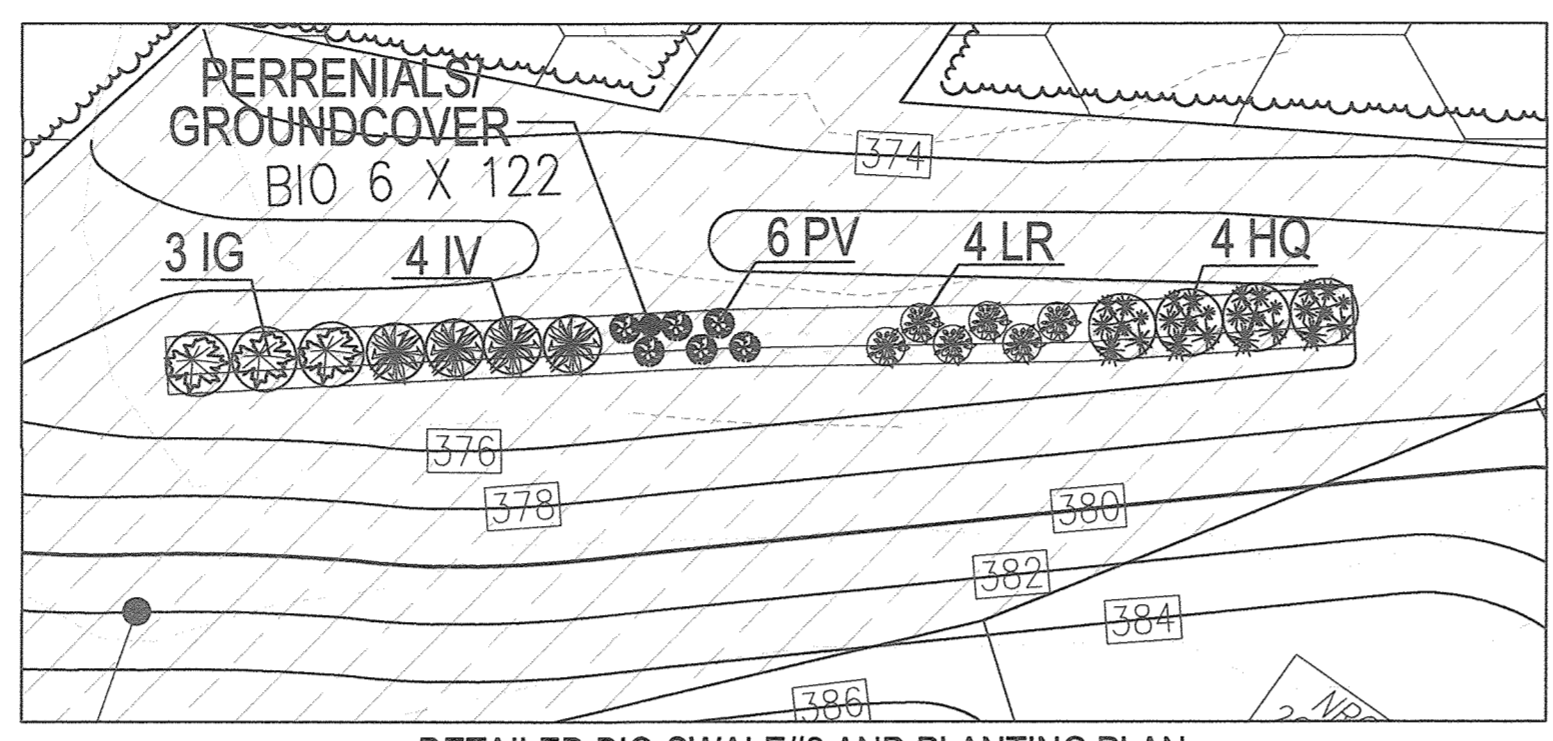
- \* PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F 758, TYPE PS 28, OR AASHTO M-278) IN A GRAVEL LAYER. THE PERFORATED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HOPE).
- \* PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 4A) GALVANIZED HARDWARE CLOTH.
- \* GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.
- \* THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.
- \* A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.
- \* A 4" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIGRATION OF FINES INTO THE UNDERDRAIN. THIS LAYER MAY BE CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

7. MISCELLANEOUS

THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.



DETAILED BIO-SWALE#1 AND PLANTING PLAN  
SCALE: 1" = 20"



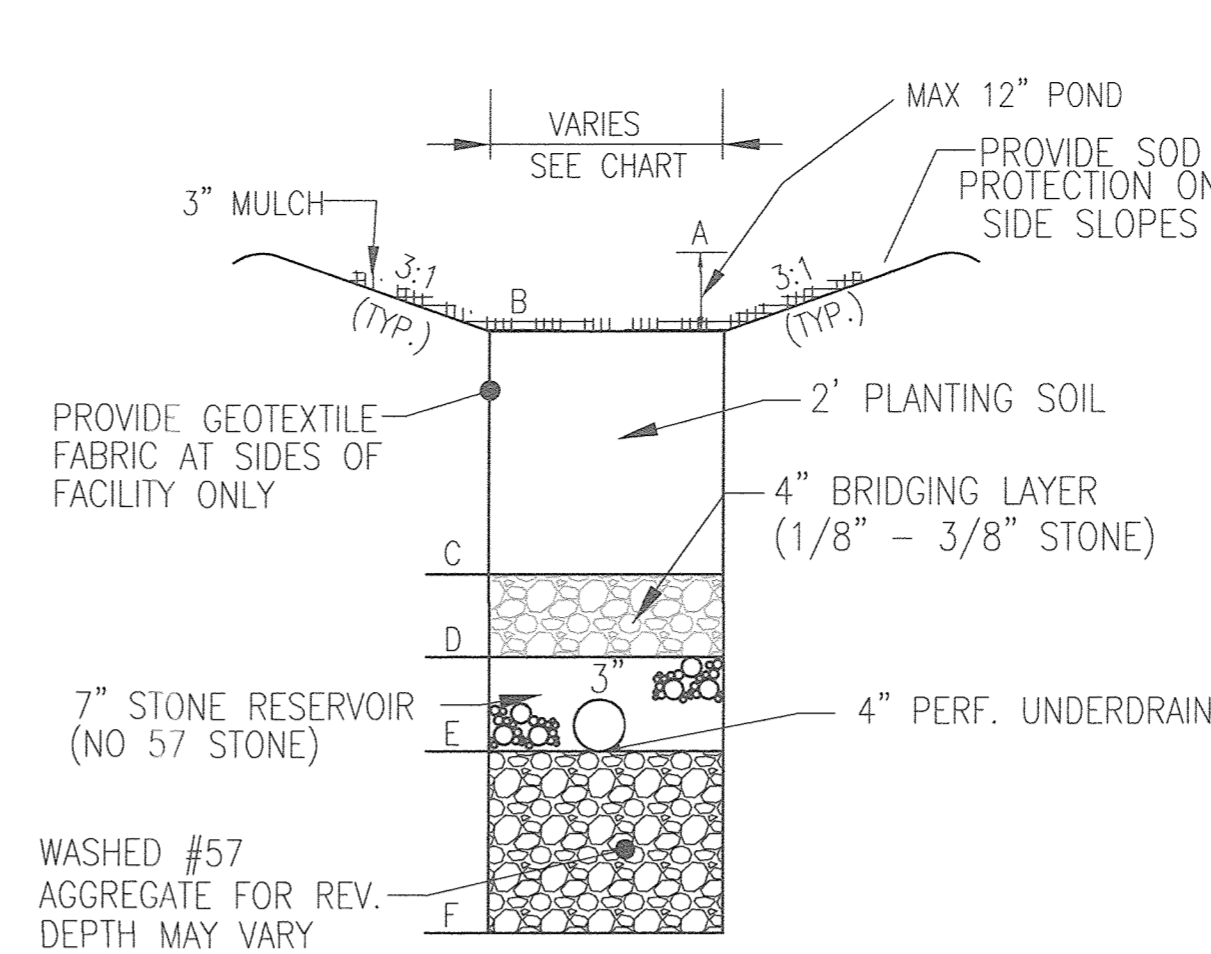
DETAILED BIO-SWALE#2 AND PLANTING PLAN  
SCALE: 1" = 20"

LEGEND	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
IG	61	BAPTISIA AUSTRALIS FALSE INDIGO	4" POT	12" - 15" O.C. FOR SIDES AND BOTTOM OF MFR. MIX ALL VARIETIES IN A NATURALIZED RANDOM PATTERN THROUGHOUT. PLANT IN GROUPS OF NO LESS THAN 5 PLANTS PER CLUMP.
IV	61	ACORUS GRAMINEUS 'OGON' GOLDEN VARIEGATED SWEET FLAG	1 QT.	

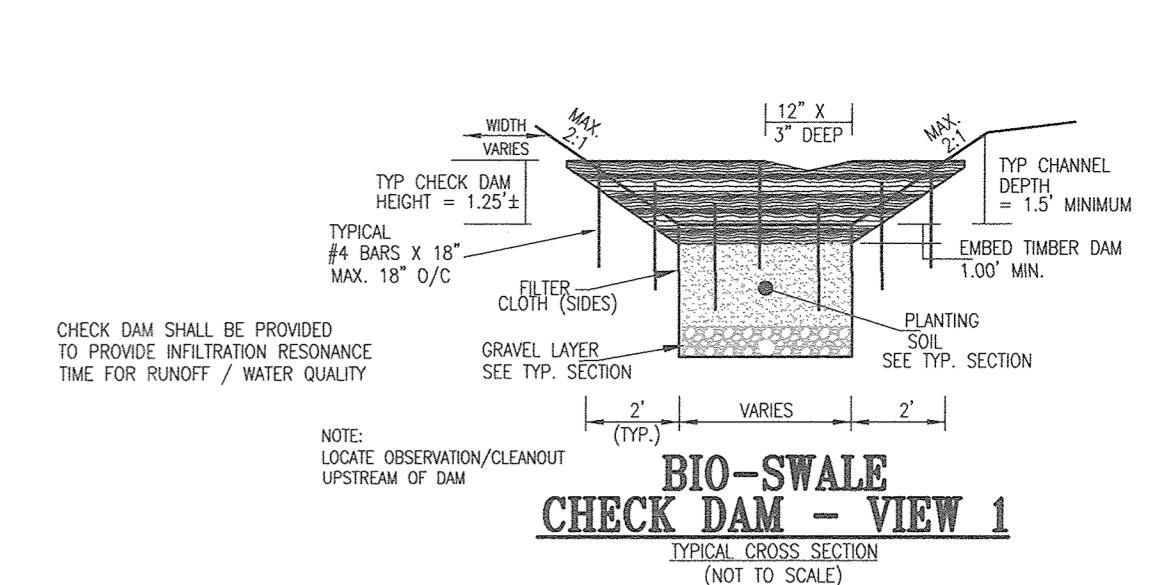
KEY	QTY	BOTANICAL NAME/COMMON NAME	SIZE	REMARKS
IG	7	ILEX GLABRA 'SHAMROCK' HOLLY	1 GALLON	18" O.C.
IV	10	IRIS SIBERICA 'BENNERUP BLUE' BENNERUP BLUE SIBERIAN	1 GALLON	18" O.C.
HQ	10	HEMEROCALLIS X 'PRAIRIE BLUE EYES' PRAIRIE BLUE EYES DAYLILY	1 GALLON	30" O.C.
LR	14	LIRIOPE MUSCARI 'BIG BLUE' BIG BLUE LILYTURF	4" HT	18" O.C.
PV	14	CORNUS SERICEA 'FLAVIRAMA' YELLOW TWIGGED DOGWOOD	18-21" HT	18" O.C.

BIO-SWALE PLANTING REQUIREMENTS				PLANTINGS PROVIDED				PERENNIALS/GROUNDCOVER PROVIDED					
BIO-SWALE	LF	AREA	STEMS REQUIRED (0.0299)	STEMS PROVIDED	IG	IV	HQ	LR	PV	BA	AG	TOTAL	TOTAL
1	361	1048	32	32	4	6	6	8	8	36	36	72	
2	259	742	23	23	3	4	4	6	6	25	25	50	
<b>TOTALS:</b>	<b>620</b>	<b>1790</b>	<b>55</b>	<b>55</b>	<b>7</b>	<b>10</b>	<b>10</b>	<b>14</b>	<b>14</b>	<b>61</b>	<b>61</b>	<b>122</b>	

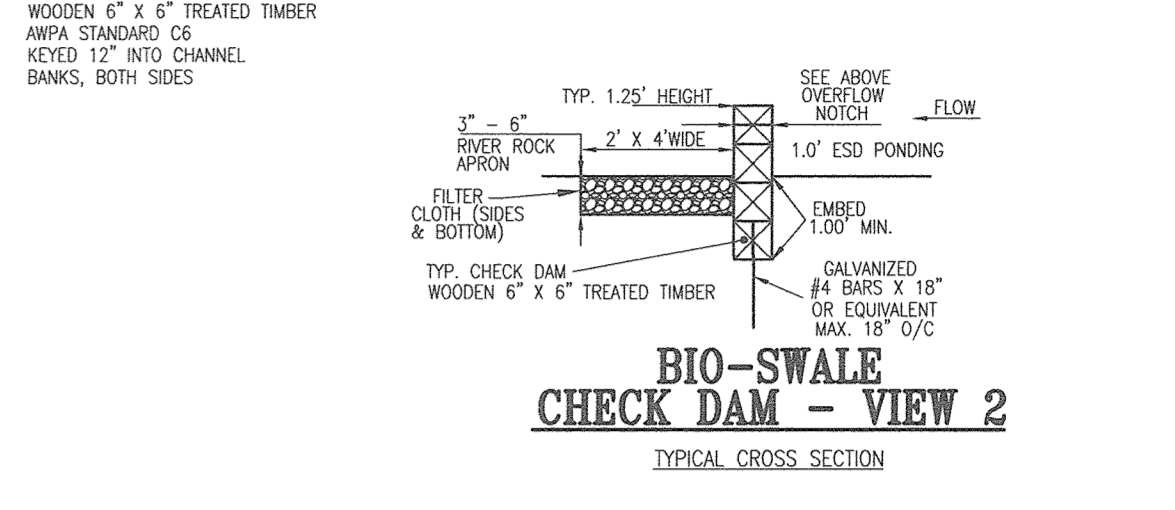
BIORETENTION AREAS ARE TO BE PLANTED BASED ON A MINIMUM DENSITY OF 1000 STEMS PER PLANTED ACRE (0.0229 STEMS PER SQUARE FOOT).



BIO SWALE - (M-8)  
TYPICAL CROSS SECTION  
(NOT TO SCALE)



BIO-SWALE CHECK DAM - VIEW 1  
TYPICAL CROSS SECTION  
(NOT TO SCALE)



BIO-SWALE CHECK DAM - VIEW 2  
TYPICAL CROSS SECTION  
(NOT TO SCALE)

Appendix A. Landscaping Guidelines for Stormwater BMPs..... Specific Landscaping Criteria

Table A.4 Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
<i>Thuja occidentalis</i>	<i>Aucubus parviflora</i>	<i>Andropogon virginicus</i>
<i>Thuja occidentalis</i>	<i>Bottlebrush Buckeye</i>	<i>Broomrape</i>
<i>Betula nigra</i>	<i>Ophiolobos occidentalis</i>	<i>Eupatorium purpureum</i>
<i>River Birch</i>	<i>Bumelia</i>	<i>Joe Pye Weed</i>
<i>Juniperus virginiana</i>	<i>Hammelia virginiana</i>	<i>Scirpus pycnanthus</i>
<i>Eastern Red Cedar</i>	<i>Witch Hazel</i>	<i>Three Square Bulrush</i>
<i>Quercus virginiana</i>	<i>Vaccinium corymbosum</i>	<i>Blue Flag</i>
<i>Pinus strobus</i>	<i>Highbush Blueberry</i>	<i>Blue Flag</i>
<i>Black Gum</i>	<i>Thuja occidentalis</i>	<i>Castilleja Flower</i>
<i>Disopygia virginiana</i>	<i>Ilex verticillata</i>	<i>Panicum virgatum</i>
<i>Persea palustris</i>	<i>Inkberry</i>	<i>Witchberry</i>
<i>Platanus occidentalis</i>	<i>Viburnum dentatum</i>	<i>Dichanthelium scoparium</i>
<i>Sycamore</i>	<i>Aronia</i>	<i>Broom Panic Grass</i>
<i>Quercus palustris</i>	<i>Lindera benzoin</i>	<i>Rudbeckia lactinosa</i>
<i>Pine Oak</i>	<i>Spicebush</i>	<i>Tall Coneflower</i>
<i>Quercus phellos</i>	<i>Myrica pennsylvanica</i>	<i>Scirpus cypripatis</i>
<i>Willow Oak</i>	<i>Bayberry</i>	<i>Vernonia noveboracensis</i>
<i>Black Willow</i>		<i>New York Ironweed</i>

Note 1: For more options on plant selection for bioretention, consult Bioretention Manual (ETAB, 1999) or the Design of Stormwater Filtering Systems (Clayton and Schauder, 1997).

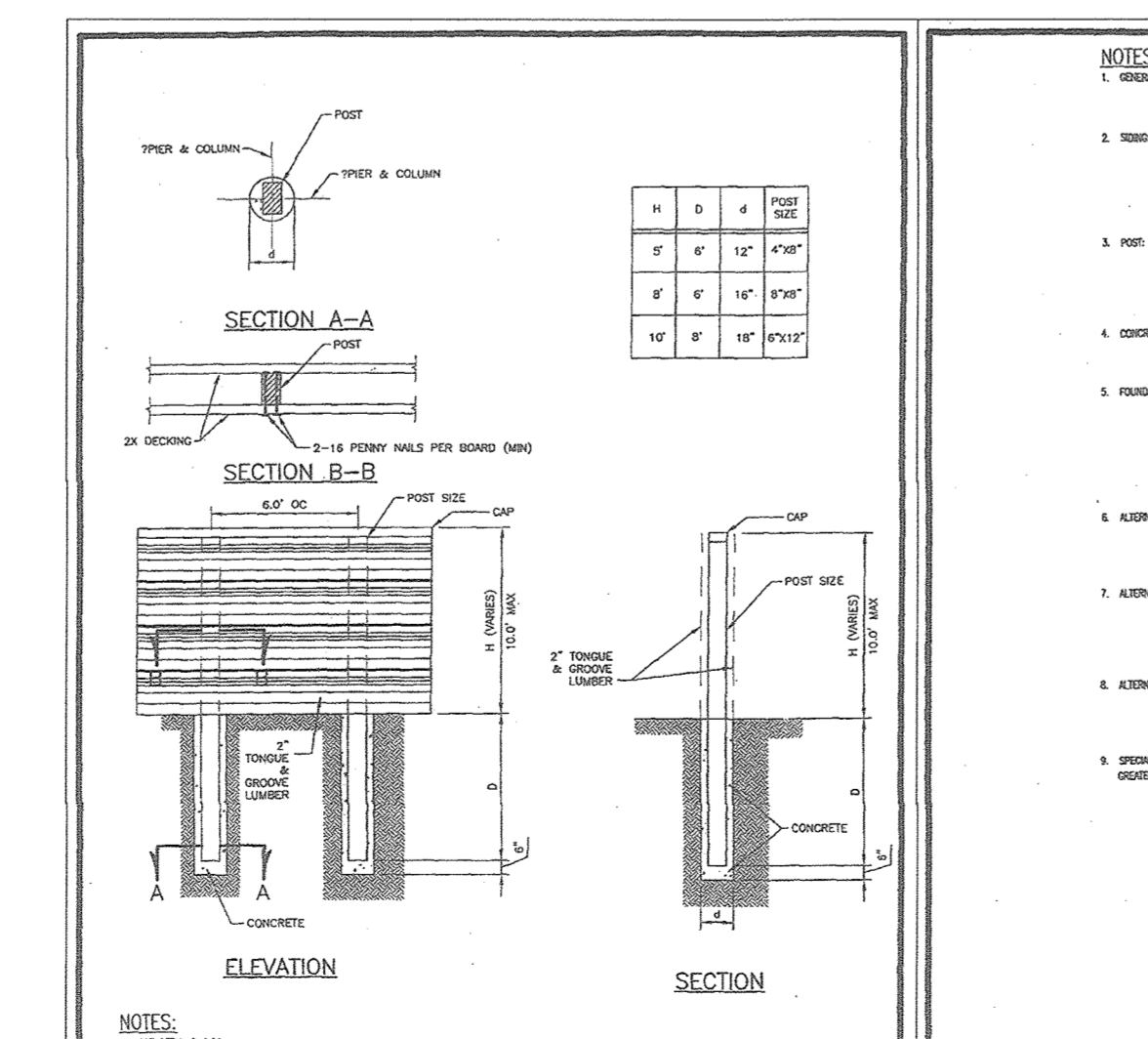
OPERATION AND MAINTENANCE SCHEDULE FOR (M-8) BIO-SWALE AREAS

- ANNUAL MAINTENANCE OF PLANT MATERIAL, MULCH LAYER AND SOIL LAYER IS REQUIRED. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II, TABLE A.4.1 AND 2.
- SCHEDULE OF PLANT INSPECTION WILL BE TWICE A YEAR IN SPRING AND FALL. THIS INSPECTION WILL INCLUDE REMOVAL OF DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, TREATMENT OF ALL DISEASED TREES AND SHRUBS AND REPLACEMENT OF ALL DEFICIENT STAKES AND WIRES.
- MULCH SHALL BE INSPECTED EACH SPRING. REMOVE PREVIOUS MULCH LAYER BEFORE APPLYING NEW LAYER ONCE EVERY 2 TO 3 YEARS.
- SOIL EROSION TO BE ADDRESSED ON AN AS NEEDED BASIS WITH A MINIMUM OF ONCE PER MONTH AND AFTER HEAVY STORM EVENTS.

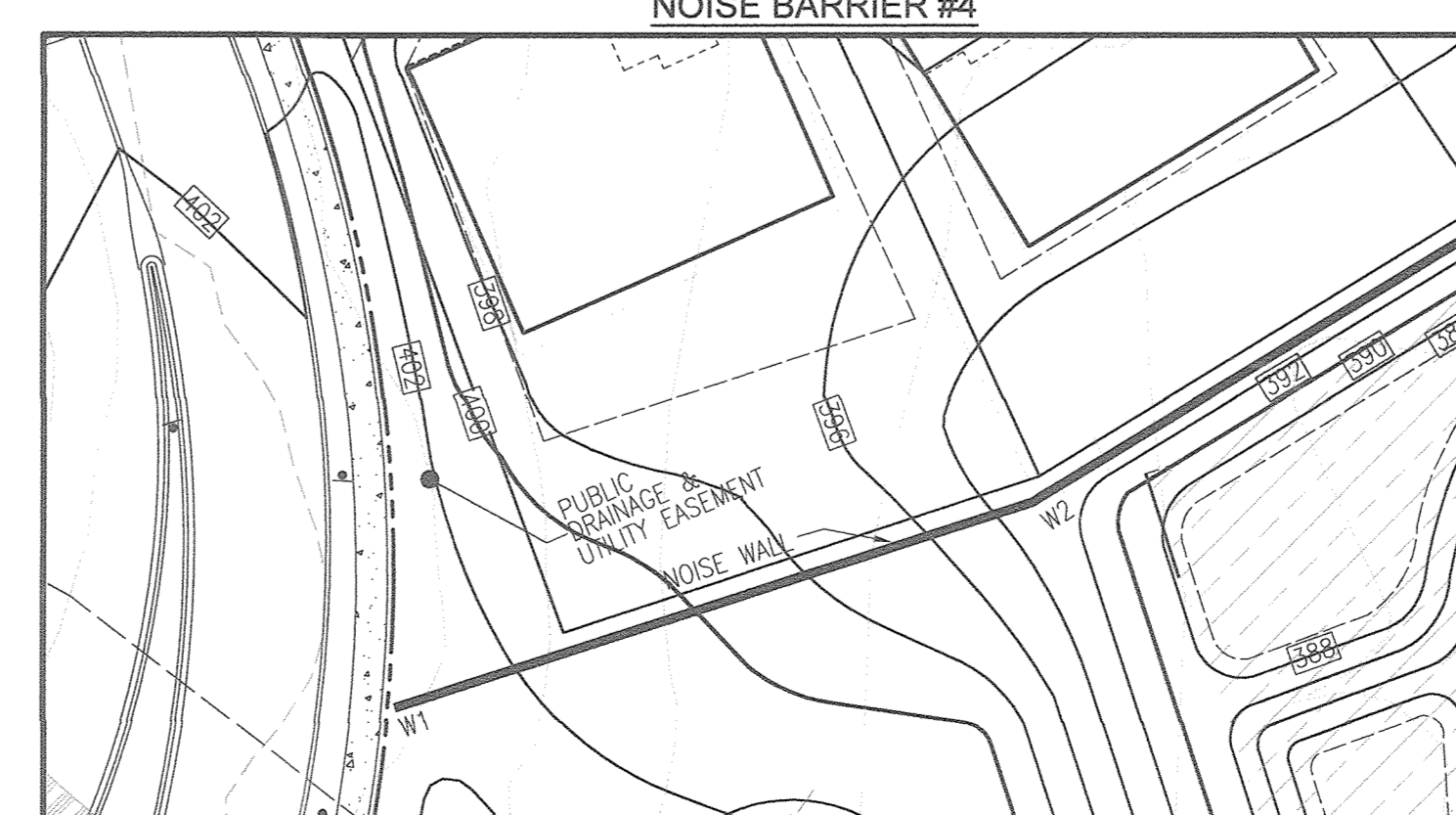
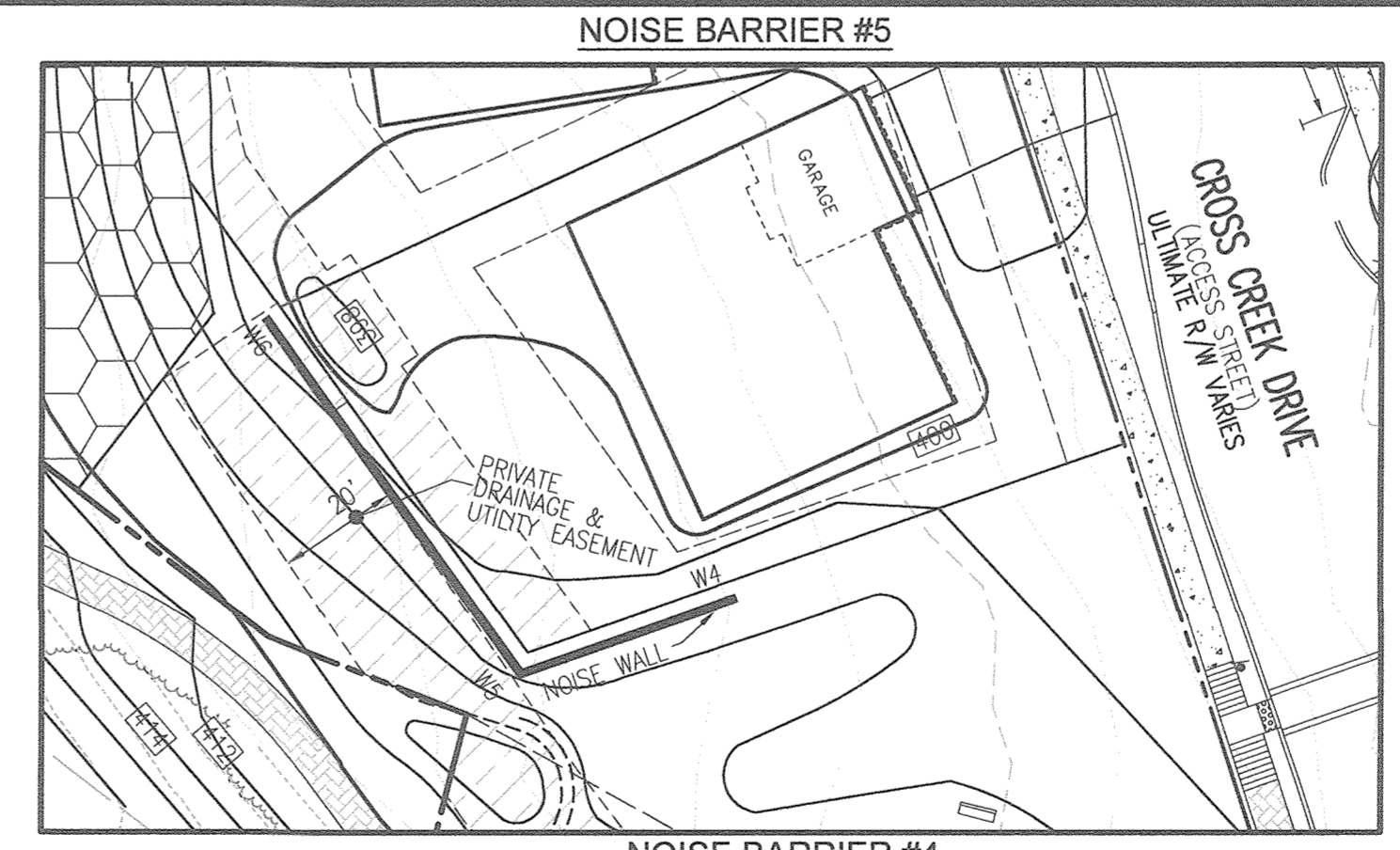
NOISE WALL DETAILING OR APPROVED EQUAL

NOISE WALL LOCATION CHART					
STREET NAME	POINT	STATION	OFFSET	GROUND	WALL HEIGHT
CROSS CREEK DRIVE	W1	0+98.3	37.4' RT.	404'	6 FEET TALL
CROSS CREEK DRIVE	W2	1+25.4	136.6' RT.	393'	7 FEET TALL
CROSS CREEK DRIVE	W3	1+45.1	209.9' RT.	393'	400'
CROSS CREEK DRIVE	W4	2+53.5	100.3' LT.	402'	6 FEET TALL
CROSS CREEK DRIVE	W5	2+53.5	138.5' LT.	402'	6 FEET TALL
CROSS CREEK DRIVE	W6	3+23.2	159.1' LT.	402'	6 FEET TALL

W1, W2, W3 = BARRIER #4 - SIMPSON OAKS - NOISE STUDY JULY 2017 (P-17-002)  
W4, W5, W6 = BARRIER #5 - SIMPSON OAKS - NOISE STUDY JULY 2017 (P-17-002)



Howard County, Maryland Department of Public Works	Detail Noise Wall Private R-9.05
Howard County, Maryland Department of Public Works	Detail Noise Wall Notes Private R-9.06



BIO-SWALE - DESIGN ELEVATION CHART												
SWALE FACILITY #	LOW PT. ESD WSEL A	TOP MULCH B	BOTTOM PLANT SOL. C	INVERT PEAS GRAVEL D	INVERT PIPE (I) E	INVERT STONE F	WIDTH FT	LENGTH FT	OWNER PRIVATE/PUBLIC	MAINTENANCE PRIVATE/PUBLIC		
1	379.00	378.00	375.75	375.42	374.84	374.59	6	175	PRIVATE HOA	PRIVATE HOA		
2	375.70	374.70	372.45	372.12	371.54	371.29	6	122	PRIVATE HOA	PRIVATE HOA		

(1) UNDERDRAIN PIPE AND OVERFLOW DISTRIBUTION PIPE

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

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

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil (2" to 4" deep)	loamy sand (60 - 65%) & compost (35 - 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)	n/a	
Mulch	shredded hardwood	n/a	aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile	n/a	n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 (3/8" TO 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes, not necessary underdrain pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; F <sub>c</sub> = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) must use previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACT Code 150.8.99; vertical loading (H-10 or H-20); allowable horizontal loading (based on soil pressures); and analysis of potential cracking.
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Crystalline (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/1/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6.17.19

CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6.26.19

FINAL ROAD CONSTRUCTION PLAN  
 ENVIRONMENTAL SITE DESIGN (ESDV)  
 BIO SWALE - NOTES, & DETAILS AND NOISE WALL DETAILS

CEDAR CREEK - PHASE 1  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C-1  
 PLATS 23334-23337

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 ZONED: CEF-R  
 P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

OWNER / DEVELOPER  
 T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRP3, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 (410) 356-9900

OWNER  
 T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-4000

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELLIOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

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 02-27-2020.

DESIGN BY: VE+TC  
 DRAWN BY: VE+TC  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

64 SHEET OF 74



W.R. GRACE POND RECONSTRUCTION

S.W.M.F. #2

S.W.M.F. #3

LOG OF BORING NO. B-1 (2015) - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-2 (2015) - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-1 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-3 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-1 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-33 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-3 (2015) - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-6 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-2 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-2 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-32 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

LOG OF BORING NO. B-32 - Table with columns for depth, soil description, and remarks. Includes project details and notes.

OWNER/DEVELOPER CERTIFICATION: I HEREBY CERTIFY THAT MY DESIGN, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN...

DESIGN CERTIFICATION: I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL LAWS, REGULATIONS, AND STANDARDS...

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING. CHIEF, DEVELOPMENT ENGINEERING DIVISION. DATE: 6.17.19

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS. CHIEF, BUREAU OF HIGHWAYS. DATE: 6/11/2019

GEO-TECHNOLOGY ASSOCIATES, INC. JAN. 2017

REPORT OF GEOTECHNICAL EXPLORATION. SIMPSON OAKS - SWM FACILITIES. HOWARD COUNTY, MARYLAND. JANUARY 18, 2017. CONCLUSIONS AND RECOMMENDATIONS: Based upon the results of this exploration, it is our opinion that the proposed SIMM improvements are feasible...

Construction Considerations: Standing water was observed in the existing pond at the time of GEA's subsurface exploration. In addition, groundwater was observed in the borings after the completion of drilling at depths ranging from about 14 to 18 feet below existing surface grades...

Infiltration Considerations for ESD Facilities: Several ESD devices, including micro-bioreactors, dry wells, and biosolids are planned throughout the site. GEA understands that several of the facilities are planned to incorporate infiltration facilities...

FINAL ROAD CONSTRUCTION PLAN. GEOTECHNICAL RECOMMENDATIONS & S.W.M.F. SOIL BORINGS. CEDAR CREEK - PHASE 1. LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1. ROBERT H. VOGEL ENGINEERING, INC. ENGINEERS • SURVEYORS • PLANNERS. 3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043. TEL: 410.461.7666 FAX: 410.461.8961

Table No. 1 - Subsurface Exploration Summary  
Simpson Oaks, SWM Facilities  
Job No. 080972x5



Exploration No.	Approximate Existing Ground Surface Elevation (ft. MSL)	Approximate Proposed Ground Surface Elevation (ft. MSL)	Proposed Cutoff (ft.)	Boring Depth (ft.)	Approximate Termination Elevation (ft. MSL)	Approximate Cave-in Depth Observations*		Encountered During Drilling		Completion of Drilling		One Day to Two Weeks After Drilling		Depth to Highly Weathered Rock	Surficial Material Thickness (ft.)
						Depth (ft.)	EL (ft. MSL)	Depth (ft.)	EL (ft. MSL)	Depth (ft.)	EL (ft. MSL)	Depth (ft.)	EL (ft. MSL)		
<b>Borings Performed in February of 2015</b>															
SWM-2	387.1	392	4.9	15	372.1	7.2	379.9	Dry	<372	Dry	<372	Dry	<372	--	3 (T)
SWM-3	421.7	404	-17.7	26	386.7	11.8	410.4	Dry	<397	Dry	<397	Dry	<397	7	2 (T)
SWM-4	367.8	368	0.2	15	352.8	7.8	360	Dry	<373	Dry	<373	Dry	<373	7	3 (T)
SWM-5	386	384	-2	15	371	6	380	Dry	<371	Dry	<371	Dry	<371	12	3 (T)
SWM-6	384.1	382	-2.1	20	354.1	10.8	373.5	Dry	<354	Dry	<354	Dry	<354	17	4 (T)
SWM-7	349.2	356	6.8	15	334.2	5	344.2	Dry	<334	Dry	<334	Dry	<334	7	7 (T)
SWM-8	352.6	354	1.4	15	337.6	6.3	346.3	Dry	<338	Dry	<338	Dry	<338	--	4 (T)
<b>Borings Performed in August of 2015</b>															
B-1 (2015)	354	--	--	20	334	--	--	Pipe	--	<334	14	340	--	--	7 (A)(S)
B-2 (2015)	355	--	--	20	335	--	--	Pipe	--	<335	--	340	--	--	7 (A)(S)
B-3 (2015)	356	--	--	20	336	--	--	Pipe	--	<336	--	340	--	--	3 (T)
<b>Borings Performed in December of 2016 and January of 2017</b>															
B-1	342	362	10	20	322	--	--	Pipe	--	<332	7.2	335	--	--	8 (T)
B-2	345	362	-3	15	330	--	--	Pipe	--	<330	9.2	336	--	--	7 (T)
B-3	348.5	350	-2	15	334	4.3	344	Dry	<344	Dry	<344	Dry	<344	5	344 (T)
B-4	350	346	-4	20	330	--	--	Pipe	--	<330	18	331	8.3	--	4 (T)
D-1	407	402	-5	15	392	--	--	Pipe	--	<392	Dry	<392	12	395	5 (T)
D-2	406	404	-2	12	394	--	--	Pipe	--	<394	13	393	--	--	4 (T)
D-3	405	402	-3	13	392	6.9	398	Dry	<398	Dry	<398	Dry	<398	--	5 (T)
D-4	412	402	-10	20	392	4.6	407	Dry	<407	Dry	<407	Dry	<407	--	6 (T)
D-5	414	402	-12	22	392	6.5	408	Dry	<408	Dry	<408	Dry	<408	--	4 (T)
D-6	423.5	403	-20.5	35	389	2.4	399	Dry	<399	Dry	<399	Dry	<399	--	7 (T)
D-7	423	403	-20	30	393	18.3	408	Dry	<408	Dry	<408	Dry	<408	--	8 (T)
D-8	414	402	-12	22	392	6.2	408	Dry	<408	Dry	<408	Dry	<408	--	6 (T)
D-9	421	398	-23	33	388	19	402	Dry	<402	Dry	<402	Dry	<402	--	6 (T)
D-10	415.5	399	-16.5	27	389	7.8	408	Dry	<408	Dry	<408	Dry	<408	--	6 (T)
D-11	407	402	-5	15	392	5.3	402	Dry	<402	Dry	<402	Dry	<402	--	7 (T)
D-12	410	402	-8	18	392	--	--	Pipe	--	<392	Dry	<392	--	--	7 (T)
D-13	406	404	-2	12	394	--	--	Pipe	--	<394	Dry	<394	--	--	7 (T)
D-14	405	405	0	10	396	6.7	399	Dry	<399	Dry	<399	--	--	7 (T)	
D-15	415	407	-8	20	397	11.3	378	Dry	<378	Dry	<378	--	--	6 (T)	
D-16	413.5	406	-8	18	395	--	--	Pipe	--	<395	Dry	<395	--	--	4 (T)
D-17	414	407	-7	17	397	13.6	400	Dry	<400	Dry	<400	--	--	8 (T)	
D-18	402	400	-2	12	394	--	--	Pipe	--	<394	Dry	<394	--	--	6 (T)
D-19	409	395	-14	24	385	4.5	405	Dry	<405	Dry	<405	--	--	6 (T)	
D-20	395.5	393	-2	14	383	--	--	Pipe	--	<383	Dry	<383	--	--	4 (T)
D-21	376.5	372	-4	15	362	7.4	369	Dry	<369	Dry	<369	--	--	4 (T)	
D-22	385	374	-11	21	364	--	--	Pipe	--	<364	Dry	<364	--	--	8 (T)
D-24	392	375	-17	27	365	8.8	383	Dry	<383	Dry	<383	--	--	8 (T)	
D-25	378	376	-2	12	366	4.4	374	Dry	<374	Dry	<374	--	--	7 (T)	
D-26	380	375	-5	15	365	--	--	Pipe	--	<365	Dry	<365	--	--	8 (T)
D-27	370	368	-2	12	358	--	--	Pipe	--	<358	Dry	<358	--	--	8 (T)
D-29	373	366	-7	17	356	5.5	368	Dry	<368	Dry	<368	--	--	8 (T)	
D-31	370.5	371	1	10	361	3.0	368	Dry	<368	Dry	<368	--	--	8 (T)	
D-32	363	362	-1	10	340	--	--	Pipe	--	<340	Dry	<340	--	--	8 (T)
D-33	355	362	7	15	340	4.8	350	Dry	<350	Dry	<350	--	--	8 (T)	
D-34	361	354	-7	20	341	6.6	--	Dry	<344	Dry	<344	--	--	8 (T)	
D-35	344	342	-2	15	329	8.5	335	Dry	<335	Dry	<335	--	--	8 (T)	
D-36	343	342	-1	11	332	--	--	Pipe	--	<332	Dry	<332	--	--	8 (T)
D-37	341.5	342	1	10	332	2.1	338	Dry	<338	Dry	<338	--	--	5 (T)	
D-38	343	342	-1	11	332	3.0	340	Dry	<340	Dry	<340	--	--	8 (T)	
D-39	376.5	370	-6.5	17	360	5.8	371	Dry	<371	Dry	<371	--	--	8 (T)	
D-40	366	364	-2	12	354	3.0	363	Dry	<363	Dry	<363	--	--	8 (T)	
D-41	368.5	367	-1.5	12	357	3	365	Dry	<365	Dry	<365	--	--	4 (T)	
D-42	370	367	-3	13	357	4.2	366	Dry	<366	Dry	<366	--	--	7 (T)	
D-43	370.5	369	-1.5	8	366	2.4	369	Dry	<369	Dry	<369	--	--	6 (T)	
P-1	380	381	1	1	372	4.3	378	Dry	<378	Dry	<378	--	--	5 (T)	
P-2	375	381	4	8	373	4.7	373	Dry	<373	Dry	<373	--	--	6 (T)	
P-3	378	379	1	8	370	4.8	373	Dry	<373	Dry	<373	--	--	6 (T)	
P-4	380	402	10	8	382	--	--	Pipe	--	<382	Dry	<382	--	--	6 (T)
P-5	387	395	8	8	397	3.8	393	Dry	<393	Dry	<393	--	--	6 (T)	
P-6	392	392	0	8	393	--	--	Pipe	--	<393	Dry	<393	--	--	5 (T)
P-7	374.5	377	2.5	8	367	--	--	Pipe	--	<367	Dry	<367	--	--	8 (T)
P-8	377	375	-2	7	371	5.7	371	Dry	<371	Dry	<371	--	--	6 (T)	
P-9	399.5	395	-4	10	389	5.7	371	Dry	<371	Dry	<371	--	--	6 (T)	
P-10	380	380	0	10	381	--	--	Pipe	--	<381	Dry	<381	--	--	6 (T)
P-11	407	397	-10	19	388	--	--	Pipe	--	<388	Dry	<388	--	--	4 (T)
P-12	412.5	399	-13	24	389	5.5	407	Dry	<407	Dry	<407	--	--	8 (T)	
P-13	403	393	-10	19	384	5.8	397	Dry	<397	Dry	<397	--	--	6 (T)	
P-14	394	386	-8	17	377	6.2	388	Dry	<388	Dry	<388	--	--	6 (T)	
P-15	390	386	-4	13	377	--	--	Pipe	--	<377	Dry	<377	--	--	7 (T)
P-16	374.5	374	-0.5	11	365	--	--	Pipe	--	<365	Dry	<365	--	--	6 (T)
P-17A	380.5	386	6	8	373	--	--	Pipe	--	<373	Dry	<373	--	--	5 (T)
P-18	377	387	10	8	369	--	--	Pipe	--	<369	Dry	<369	--	--	5 (T)
P-19B	408	394	-12	21	385	9.7	396	Dry	<396	Dry	<396	--	--	6 (T)	
P-20	403.5	395	-8	19	389	--	--	Pipe	--	<389	Dry	<389	--	--	6 (T)
P-21	402	397	-5	14	388	--	--	Pipe	--	<388	Dry	<388	--	--	4 (T)
P-21A	408.5	396	-12	11	389	5	404	Dry	<404	Dry	<404	--	--	5 (T)	
P-22	408	404	4	11	395	2.8	403	Dry	<403	Dry	<403	--	--	4 (T)	
P-23	392	388	-4	13	379	3.8	388	Dry	<388	Dry	<388	--	--	8 (T)	
P-24	380	379	-1	10	365	--	--	Pipe	--	<365	Dry	<365	--	--	5 (T)
P-25	375	374	-1	10	365	--	--	Pipe	--	<365	Dry	<365	--	--	5 (T)
P-27	400	384	-16	23	374	8.0	392	Dry	<392	Dry	<392	--	--	6 (T)	
P-28	400	384	-16	25	375	--	--	Pipe	--	<375	Dry	<375	--	--	6 (T)
P-29	393	388	-5	14	379	--	--	Pipe	--	<379	Dry	<379	--	--	6 (T)
P-30	397	370	-27	3	369	--	--	Pipe	--	<369	Dry	<369	--	--	5 (T)
P-31	344	341	-3	13	332	5.5	339	Dry	<339	Dry	<339	--	--	10 (T)	
P-32	352	348	-4	13	339	--	--	Pipe	--	<339	Dry	<339	--	--	8 (T)
P-33	352.5	353	1	9	34										

**MARYLAND 378  
STORMWATER MANAGEMENT POND CONSTRUCTION SPECIFICATIONS**

**CONSTRUCTION SPECIFICATIONS**

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and AASHTO specifications apply to the most recent version.

**Site Preparation**

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

**Earth Fill**

Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6", frozen or other objectionable materials. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer. Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within +/-2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the core shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

**Structure Backfill**

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi; 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that a minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sides of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

**Pipe Conduits**

All pipes shall be circular in cross section.

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

1. Materials - (Polymer Coated steel pipe)- Steel pipes with polymeric coating shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.

Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling, bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be rolled on adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches diameter. Flanges on both ends of the pipe with a circular 3/8 inch closed cell neoprene gasket. Pipe - Flanged to the flange bolt circle sandwich between adjacent flanges; a 12 inch wide standard lap type band with 12 inch wide by 3/8 inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8-inch closed cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

4. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

5. Backfilling shall conform to "Structure Backfill."

6. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-361.

2. Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.

4. Backfilling shall conform to "Structure Backfill."

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:

1. Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" -10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.

2. Joints and connections to anti-seep collars shall be completely watertight.

3. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform to "Structure Backfill."

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete  
Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

Rock Riprap  
Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

**Care of Water during Construction**

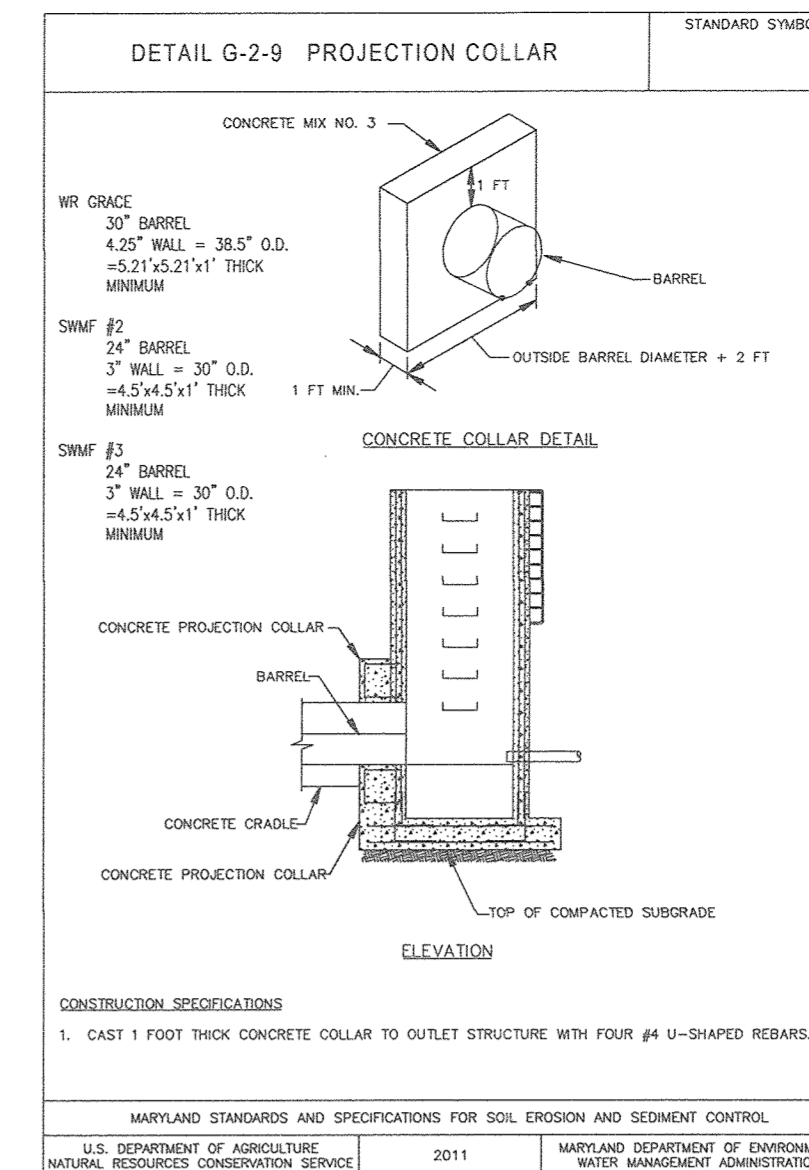
All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water pumps from which the water shall be pumped.

**Stabilization**

All borrow areas shall be graded to provide proper drainage and left in a slightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

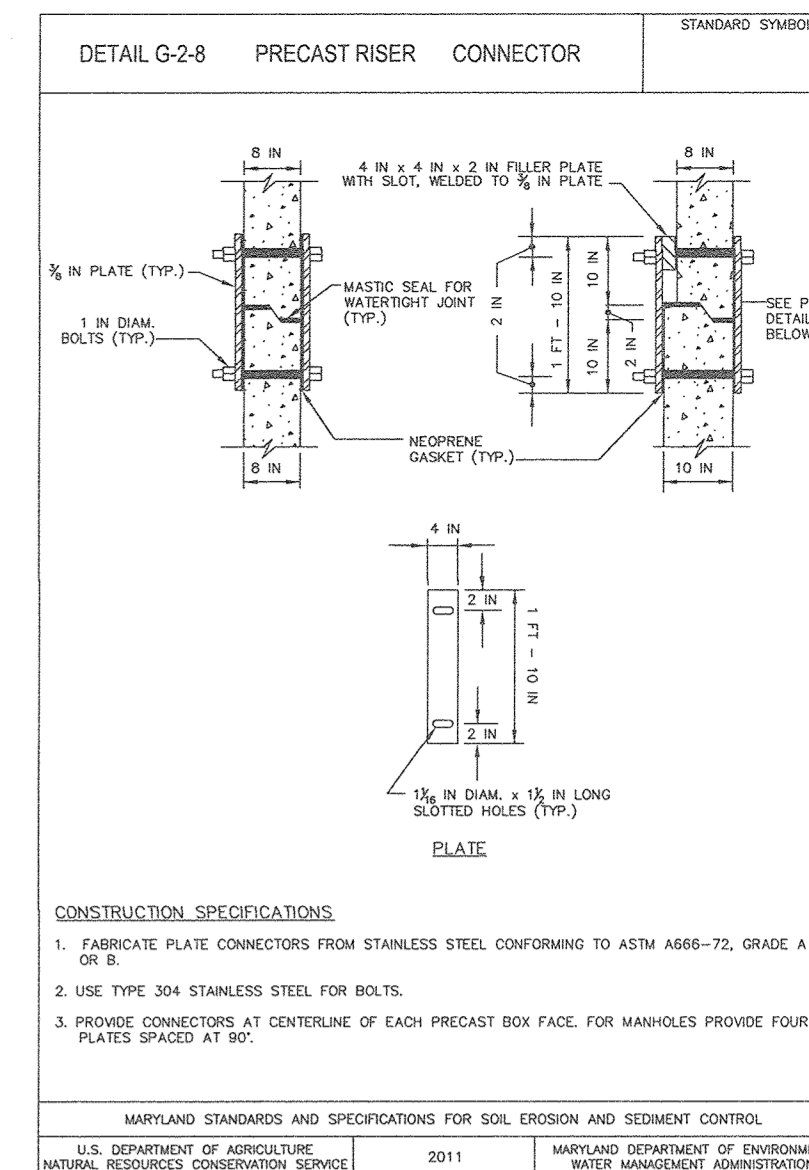
**Erosion and Sediment Control**

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.



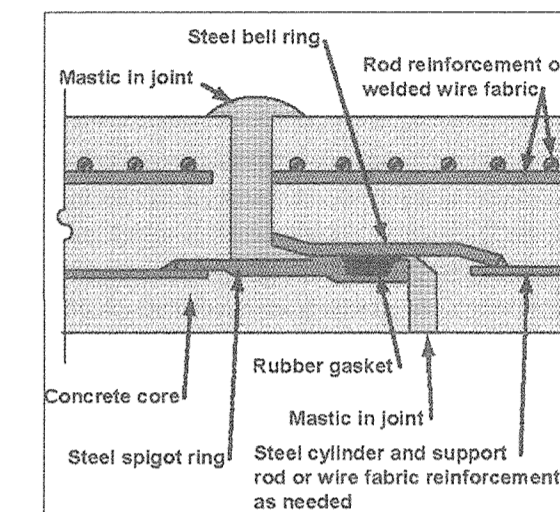
CONSTRUCTION SPECIFICATIONS  
1. CAST 1 FOOT THICK CONCRETE COLLAR TO OUTLET STRUCTURE WITH FOUR #4 U-SHAPED REBARS.

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



CONSTRUCTION SPECIFICATIONS  
1. FABRICATE PLATE CONNECTORS FROM STAINLESS STEEL CONFORMING TO ASTM A667-72, GRADE A OR B.  
2. USE TYPE 304 STAINLESS STEEL FOR BOLTS.  
3. PROVIDE CONNECTORS AT CENTERLINE OF EACH PRECAST BOX FACE. FOR MANHOLES PROVIDE FOUR PLATE SPACES AT 90°.

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



**WATERTIGHT  
BARREL JOINT DETAIL**  
N.T.S.

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000

**OWNER/DEVELOPER CERTIFICATION:**  
I HEREBY CERTIFY THAT ANY CLEARING, GRUBBING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL DESIGN A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION, AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-ENTRY FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDE.

*[Signature]*  
OWNER/DEVELOPER SIGNATURE  
**SCOTT D. PAULK P.M. SIMPSON OAKS CRP3, LLC**  
PRINTED NAME & TITLE

**W.R. GRACE POND RECONSTRUCTION  
DEWATERING STRATEGY**

Dewatering refers to the act of removing and discharging water from excavated areas on construction sites or from sediment traps or basins on construction sites. Standards and specifications for dewatering practices follow:

These standards apply to removal and discharge of water from any excavated area or sediment trap or basin at any construction site. Given the unique conditions at any particular construction site, any or all of the practices may apply. Regardless of the applicability of the practices listed herein, operators are required to use acceptable procedures for maintenance and dewatering. In all cases, every effort shall be made to eliminate sediment pollution associated with dewatering.

Designers shall specify the preferred procedures for dewatering on plans. In particular, designers should identify procedures for dewatering sediment traps and basins prior to elimination of the last sediment control facility on the site or prior to conversion of sediment control facilities to stormwater management facilities. Recommended procedures shall be consistent with these standards. Atypical site conditions may require innovative dewatering designs. Dewatering measures not referenced in this standard may be used with the consent of the approval authority.

Dewatering of Excavated Areas

A. Designers shall specify on plans, and in sequences of construction included on plans, practices for dewatering of excavated areas. Plan reviewers shall check to see that procedures for dewatering are included on plans.

B. In all cases, water removed from excavated areas shall be discharged such that it shall pass through a sediment control device prior to entering receiving waters. Sediment control devices include sediment traps and basins, in addition to the practices in this section.

Approved Practices for Dewatering of Excavated Areas

1. Pumping of water to an existing sediment basin or trap in which the entire volume of water from the area to be dewatered can be contained without discharge to receiving waters.
2. Pumping of water to an existing sediment basin or trap such that the entire volume of water from the area to be dewatered can be managed without exceeding the design outflow from the sediment control structure.
3. Removable Pumping Station - Standards and specifications for Removable Pumping Station are on Detail 20A.
4. Use of a Sump Pit: Standards and specifications for a sump pit are on Detail 20B.
5. Sediment Tank: Standards and specifications for a sump pit are on Detail 21.

Dewatering of Sediment Traps and Basins

Designers shall specify on plans, and in sequences of construction included on plans, the practices for dewatering of sediment traps and basins. Plan reviewers shall check to see that procedures for dewatering to be used are included on plans. In all cases, water removed from traps and basins shall be discharged so that it passes through a sediment control device prior to entering receiving waters.

Approved Practices for Dewatering of Traps and Basins

1. Removable pumping station.
2. Use of a Sump Pit.
3. Use of a flooding suction hose to pump the cleaner water from the top of the pond. As the cleaner water is pumped the suction hose will lower and eventually encounter sediment bottom water. When this happens the pumping operation will cease. Provisions shall be made to filter water.

**DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*[Signature]*  
DESIGNER'S SIGNATURE  
ROBERT H. VOGEL  
PRINTED NAME

MD REGISTRATION NO. 16193  
(P.E.) R.L.S., OR R.L.A. (Circle one)

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*[Signature]*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*[Signature]*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

*[Signature]*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.26.19

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
*[Signature]*  
HOWARD S.C.D.  
DATE: 5/16/19

NO. \_\_\_\_\_ REVISION \_\_\_\_\_ DATE \_\_\_\_\_

FINAL ROAD CONSTRUCTION PLAN  
MD-378 POND CONSTRUCTION SPECIFICATIONS,  
NOTES AND DETAILS

**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACE TECH PARK - PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 GRD 21 ----- ZONED: CER-R ----- P/O PARCEL 145  
SITE ELECTION DISTRICT: ----- OPZ REFERENCE: SEE SITE DATA ----- HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL  
ENGINEERING, INC.**  
ENGINEERS • SURVEYORS PLANNERS  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

**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: 09-27-2020

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

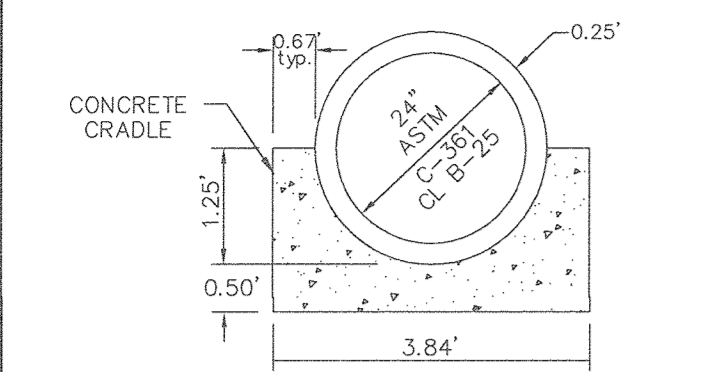
67 SHEET OF 74

ROBERT H. VOGEL, PE No.16193



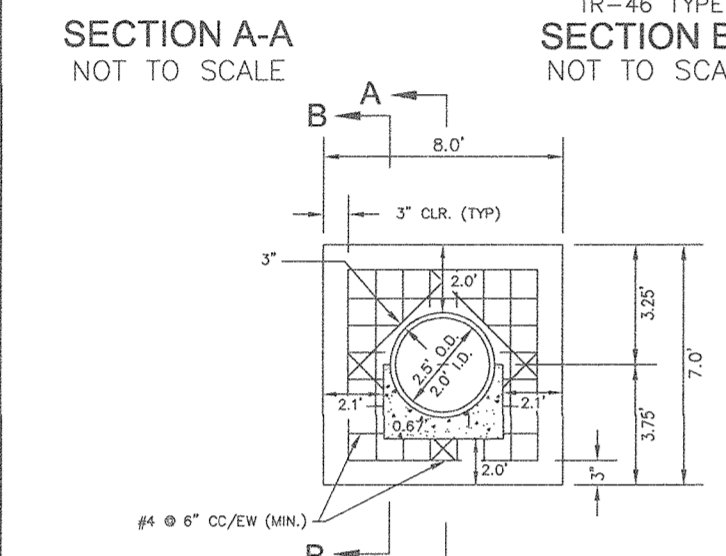
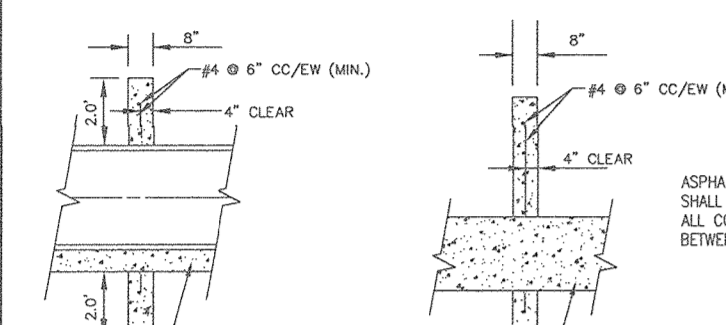
**OPERATION, MAINTENANCE AND INSPECTION**

INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USCA SSC STANDARDS AND SPECIFICATIONS FOR PONDS (MD-378). THE POND OWNER(S) AND ANY HEIRS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, MAINTENANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATIONS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.



REINFORCING STEEL: INTERMEDIATE GRADE  
CONCRETE: CLASS B  
fc=3,500 P.S.I.  
fc=1,800 P.S.I.

**SCS TR-46  
A-2 PIPE CRADLE DETAIL  
SWMF #3**  
NOT TO SCALE



**CONCRETE ANTI-SEEP COLLAR DETAIL  
SWMF #2**  
NOT TO SCALE

NOTES:  
1. ANTI-SEEP COLLARS SHOULD BE PLACED WITHIN THE SATURATION ZONE.  
2. ALL ANTI-SEEP COLLARS AND THEIR CONNECTIONS TO THE CONDUIT SHALL BE WATER-TIGHT AND MADE COMPATIBLE WITH THE CONDUIT.  
3. COLLAR DIMENSIONS SHALL EXTEND A MIN. OF 2' IN ALL DIRECTIONS AROUND THE PIPE.  
4. ANTI-SEEP COLLAR SHALL BE PLACED A MIN. OF 2' FROM PIPE JOINTS EXCEPT WHERE FLANGED JOINTS ARE USED.

**OPERATION AND MAINTENANCE SCHEDULE FOR  
STORMWATER MANAGEMENT FACILITY**

**STORMWATER MANAGEMENT FACILITY  
ROUTINE MAINTENANCE (SWMF #2 - DRY EXTENDED DETENTION)**

- FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IF IT IS FUNCTIONING PROPERLY.
- TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES A YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHOULD BE MOWED AS NEEDED.
- DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

**NON-ROUTINE MAINTENANCE (HOWARD COUNTY)**

- STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE LOW RISE STRUCTURE, SAND FILTER & PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
- SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERES WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

**OWNER/DEVELOPER CERTIFICATION:**  
I HEREBY CERTIFY THAT ANY CLEARING, GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN INCLUDING RESPECTING AND MAINTAINING CONTROLS, AND THAT THE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT (MDE) APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARYLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY RIGHT-OF-CENTRE FOR PERIODIC ON-SITE EVALUATION BY HOWARD COUNTY, THE HOWARD SOIL CONSERVATION DISTRICT AND/OR MDC.

*Scott D. Paulk, P.E., SMP/PAID OAKS APP/3.C.C.*  
OWNER/DEVELOPER SIGNATURE  
PRINTED NAME & TITLE

**DESIGN 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 SOIL CONSERVATION DISTRICT. I HAVE NOTICED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

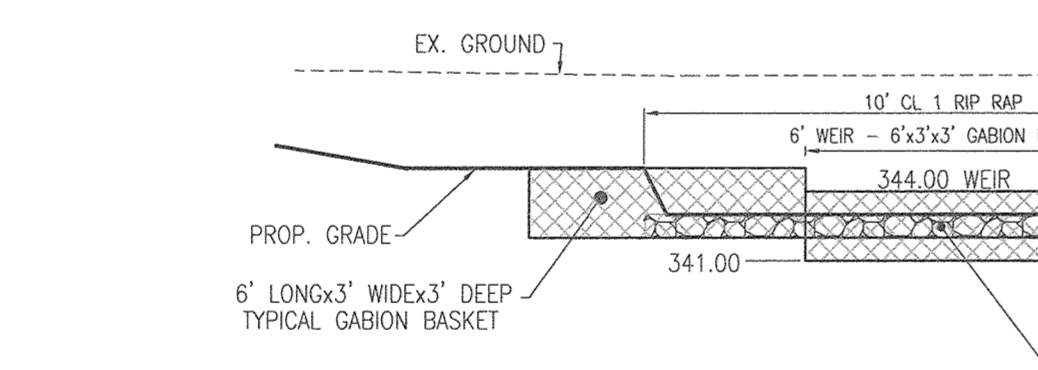
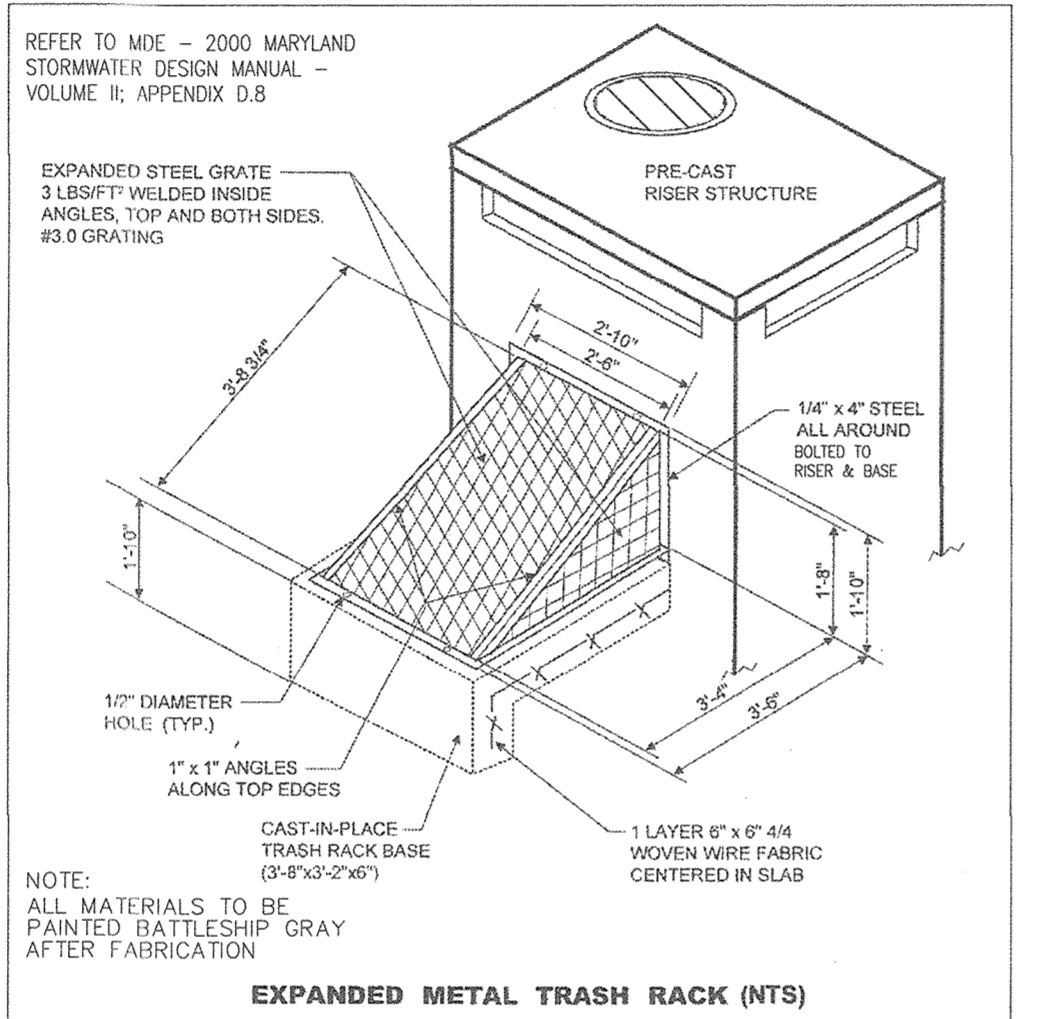
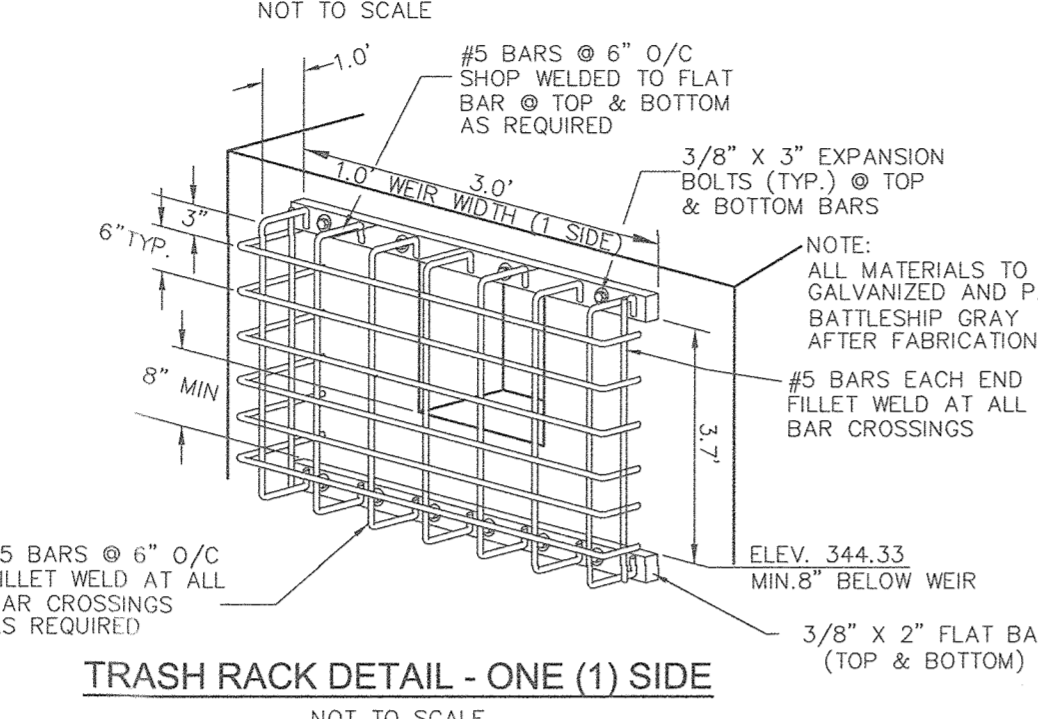
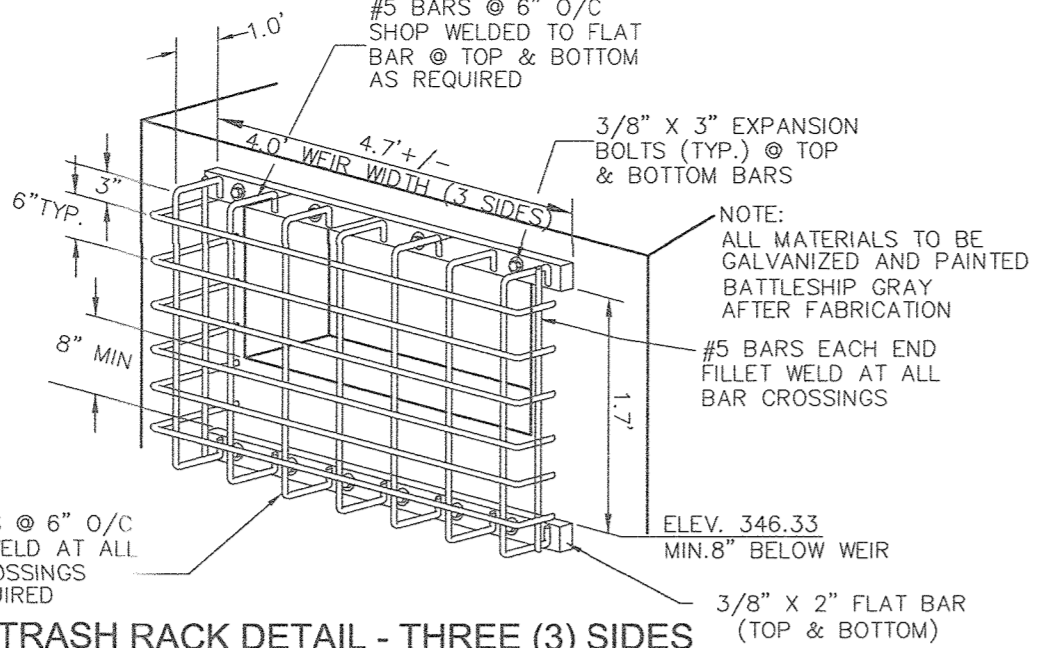
*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
DATE: 6/17/19

ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
(P.E., R.L.S., OR R.L.A. (circle one))

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
DATE: 6/11/2019  
CHIEF, BUREAU OF HIGHWAYS

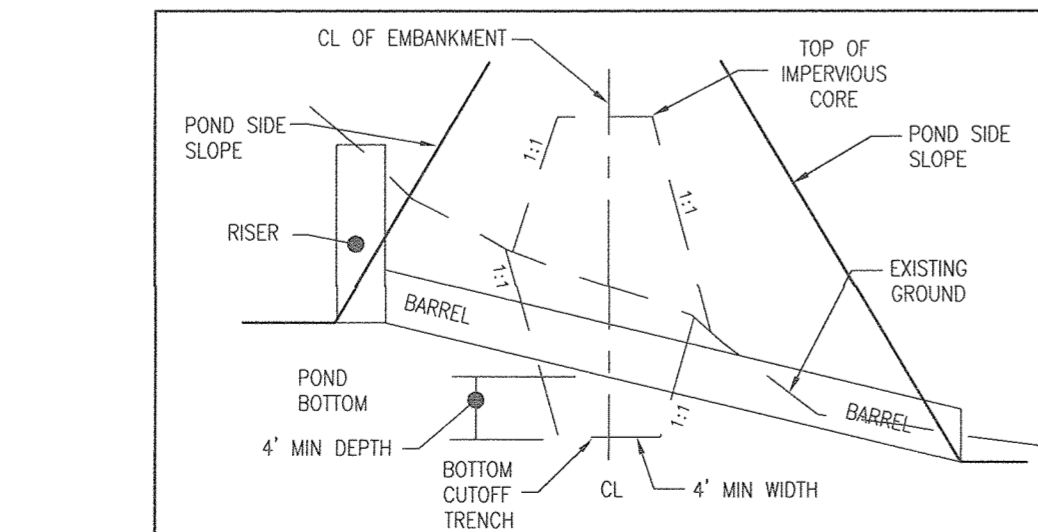
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DATE: 6.17.19  
CHIEF, DEVELOPMENT ENGINEERING DIVISION

APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
DATE: 6.26.19  
CHIEF, DIVISION OF LAND DEVELOPMENT



**GABION BASKET WEIR DETAIL  
(S.W.M.F #2)**  
SCALE: N.T.S.

NOTES:  
1. ALL WIRE USED IN GABION CONSTRUCTION SHALL BE GALVANIZED AND PLASTIC COATED.  
2. FILTER CLOTH SHALL BE PLACED WHEREVER GABIONS COME INTO CONTACT WITH SOIL.  
3. STONE FILL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE 4"-8" IN DIAMETER.  
4. CONSTRUCTION MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.  
5. RIP-RAP TO BE PLACED BELOW GABION WEIR TO BOTTOM OF FOREBAY.

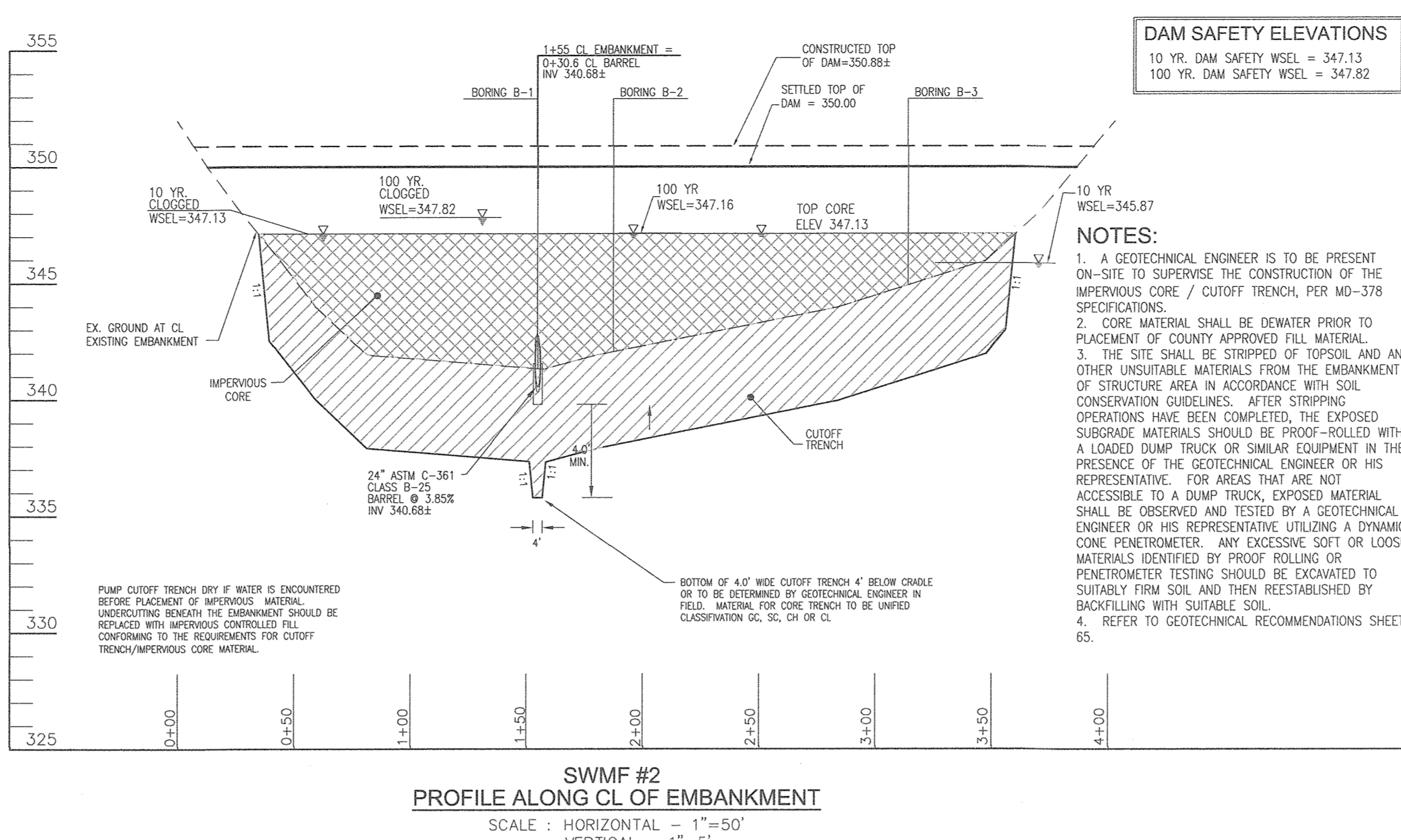


**CUTOFF TRENCH/  
IMPERVIOUS CORE TYPICAL SECTION**  
N.T.S.

NOTE: COUNTY APPROVED MATERIAL\* IS TO BE USED FOR CUTOFF TRENCH/IMPERVIOUS CORE TRENCH. IF UNSUITABLE MATERIAL EXISTS ON-SITE, ACCEPTABLE MATERIAL WILL NEED TO BE BROUGHT TO SITE.  
\*COUNTY APPROVED MATERIAL MUST CONFORM TO UNIFIED CLASSIFICATION DESIGNATIONS OF CL, CH, SC OR CC

THIS PLAN IS APPROVED FOR SMALL POND CONSTRUCTION, AND SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

*Robert H. Vogel*  
DATE: 5/6/19



**SWMF #2  
PROFILE ALONG CL OF EMBANKMENT**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**DAM SAFETY ELEVATIONS**  
10 YR. DAM SAFETY WSEL = 347.13  
100 YR. DAM SAFETY WSEL = 347.82

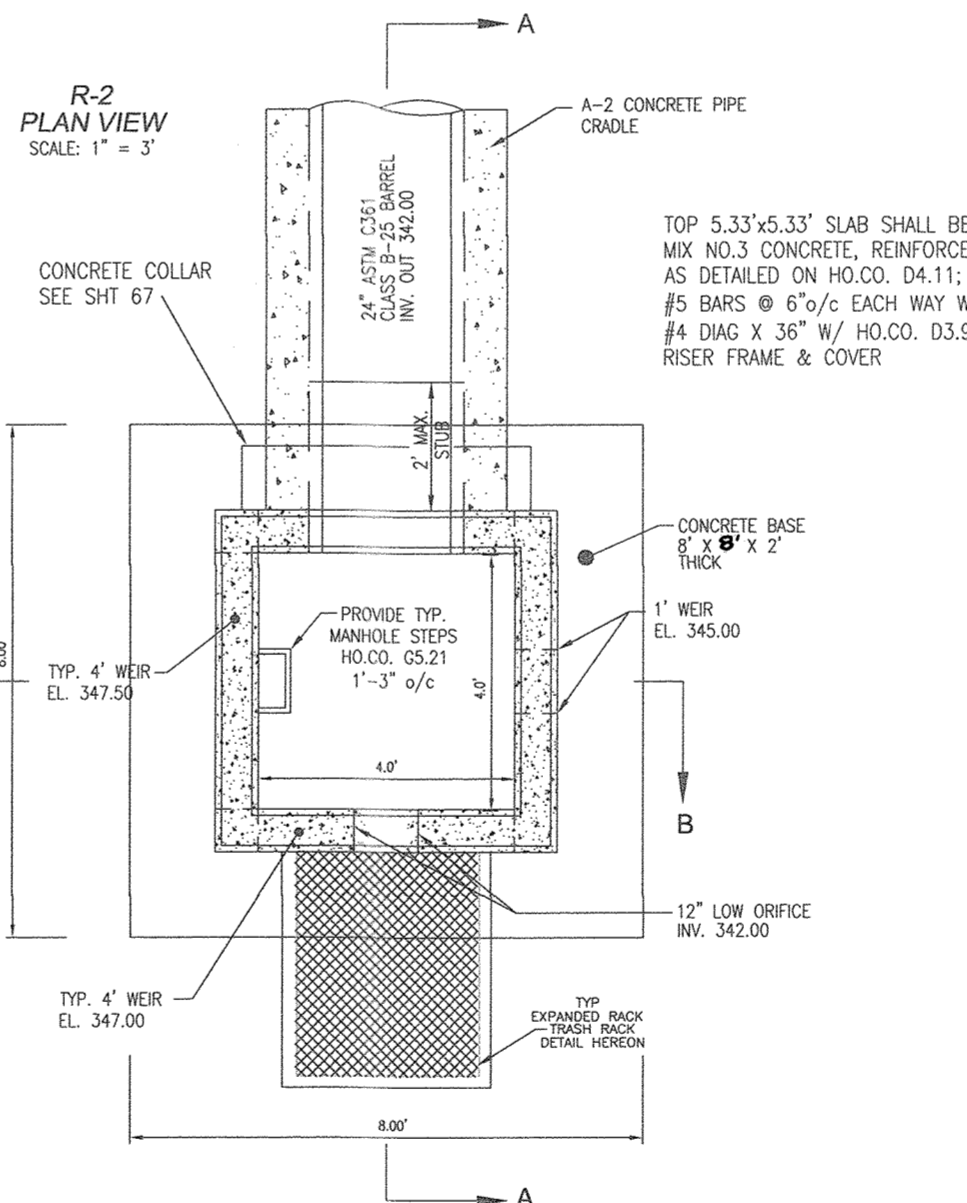
NOTES:  
1. A GEOTECHNICAL ENGINEER IS TO BE PRESENT ON-SITE TO SUPERVISE THE CONSTRUCTION OF THE IMPERVIOUS CORE / CUTOFF TRENCH, PER MD-378 SPECIFICATIONS.  
2. CORE MATERIAL SHALL BE DEWATER PRIOR TO PLACEMENT OF COUNTY APPROVED FILL MATERIAL.  
3. THE SITE SHALL BE STRIPPED OF TOPSOIL AND ANY OTHER UNSUITABLE MATERIALS FROM THE EMBANKMENT OF STRUCTURE AREA IN ACCORDANCE WITH SOIL CONSERVATION GUIDELINES. AFTER STRIPPING OPERATIONS HAVE BEEN COMPLETED, THE EXPOSED SUBGRADE MATERIALS SHOULD BE PROOF-ROLLED WITH A LOADED DUMP TRUCK OR SIMILAR EQUIPMENT IN THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE. FOR AREAS THAT ARE NOT ACCESSIBLE TO A DUMP TRUCK, EXPOSED MATERIAL SHALL BE OBSERVED AND TESTED BY A GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE UTILIZING A DYNAMIC CONE PENETROMETER. ANY EXCESSIVE SORT OR LOOSE MATERIALS IDENTIFIED BY PROOF ROLLING OR PENETROMETER TESTING SHOULD BE EXCAVATED TO SUITABLY FIRM SOIL AND THEN REESTABLISHED BY BACKFILLING WITH SUITABLE SOIL.  
4. REFER TO GEOTECHNICAL RECOMMENDATIONS SHEET 65.

**ONSITE SWMF #2 - DRY EXTENDED DETENTION**

TYPE: MD 378  
HAZARD CLASS: A  
EX. DRAINAGE AREA: 23.58 AC. (B/C COMBINED)  
PROP. DRAINAGE AREA: 7.5 AC.  
BOTTOM ELEV.: 343.0 TOP SAND FILTER  
LOW FLOW INVERT: 343.00  
SAND FILTER: 340.5 - 343.00 (SURFACE)  
TOP OF EMBANKMENT: 352.00  
EMERGENCY SPILLWAY: N/A

Qp10 (DEV): 9.5 CFS  
Qp100 (DEV): 19.6 CFS

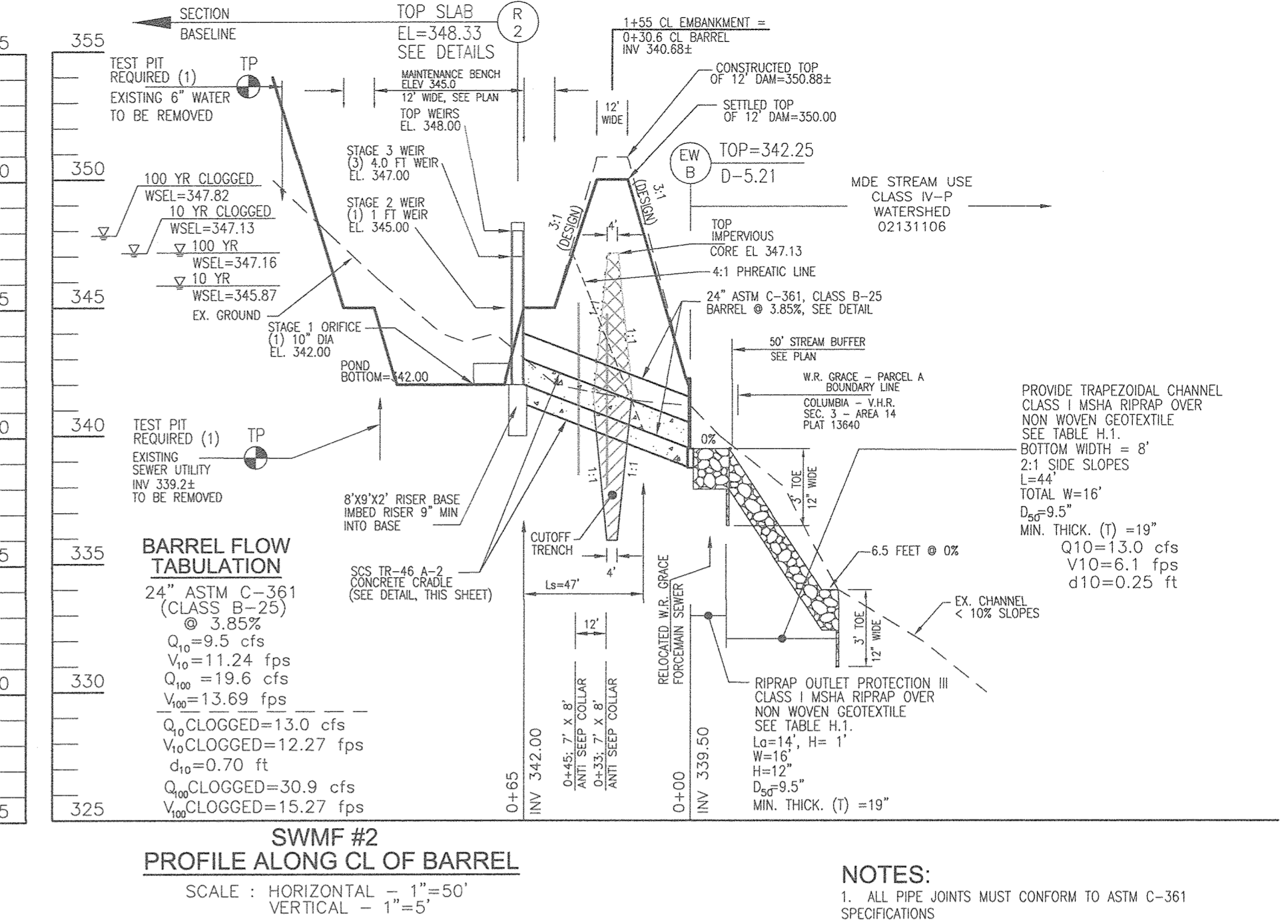
Rev Required = 1,291 cuft  
Rev Provided = 1,645 sf @ MBR & DRYWELLS ABOVE FACILITY



**R-2 PLAN VIEW  
SCALE: 1" = 3'**

NOTE: A GEOTECHNICAL ENGINEER SHOULD OBSERVE CONCRETE BASE EXCAVATIONS AND CONDUCT DYNAMIC CONE PENETROMETER TEST OF THE BEARING SURFACE.

**REINFORCEMENT NOTE**  
\*STRUCTURAL ENGINEER SHALL VERIFY REINFORCEMENT SPECIFIED IS ADEQUATE FOR APPLICATION



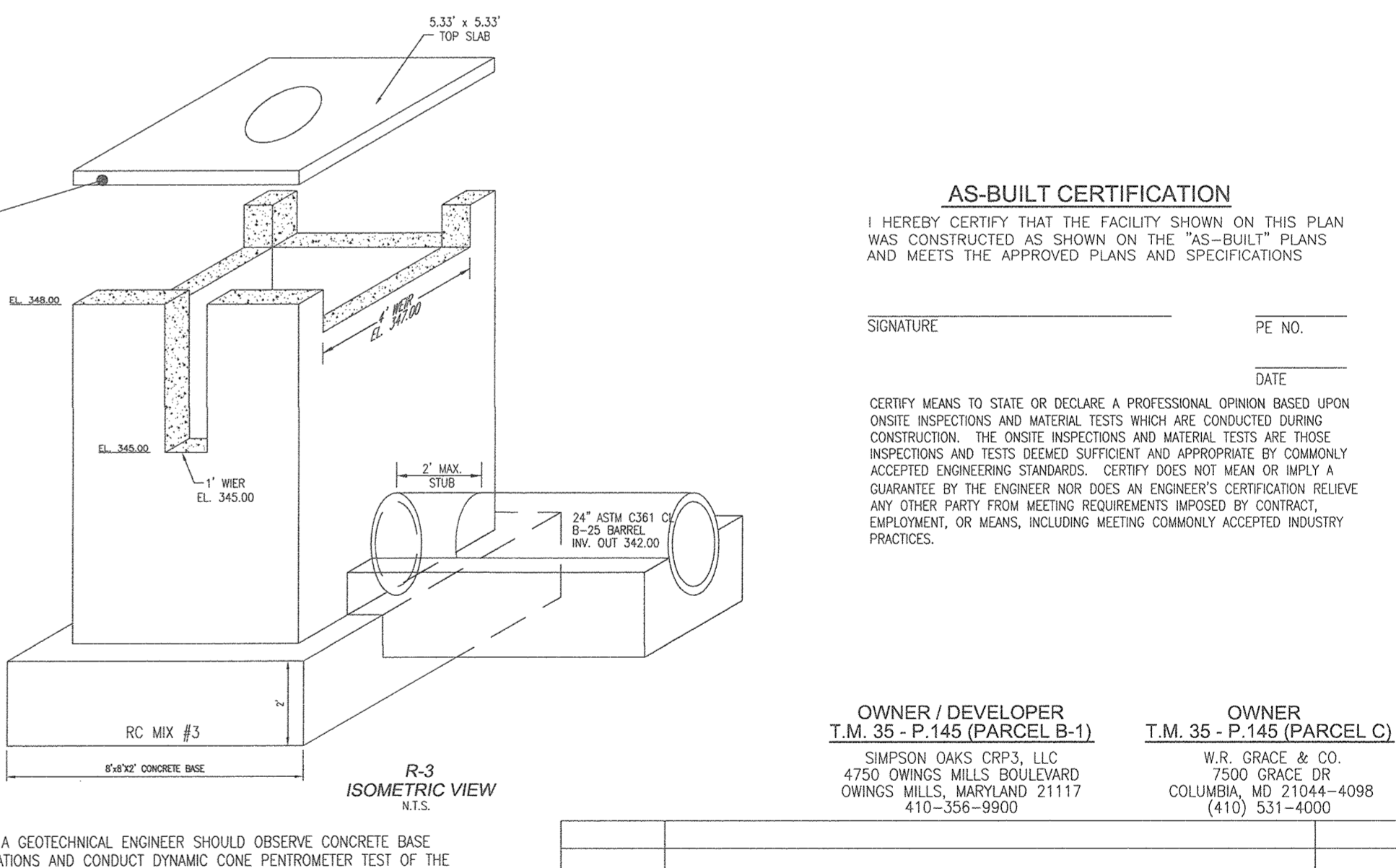
**SWMF #2  
PROFILE ALONG CL OF BARREL**  
SCALE: HORIZONTAL - 1"=50'  
VERTICAL - 1"=5'

**EXISTING UTILITIES  
NOTES TO CONTRACTOR**  
(1) CONTRACTOR SHALL TEST PIT FOR EXISTING SEWER AND WATER LINES WHICH IMPACT SWMF #3  
(2) CONTRACTOR SHALL MAINTAIN UNINTERRUPTED SERVICE UNTIL SUCH TIME THE UTILITY CAN BE REMOVED OR ABANDON IN PLACE.

**AS-BUILT CERTIFICATION**  
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.

OWNER / DEVELOPER  
T.M. 35 - P.145 (PARCEL B-1)  
SIMPSON OAKS CRP3, LLC  
4750 OWINGS MILLS BOULEVARD  
OWINGS MILLS, MARYLAND 21117  
410-356-9900

OWNER  
T.M. 35 - P.145 (PARCEL C)  
W.R. GRACE & CO.  
7500 GRACE DR  
COLUMBIA, MD 21044-4098  
(410) 531-4000



**R-3 ISOMETRIC VIEW  
N.T.S.**

NOTE: A GEOTECHNICAL ENGINEER SHOULD OBSERVE CONCRETE BASE EXCAVATIONS AND CONDUCT DYNAMIC CONE PENETROMETER TEST OF THE BEARING SURFACE.

**FINAL ROAD CONSTRUCTION PLAN  
S.W.M.F. #2 POND CONSTRUCTION - NOTES AND DETAILS**

**CEDAR CREEK - PHASE 1**  
LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-C AND PARCEL C-1  
A RESUBDIVISION OF GRACYS BARRIE PARCELS B-1 & C  
PLATS 23334-23337

TAX MAP 35 GRD 21  
5TH ELECTION DISTRICT  
DPZ REFERENCE: SEE SITE DATA

ZONED: CER-R  
HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL  
ENGINEERS • SURVEYORS PLANNERS**  
3300 N. RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
TEL: 410.461.7666 FAX: 410.461.8961

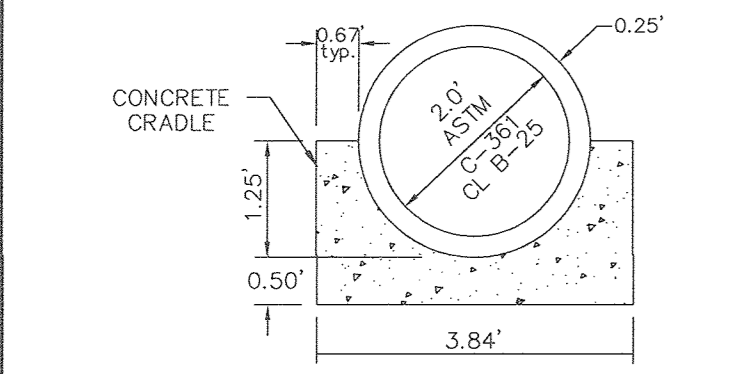
**PROFESSIONAL CERTIFICATE**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
EXPIRATION DATE: 09-27-2023

DESIGN BY: VE+TG  
DRAWN BY: VE+TG  
CHECKED BY: RHV  
DATE: APRIL 2019  
SCALE: AS SHOWN  
W.O. NO.: 15-55

69 SHEET OF 74

**OPERATION, MAINTENANCE AND INSPECTION**

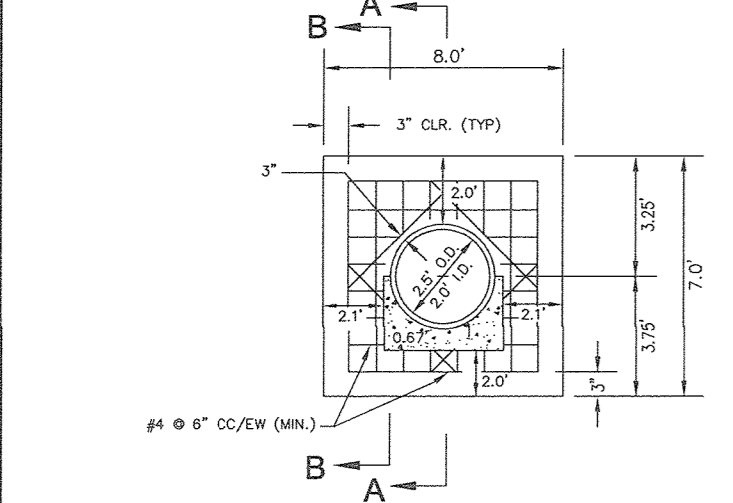
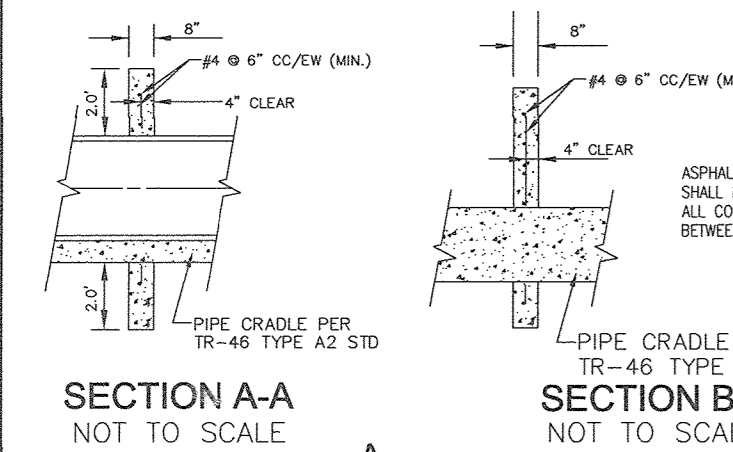
INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USA, SCS STANDARDS AND SPECIFICATIONS FOR PONDS (MD-378). THE POND OWNER(S) AND ANY AGENTS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS, OBSERVATIONS THAT MAY BE INDICATORS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.



REINFORCING STEEL: INTERMEDIATE GRADE  
CONCRETE, CLASS B  
f<sub>c</sub>=3,500 P.S.I.  
f<sub>t</sub>=1,600 P.S.I.

**SCS TR-46  
A-2 PIPE CRADLE DETAIL  
SWMF #3**

NOT TO SCALE



NOTES:

- ANTI-SEEP COLLARS SHOULD BE PLACED WITHIN THE SATURATION ZONE.
- ALL ANTI-SEEP COLLARS AND THEIR CONNECTIONS TO THE CONDUIT SHALL BE WATER-TIGHT AND MADE COMPATIBLE WITH THE CONDUIT AROUND THE PIPE.
- COLLARS DIMENSIONS SHALL EXTEND A MIN. OF 2' IN ALL DIRECTIONS AROUND THE PIPE.
- ANTI-SEEP COLLAR SHALL BE PLACED A MIN. OF 2' FROM PIPE JOINTS EXCEPT WHERE FLANGED JOINTS ARE USED.

**CONCRETE ANTI-SEEP COLLAR DETAIL  
SWMF #3**

NOT TO SCALE

**OPERATION AND MAINTENANCE SCHEDULE FOR  
STORMWATER MANAGEMENT FACILITY**

STORMWATER MANAGEMENT FACILITY  
ROUTINE MAINTENANCE (S.W.M.F. #3 / F-1 SAND FILTER)

- FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IF IT IS FUNCTIONING PROPERLY.
- TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES A YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER. OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHOULD BE MOWED AS NEEDED.
- DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE (HOWARD COUNTY)

- STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, THE LOW RISE STRUCTURE, SAND FILTER & PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING ROUTINE MAINTENANCE OPERATIONS.
- SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERES WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

**OWNER/DEVELOPER CERTIFICATION:**  
I HEREBY CERTIFY THAT ANY GRADING, CONSTRUCTION, OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS APPROVED EROSION AND SEDIMENT CONTROL PLAN INCLUDING INSPECTING AND MAINTAINING CONTROLS, AND THAT THE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF TRAINING A MARLAND REGISTERED PROFESSIONAL ENGINEER (R.P.E.) TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT PRIOR TO BEGINNING THE PROJECT. I SHALL ENGAGE A MARLAND REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD COUNTY DEPARTMENT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I CERTIFY THAT I HAVE PROVIDED THE HOWARD COUNTY DEPARTMENT WITH THE HOWARD COUNTY DEPARTMENT AND/OR FOR HIS USE.

*Scott D. Paul*  
OWNER/DEVELOPER SIGNATURE  
Scott D. Paul, P.E., SUPERVISOR, O&S/C&P, LLC  
PRINTED NAME & TITLE

**DESIGN CERTIFICATION:**  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH CURRENT MARYLAND EROSION AND SEDIMENT CONTROL STANDARDS 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 DEPARTMENT OF PUBLIC WORKS. I HAVE NOTICED THE DEVELOPER THAT HE/MOST MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD COUNTY DEPARTMENT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

*Robert H. Vogel*  
DESIGNER'S SIGNATURE  
ROBERT H. VOGEL  
PRINTED NAME  
MD REGISTRATION NO. 16193  
(P.E.) R.L.S. OR R.L.A. (circle one)

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
*James*  
CHIEF, BUREAU OF HIGHWAYS  
DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Walter*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 6.17.19

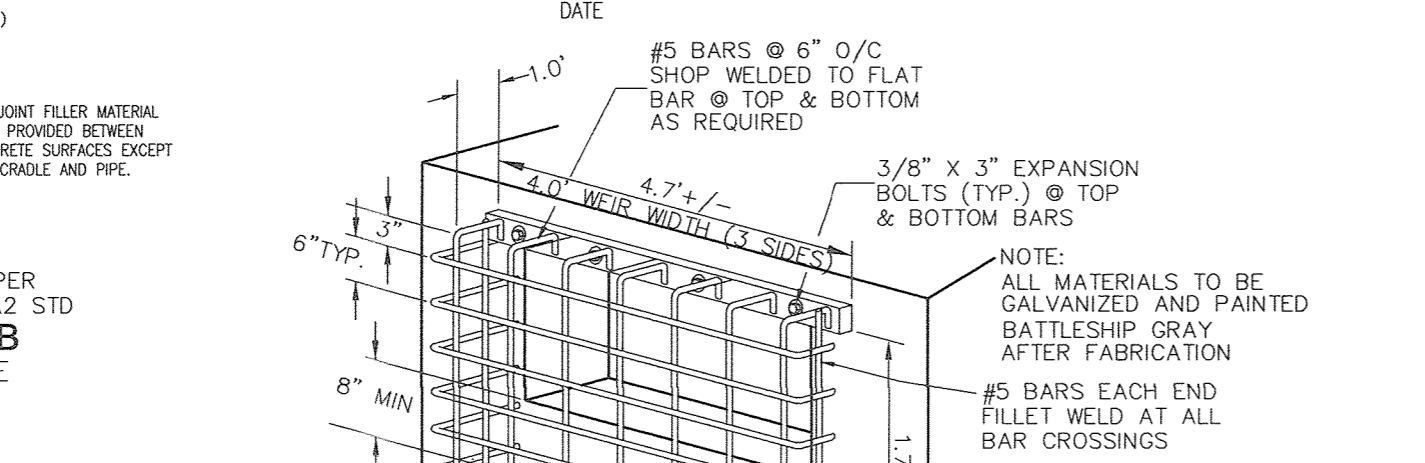
APPROVED: HOWARD COUNTY DEPARTMENT OF LAND DEVELOPMENT  
*Walter*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 6.26.19

Material	Specification/Test Method	Size	Notes
sand	clean AASHTO M-6 or ASTM C-33 concrete sand	0.075" to 0.04"	Substitutions such as Diabase and Gneiss: #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.
peat	ash content: < 15% pH range: 5.2 to 4.9 bulk density: 0.12 to 0.15 pcf	n/a	The material must be reed-seep boric peat, shrouded, uncompacted, uniform, and clean.
leaf compost	n/a	n/a	n/a
underdrain gravel	AASHTO M-44 ASTM D-4833 (compressive strength - 125 lb.) ASTM D-4832 (Tensile Strength - 300 lb.)	0.375" to 0.75" 8.00" holes equivalent opening size of #40 sieve	Must maintain 125 gm per sq. ft. flow rate. Note: a 4" non gravel layer may be substituted for geotextiles ocean to "apex" filter layers.
impermeable liner (if required)	ASTM D-4833 (thickness) ASTM D-4142 (tensile strength 1,100 lb., elongation 200%) ASTM D-624 (Tear resistance - 150 lb./in.) ASTM D-471 (water absorption: 1.8 to 2.9 mm)	30 mil thickness	Liner to be ultra-violet resistant. A geotextile fabric should be used to protect the liner from punctures.
underdrain piping	F79A, Type F9 38 or AASHTO M-278	4" - 6" rigid schedule 40 PVC or SDR33	3/8" port @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; no necessary underdrain pipes
concrete (cast-in-place)	MSHA Standards and Specs. Section 902, Mix No. 3, f <sub>c</sub> = 3500 psi, normal weight, air-entrained, reinforcing steel to ASTM A-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using preapproved state or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland
concrete (pre-cast)	per precast manufacturer	n/a	n/a
non-rebar steel	ASTM A 36	n/a	structural steel to be hot-dipped galvanized ASTM-A-123

**AS-BUILT CERTIFICATION**  
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS

SIGNATURE: \_\_\_\_\_ PE NO. \_\_\_\_\_ DATE: \_\_\_\_\_

CERTIFY MEANS TO STATE OR DECLARE A PROFESSIONAL OPINION BASED UPON ON-SITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ON-SITE INSPECTIONS AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY THE COMMONLY ACCEPTED ENGINEERING STANDARDS. CERTIFY DOES NOT MEAN OR IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.

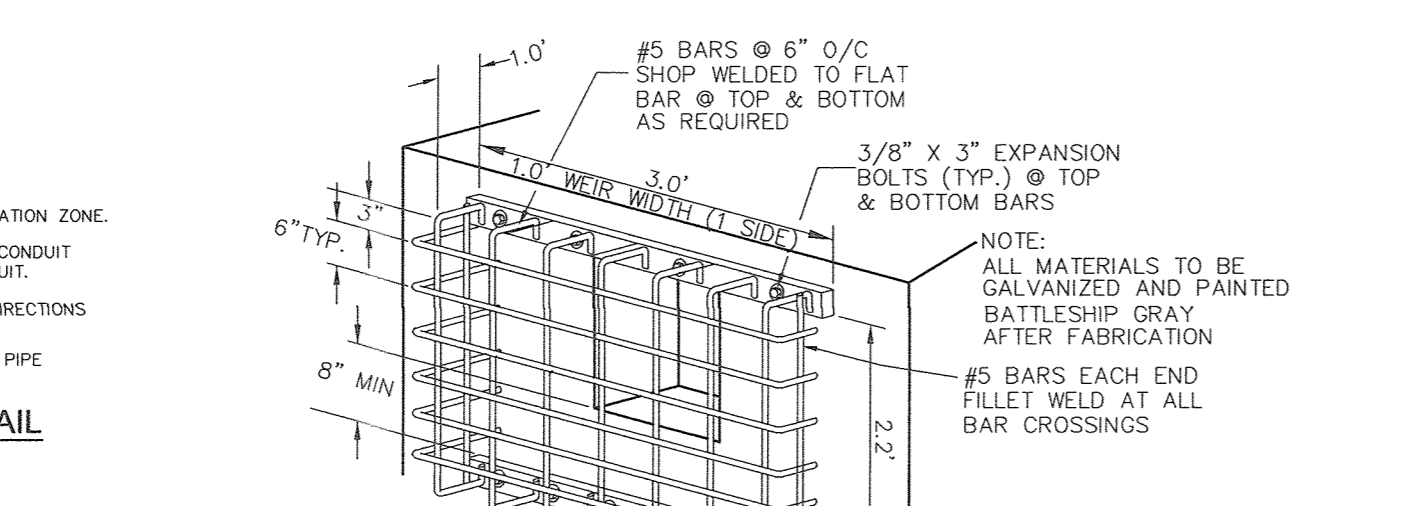


NOTES:

- ALL MATERIALS TO BE GALVANIZED AND PAINTED BATTLESHIP GRAY AFTER FABRICATION.
- #5 BARS EACH END FILLET WELD AT ALL BAR CROSSINGS.
- 3/8" X 2" FLAT BAR (TOP & BOTTOM).

**TRASH RACK DETAIL - ONE (1) SIDE**

NOT TO SCALE

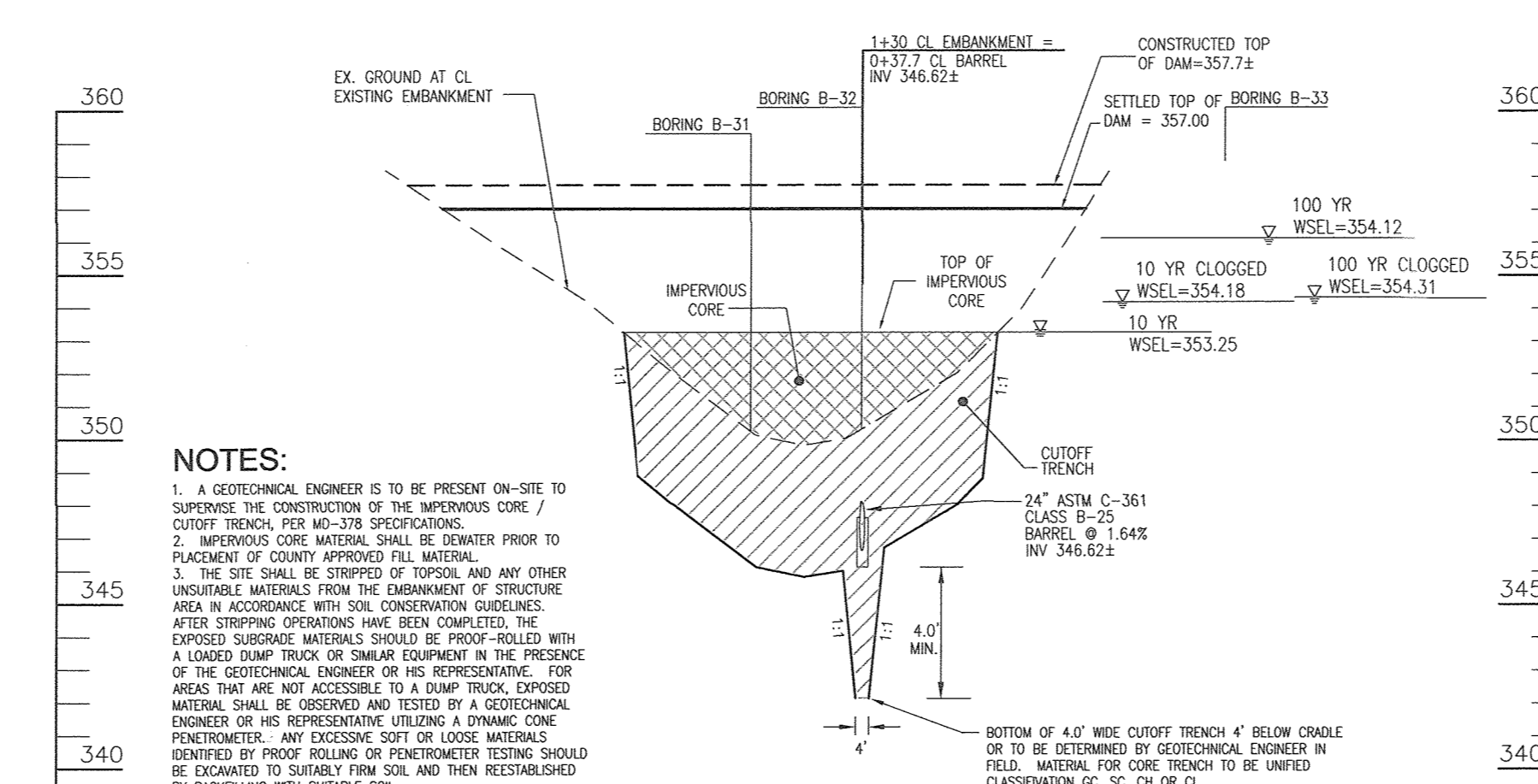
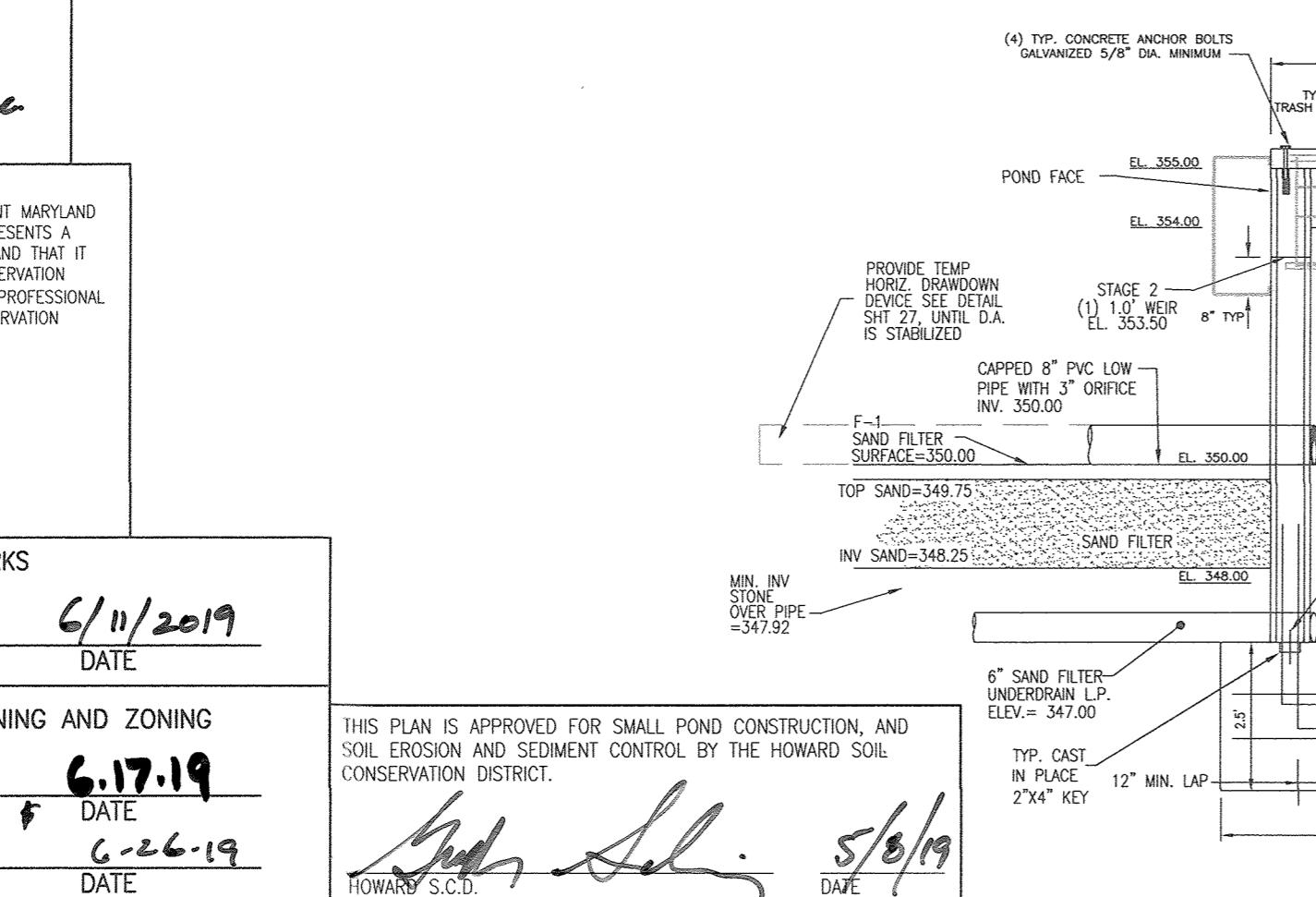


TYPE: MD 378  
HAZARD CLASS: A  
EX. DRAINAGE AREA: 23.58 AC. (B/C COMBINED)  
PROP. DRAINAGE AREA: 2.0 AC  
BOTTOM ELEV.: 350.0 TOP SAND FILTER  
LOW FLOW INVERT: 351.0  
SAND FILTER: 347.0 - 350 (SURFACE)  
TOP OF EMBANKMENT: 357.0  
EMERGENCY SPILLWAY: N/A

Q1/CPV (DEV): 0.2 CFS  
Qp10 (DEV): 0.4 CFS  
Qp100 (DEV): 5.1 CFS

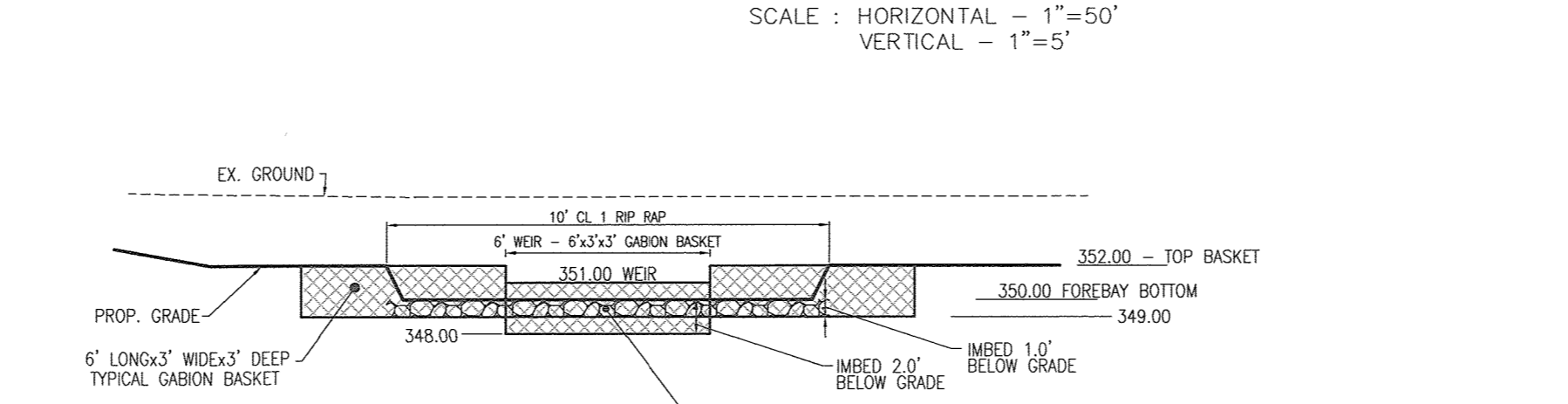
REV Required = 302 cuft  
REV Provided = 472 cf @ 6" Stone  
Below Underdrain

**NOTE**  
RISER SHALL BE CAST IN PLACE. IF CONTRACTOR UTILIZES MULTIPLE PRECAST UNITS, THE PRECAST UNITS SHALL BE CONNECTED IN ACCORDANCE WITH MDE DETAIL C-2-B OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.



**NOTES:**

- A GEOTECHNICAL ENGINEER IS TO BE PRESENT ON-SITE TO SUPERVISE THE CONSTRUCTION OF THE IMPERVIOUS CORE / CUTOFF TRENCH PER MD-378 SPECIFICATIONS.
- IMPERVIOUS CORE MATERIAL SHALL BE DELIVERED PRIOR TO STARTUP OF CONSTRUCTION APPROVED FILL MATERIAL.
- THE SITE SHALL BE STRIPPED OF TOPSOIL AND ANY OTHER UNSUITABLE MATERIAL FROM THE EMBANKMENT OF STRUCTURE AREA IN ACCORDANCE WITH SOIL CONSERVATION GUIDELINES. AFTER STRIPPING OPERATIONS HAVE BEEN COMPLETED, THE EXPOSED SUBSTRATE MATERIALS SHOULD BE PROOF-ROLLED WITH A LOADED SAND TRUCK OR SIMILAR EQUIPMENT. THE PRESENCE OF THE GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE, FOR AREAS THAT ARE NOT ACCESSIBLE TO A SAND TRUCK, EQUIPMENT MATERIAL SHALL BE OBSERVED AND TESTED BY A GEOTECHNICAL ENGINEER OR HIS REPRESENTATIVE. UNDESIRABLE MATERIALS IDENTIFIED BY PROOF ROLLING OR PENETROMETER TESTING SHOULD BE EXCAVATED TO SUITABLE FIRM SOIL AND THEN RESTORED (BY BACKFILLING WITH SUITABLE SOIL).
- REFER TO GEOTECHNICAL RECOMMENDATIONS SHEET XX.

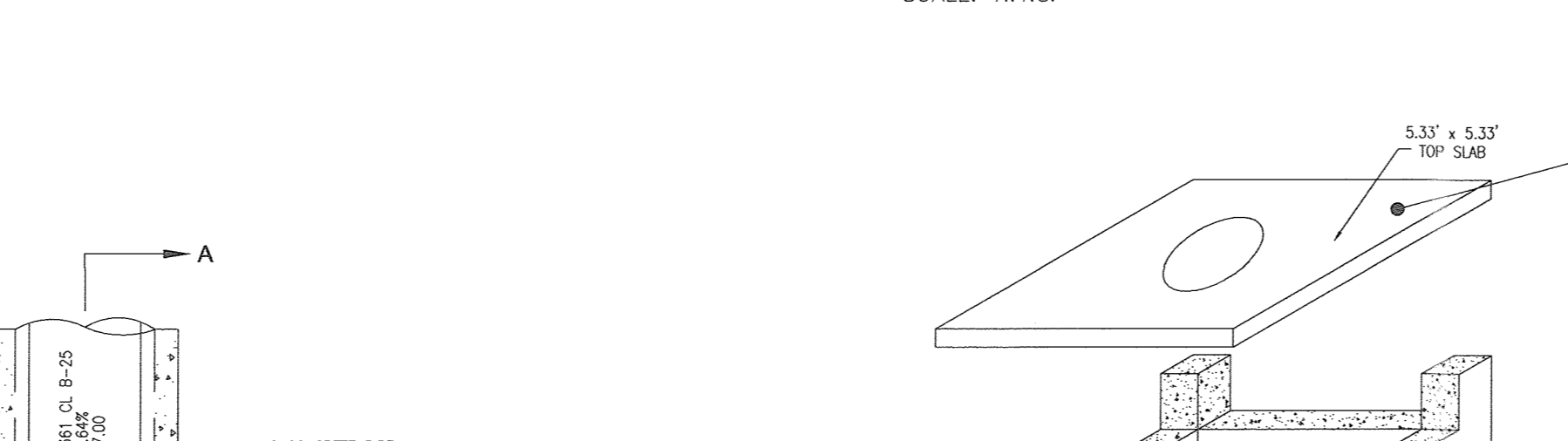


**NOTES:**

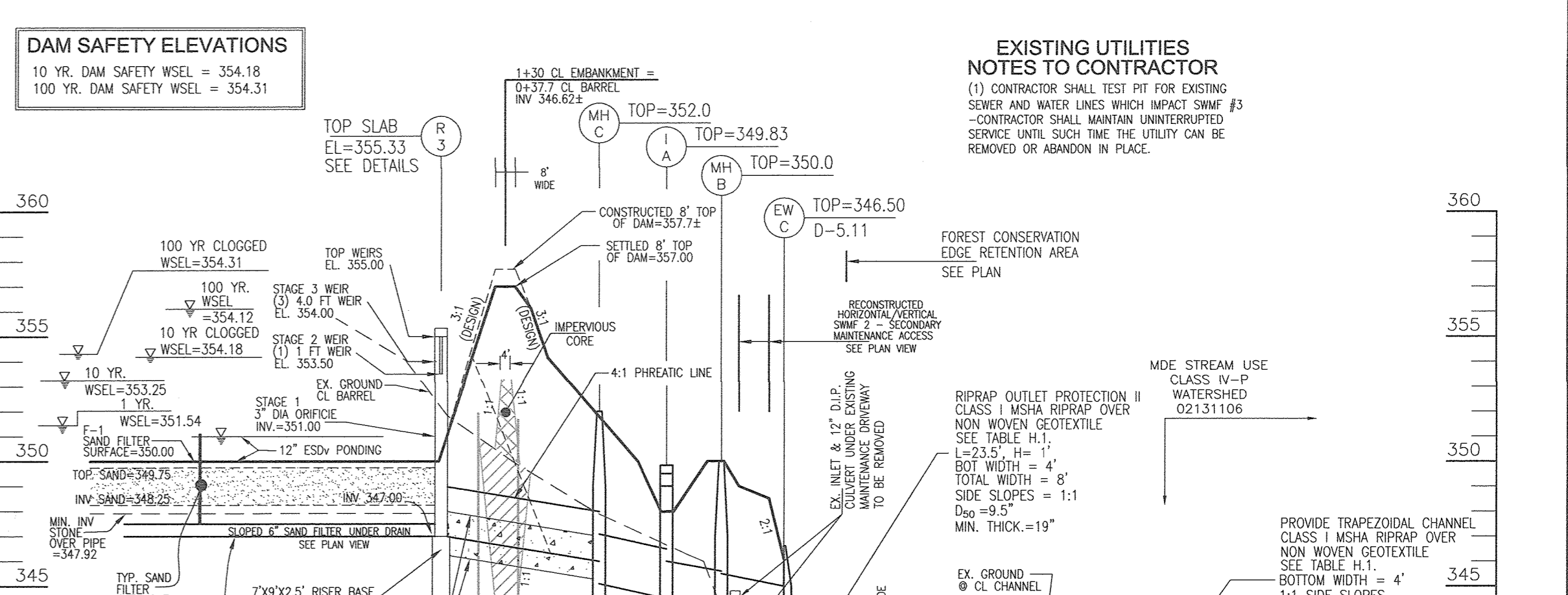
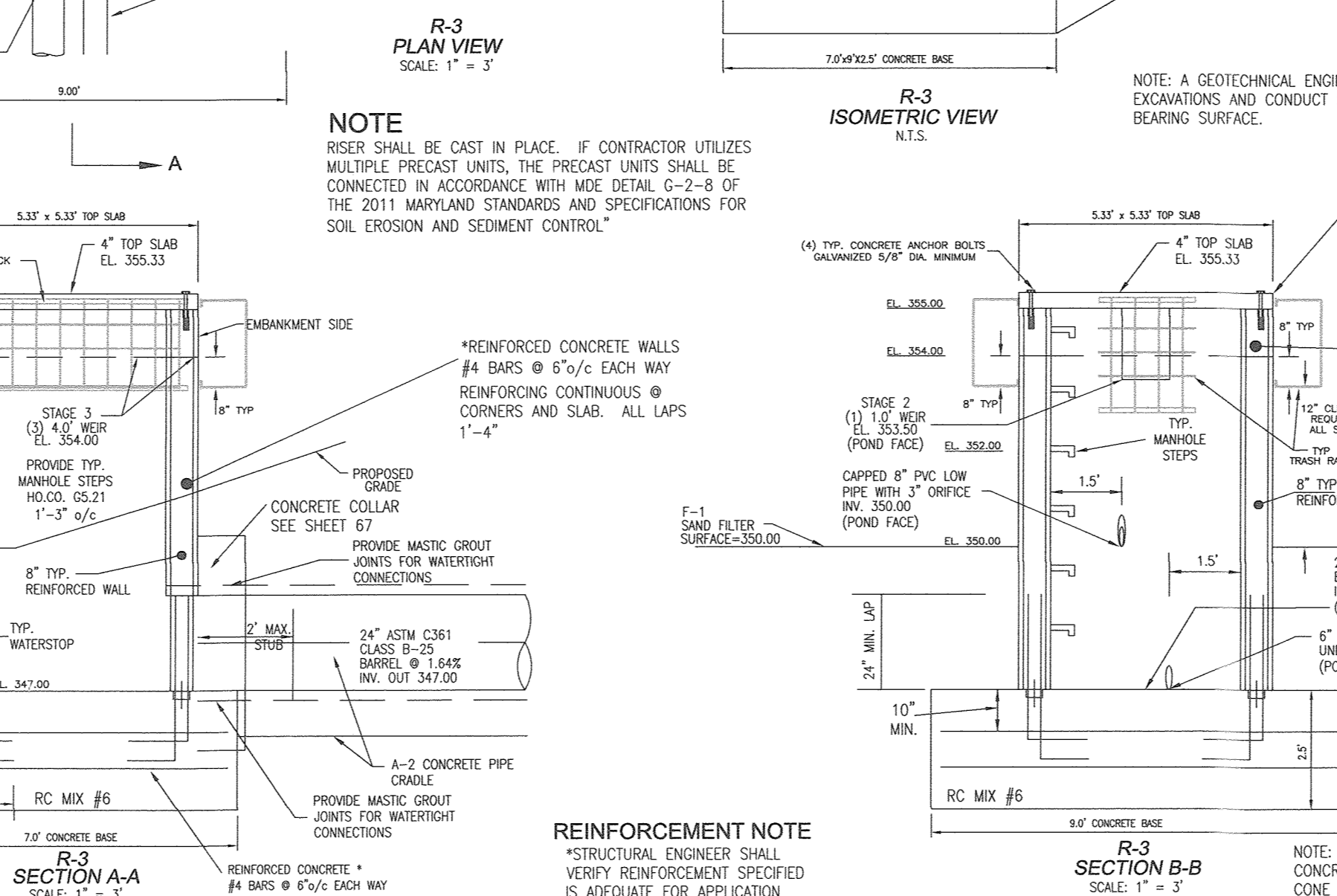
- ALL WIRE USED IN GABION CONSTRUCTION SHALL BE GALVANIZED AND PLASTIC COATED.
- FILTER CLOTH SHALL BE PLACED WHEREVER GABION BASKETS COME INTO CONTACT WITH SOIL.
- STONE FILL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE 4"-8" IN DIAMETER.
- CONSTRUCTION MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- RIP-RAP TO BE PLACED BELOW GABION WEIR TO BOTTOM OF FOREBAY.

**GABION BASKET WEIR DETAIL (S.W.M.F. #3)**

SCALE: N.T.S.



**REINFORCEMENT NOTE**  
STRUCTURAL ENGINEER SHALL VERIFY REINFORCEMENT SPECIFIED IS ADEQUATE FOR APPLICATION



# SEGMENTAL RETAINING WALL SPECIFICATIONS

## PART 1 - GENERAL

### 1.1 WORK INCLUDES

WORK INCLUDES FURNISHING AND INSTALLING SEGMENTAL RETAINING WALL UNITS, WALL FILL, AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS PRODUCED BY ROBERT H. VOGEL ENGINEERING, INC. AND AS SPECIFIED HEREIN. THE CONTRACTOR SHALL ALSO INCLUDE THE FURNISHING AND INSTALLING OF ALL APPROPRIATE MATERIALS, EQUIPMENT, AND LABOR REQUIRED FOR THE CONSTRUCTION OF THE SEGMENTAL RETAINING WALL, THE GEOTECHNICAL EXPLORATION FOR THIS SITE WAS PERFORMED BY GEO-TECHNOLOGY ASSOCIATES, INC., AS SUMMARIZED IN OUR REPORT DATED FEBRUARY 24, 2015.

### 1.2 REFERENCE STANDARDS

- A. ASTM C90-75 (1981 REV) - HOLLOW LOAD BEARING MASONRY UNITS.
- B. ASTM C140-75 (1981 REV) - SAMPLING AND TESTING CONCRETE MASONRY UNITS.
- C. ASTM C145-75 (1981 REV) - SOLID LOAD BEARING CONCRETE MASONRY UNITS.
- D. GEOSYNTHETIC RESEARCH INSTITUTE (GRI), GRI-GG4 - DETERMINATION OF LONG TERM DESIGN STRENGTH OF GEOGRIDS.
- E. ASTM D 838 - TEST METHOD FOR TENSILE PROPERTIES OF PLASTIC.
- F. ASTM D 1248 - SPECIFICATION OF POLYETHYLENE PLASTICS MOLDING AND EXTRUSION MATERIALS.
- G. ASTM D 4218 - TEST METHOD FOR CARBON BLACK CONTENT IN POLYETHYLENE COMPOUNDS BY THE MUFFLE FURNACE TECHNIQUE.
- H. ASTM D 3034 - SPECIFICATION FOR POLYVINYL CHLORIDE (PVC) PIPE.
- I. ASTM C 1372 - SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.

### 1.3 DELIVERY, STORAGE AND HANDLING

- A. CONTRACTOR SHALL CHECK THE MATERIALS UPON DELIVERY TO ASSURE THAT THE PROPER MATERIAL HAS BEEN RECEIVED. CONTRACTOR SHALL PREVENT EXCESSIVE MUD, WET CEMENT, EPOXY, AND LIKE MATERIALS WHICH MAY AFFIX THEMSELVES, FROM COMING IN CONTACT WITH THE MATERIALS.
- B. CONTRACTOR SHALL PROTECT THE MATERIALS FROM DAMAGE. DAMAGED MATERIAL SHALL NOT BE INCORPORATED INTO THE REINFORCED RETAINING WALL.
- C. GEOGRIDS SHOULD BE STORED ABOVE -20°F

### 1.4 SUBMITTALS/CERTIFICATION

THE CONTRACTOR SHALL SUBMIT A MANUFACTURER'S CERTIFICATION, PRIOR TO THE START OF THE WORK, THAT THE RETAINING WALL SYSTEM COMPONENTS MEET THE REQUIREMENTS OF ASTM C 1372 AND OTHER REQUIREMENTS SPECIFIED HEREIN. THIS CERTIFICATION SHOULD BE PROVIDED TO THE GEOTECHNICAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO WALL CONSTRUCTION.

## PART 2 - PRODUCTS

### 2.1 DEFINITIONS

- A. GEOGRID IS A HIGH DENSITY POLYETHYLENE, POLYESTER, OR POLYPROPYLENE GRID, SPECIFICALLY FABRICATED FOR USE AS A SOIL REINFORCEMENT.
- B. CONCRETE RETAINING WALL UNITS ARE AS DETAILED ON THE DRAWINGS AND AS SPECIFIED HEREIN.
- C. BACKFILL IS THE SOIL WHICH IS USED AS FILL FOR THE REINFORCED SOIL MASS.
- D. FOUNDATION SOIL IS THE IN-SITU SOIL OR CONTROLLED COMPACTED FILL PLACED BELOW THE BOTTOM OF THE RETAINING WALL AND GEOGRID ZONE.

### 2.2 MATERIALS

THE CONTRACTOR SHALL SUBMIT MANUFACTURER'S CATALOG AND SAMPLES OF THE PROPOSED MATERIALS FOR APPROVAL BY THE PROJECT GEOTECHNICAL ENGINEER A MINIMUM OF SEVEN DAYS BEFORE THE START OF CONSTRUCTION. MATERIALS SHALL BE TRANSPORTED TO THE SITE ONLY AFTER APPROVAL OF THE PROPOSED MATERIALS BY THE PROJECT GEOTECHNICAL ENGINEER.

#### A. CONCRETE UNITS

- 1. MASONRY UNITS SHALL BE KEYSTONE COMPAC III UNITS. SUBSTITUTION OF OTHER CONCRETE UNITS MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER.
- 2. CONCRETE WALL UNITS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI, IN ACCORDANCE WITH ASTM C-90. THE CONCRETE SHALL HAVE ADEQUATE FREEZE/THAW PROTECTION WITH A MAXIMUM MOISTURE ABSORPTION OF 24.8 PERCENT.
- 3. MODULAR CONCRETE MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 1372 - STANDARD SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.
- 4. THE UNITS SHALL PASS 100 FREEZE/THAW CYCLES IN WATER WITH LESS THAN 1% WEIGHT LOSS IN ACCORDANCE WITH ASTM C 1372.
- 5. EXTERIOR DIMENSIONS MAY VARY. UNITS ARE REQUIRED TO HAVE A MINIMUM OF 1.0 SQUARE FOOT OF FACE AREA EACH.
- 6. UNITS SHALL HAVE ANGLED SIDES AND BE CAPABLE OF ATTAINING CONCAVE AND CONVEX ALIGNMENT CURVES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- 7. UNITS SHALL BE INTERLOCKED WITH NON-CORROSIVE REINFORCED FIBERGLASS PINS.
- 8. UNITS SHALL BE INTERLOCKED AS TO PROVIDE A MAXIMUM OF 1.25-INCH OF SETBACK PER BLOCK.

#### B. LEVELING PAD

MATERIAL FOR LEVELING PAD/FOOTING SHALL CONSIST OF COMPACTED FREE-DRAINING COARSE AGGREGATES MEETING THE REQUIREMENTS OF ASTM #57 STONE. A COMPACTED LEVELING PAD A MINIMUM OF 6 INCHES THICK AND 24 INCHES WIDE IS REQUIRED.

#### C. FIBERGLASS CONNECTING PINS

- 1. THERMOSET ISOPHTHALIC POLYESTER RESIN PULTRUDED FIBERGLASS REINFORCEMENT RODS, A MINIMUM ONE-HALF INCH IN DIAMETER.
- 2. PINS SHALL HAVE A MINIMUM FLEXURAL STRENGTH OF 128,000 PSI AND SHORT BEAM SHEAR OF 6,400PSI.
- 3. FOR SUBSTITUTE OF CONCRETE UNITS, USE OF OTHER COMPATIBLE CONNECTOR SYSTEMS MAY BE ALLOWED WITH THE PRIOR APPROVAL OF THE GEOTECHNICAL ENGINEER.

#### D. GEOGRID

- 1. GEOSYNTHETIC REINFORCEMENT SHALL CONSIST OF HIGH PERFORMANCE WOVEN POLYESTER GEOGRIDS MANUFACTURED BY TENCATE INTERNATIONAL FOR SOIL REINFORCEMENT APPLICATIONS. THE TYPE, STRENGTH AND PLACEMENT LOCATION OF THE REINFORCING GEOSYNTHETIC SHALL BE AS SHOWN ON THE PLANS. DETAILED TEST DATA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION AND SHALL INCLUDE TENSILE STRENGTH (ASTM D 4595 OR ASTM D 6637), CREEP (ASTM D 5262), SITE DAMAGE AND DURABILITY (GRI GG-4), PULLOUT (ASTM D 6706), AND CONNECTION (ASTM D6638) TEST DATA.
- 2. INCLUDED WITH THE TEST DATA SHALL BE A REPORT THAT WILL SHOW THAT THE MIRAFI 3XT SHALL HAVE AN ULTIMATE TENSILE STRENGTH OF 3,500 POUNDS PER LINEAR FOOT (MARV), A LONG-TERM DESIGN STRENGTH OF 1,918 POUNDS PER LINEAR FOOT, IN ACCORDANCE WITH ASTM D 6637 AND A JUNCTION STRENGTH OF 975 POUNDS PER LINEAR FOOT (MARV) IN ACCORDANCE WITH GRI-GG2.
- 3. TYPE OF FENCING SELECTED BY THE OWNER/DEVELOPER MAY INTERFERE WITH GEOGRID REINFORCEMENT. INSTALL SLEEVE-IT™ 1224R FENCE POST FOUNDATION SYSTEM, SONOTUBES CONCURRENTLY, OR OTHER FOUNDATION SYSTEM CONCURRENTLY WITH GEOGRID AND FILL PLACEMENT TO AVOID CONFLICTS OR DAMAGE TO GEOGRID. OWNER SHALL SELECT FENCING PRIOR TO START OF WALL CONSTRUCTION SO WALL AND FENCE CONTRACTORS CAN COORDINATE INSTALLATION.

#### E. REINFORCED ZONE

CONTROLLED FILL SOIL SHALL MEET THE REQUIREMENTS OF AASHTO GROUP CLASSIFICATION OF A-2-4 OR MORE GRANULAR. IF ADEQUATE QUANTITIES ARE NOT AVAILABLE ON-SITE, IMPORTED BACKFILL SHOULD MEET THE ABOVE REQUIREMENTS AND SHOULD BE APPROVED BY GTA.

#### F. RETAINED FILL AND STRUCTURAL FILL

CONTROLLED FILL SOILS TO BE PLACED OUTSIDE THE REINFORCED BACKFILL AREA AND WHERE SPECIFIED SHALL CONSIST OF ON-SITE OR BORROW SOILS MEETING THE REQUIREMENTS OF USCS SM OR MORE GRANULAR. ALL FILL MATERIALS PROPOSED TO BE PLACED BEHIND THE REINFORCED BACKFILL SHALL BE PLACED AS CONTROLLED FILL COMPACTED TO 92 PERCENT OF THE MAXIMUM DRY DENSITY IN ACCORDANCE WITH THE MODIFIED PROCTOR, ASTM D-1557.

#### G. LOW-PERMEABILITY SOIL

LOW-PERMEABILITY SOILS TO BE PLACED AT THE TOP OF THE WALLS WHERE SPECIFIED SHALL CONSIST OF SANDY, SILTY OR CLAYEY SOILS MEETING THE REQUIREMENTS OF ML, CL, OR SC WITH A MINIMUM OF 30% PASSING THE #200 SIEVE.

#### H. UNIT FILL / DRAINAGE LAYER

THE UNIT FILL AND DRAINAGE LAYER SHALL CONSIST OF AASHTO #57 STONE AND BE PLACED WITHIN THE BLOCK AS UNIT FILL AND BEHIND THE BLOCK AS THE DRAINAGE LAYER WITH A MINIMUM THICKNESS OF 12 INCHES.

#### I. DRAINAGE PIPE

THE DRAINAGE PIPES SHALL BE PERFORATED HDPE OR SOLID PVC PIPE AS INDICATED.

#### J. FILTER FABRIC

FILTER FABRIC SHALL BE NON-WOVEN, POLYPROPYLENE GEOTEXTILE, 140N MANUFACTURED BY NICOLON MIRAFI GROUP OR APPROVED EQUIVALENT.

#### K. SLEEVE-IT OR SONOTUBE

SLEEVE-IT OR SONOTUBE SHALL BE INSTALLED DURING WALL CONSTRUCTION AT FENCE POST HOLDER LOCATIONS BASED ON THE SELECTED FENCE.

## PART 3 - EXECUTION

### A. EARTHWORK

- 1. THE CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. UNDER NO CIRCUMSTANCES SHOULD THE EXCAVATION LINES AND GRADES BE EXCEEDED, EXCEPT WITH OWNER'S APPROVAL. THE CONTRACTOR SHALL PROTECT THE EXCAVATION FROM SLOUGHING BY EXCAVATING TO THE APPROPRIATE GRADE FOR THE GIVEN SOIL TYPE AND COVERING THE EXCAVATED FACE WITH THE STONE DRAINAGE LAYER.
- 2. THE BOTTOM OF WALL EXCAVATION SHALL BE SLOPED AT A MINIMUM GRADE OF 2% TOWARDS THE WALL FACE.
- 3. THE CONTRACTOR IS RESPONSIBLE FOR STABILITY OF ALL EXCAVATION AND FILL SLOPES REQUIRED TO CONSTRUCT THE WALL. PERFORM ALL EXCAVATIONS IN ACCORDANCE WITH THE APPLICABLE OSHA AND COUNTY STANDARDS.
- 4. PRIOR TO RETAINING WALL CONSTRUCTION AND THE PLACEMENT OF FILL, ALL TOPSOIL SHALL BE STRIPPED AND REMOVED FROM THE WALL AREA.
- 5. ALL UTILITIES WITHIN 20 FEET OF THE PROPOSED RETAINING WALLS SHALL BE INSTALLED PRIOR TO WALL CONSTRUCTION WITH THE FILL MATERIAL SHALL CONSIST OF STRUCTURAL FILL THAT MEETS THE REQUIREMENTS OF PART 2, ITEM F. THE FILL SHALL BE PREPARED, PLACED, COMPACTED, AND TESTED IN ACCORDANCE WITH PART 3, ITEM F.
- 6. INLET 1-37 SHALL BE INSTALLED CONCURRENTLY WITH WALL CONSTRUCTION. BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH PART 2, ITEM F AND BE PLACED IN ACCORDANCE WITH PART 3, ITEM F.

### B. FOUNDATION SUBGRADE PREPARATION

- 1. FOUNDATION SOIL SHALL BE EXCAVATED AS REQUIRED FOR INSTALLATION OF LEVELING PAD, GEOGRID, STRUCTURAL FILL, AND OTHER ELEMENTS AND AS SHOWN ON THE CONSTRUCTION DRAWINGS.
- 2. THE EXPOSED SUBGRADE SHALL BE THOROUGHLY PROFFERLOD. THE SURFICIAL SOFT/LOOSE SOILS, AND TOPSOIL SHALL BE REMOVED TO A STABLE SUBGRADE AS DIRECTED BY GTA.
- 3. ALL FILL REQUIRED TO ACHIEVE THE WALL BOTTOM ELEVATION SHALL CONSIST OF STRUCTURAL FILL THAT MEETS THE REQUIREMENTS OF PART 2, ITEM F. THE FILL SHALL BE PREPARED, PLACED, COMPACTED, AND TESTED IN ACCORDANCE WITH PART 3, ITEM F. PLACEMENT OF STRUCTURAL FILL SHALL NOT PROCEED UNTIL THE SUBGRADE HAS BEEN APPROVED BY GTA.
- 4. FOUNDATION SOIL SHOULD BE EXAMINED BY GTA TO ASSURE THAT THE ACTUAL FOUNDATION SOIL STRENGTH MEETS OR EXCEEDS ASSUMED DESIGN STRENGTH. SOILS NOT MEETING REQUIRED STRENGTH SHOULD BE REMOVED AND REPLACED WITH CONTROLLED, COMPACTED MATERIAL.
- 5. ALLOWABLE BEARING PRESSURE FOR NATURAL AND CONTROLLED, COMPACTED STRUCTURAL FILL SHALL BE AS SPECIFIED IN PART 5, FOUNDATION SOIL.

### C. LEVELING PAD

- 1. THE LEVELING PAD SHALL BE PLACED AS SHOWN ON THE CONSTRUCTION DRAWINGS WITH A MINIMUM THICKNESS OF 6 INCHES AND 24 INCHES WIDE.
- 2. LEVELING PAD MATERIALS SHALL BE INSTALLED ON UNDISTURBED IN-SITU SOILS OR CONTROLLED, COMPACTED BACKFILL.
- 3. LEVELING PAD SHALL BE PREPARED TO ENSURE COMPLETE CONTACT OF RETAINING WALL UNIT WITH BASE. GAPS SHALL NOT BE ALLOWED.
- 4. THE LEVELING PAD SHALL BE CONSTRUCTED WITH THE MATERIALS DESCRIBED IN PART 2, ITEM B.

### D. UNIT INSTALLATION

- 1. FIRST COURSE OF CONCRETE WALL UNITS SHALL BE PLACED ON THE LEVELING PAD. THE UNITS SHALL BE CHECKED FOR LEVEL AND ALIGNMENT. THE FIRST COURSE IS THE MOST IMPORTANT TO PROVIDE ACCURATE AND ACCEPTABLE RESULTS.
- 2. ENSURE THAT UNITS ARE IN FULL CONTACT WITH BASE.
- 3. UNITS ARE PLACED SIDE BY SIDE FOR FULL LENGTH OF WALL ALIGNMENT. ALIGNMENT MAY BE DONE BY MEANS OF A STRING LINE OR OFFSET FROM BASE LINE.
- 4. INSTALL FIBERGLASS CONNECTING PIN.
- 5. LAY UP EACH COURSE ENSURING THAT THE CONNECTING PINS ARE INSERTED THROUGH FRONT SLOT OF THE UNIT, AND INTO THE RECEIVING SLOT IN THE COURSE BENEATH. REPEAT PROCEDURE TO THE EXTENT OF WALL HEIGHT.
- 6. AT THE END OF EACH COURSE WHERE THE WALL CHANGES ELEVATION, UNITS SHALL BE TURNED INTO THE BACKFILL UNITS SHALL BE LAID AS TO CREATE THE MINIMUM RADIUS POSSIBLE. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, A MINIMUM OF ONE UNIT SHALL BE INSTALLED INTO THE GRADE. ONLY THE FRONT FACE OF THE UNITS SHALL BE VISIBLE FROM THE SIDE OF THE WALL.
- 7. CAP UNITS SHALL BE INSTALLED AND BONDED WITH CONSTRUCTION ADHESIVE OR EPOXY CEMENT AS REQUIRED BY MANUFACTURER.
- 8. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE FOR THE BACK OF THE RETAINING WALL DURING CONSTRUCTION.

### E. GEOGRID INSTALLATION

- 1. THE GEOGRID SOIL REINFORCEMENT SHALL BE LAID HORIZONTALLY ON COMPACTED BACKFILL AND CONNECTED TO THE CONCRETE WALL UNITS. HOOK GRID OVER THE FIBERGLASS CONNECTING PIN, PULL TIGHT, AND ANCHOR BEFORE BACKFILL IS PLACED ON THE GEOGRID.
- 2. BLACK IN THE GEOGRID AT THE WALL UNIT CONNECTIONS SHALL BE REMOVED IN A MANNER, AND TO SUCH A DEGREE, AS APPROVED BY THE ENGINEER.
- 3. GEOGRID SHALL BE LAID AT THE PROPER ELEVATION AND ORIENTATION AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- 4. CORRECT ORIENTATION (ROLL DIRECTION) OF THE GEOGRID SHALL BE VERIFIED BY THE CONTRACTOR.
- 5. GEOGRID SHALL BE SECURED IN-PLACE WITH STAPLES, PINS, SAND BAGS, OR BACKFILL AS REQUIRED BY FILL PROPERTIES, FILL PLACEMENT PROCEDURES, OR WEATHER CONDITIONS, OR AS DIRECTED BY THE ENGINEER.
- 6. OVERLAPS:
  - a. UNIAxIAL GEOGRID DOES NOT NEED TO BE OVERLAPPED IN THE ACROSS THE ROLL DIRECTION, EXCEPT TO CONTAIN THE FILL AT THE SLOPE FACE WHEN WRAP-AROUND FACING IS USED. UNIAxIAL GRID SHOULD BE OVERLAPPED 48" IN THE ROLLED DIRECTION.
  - b. A LAYER OF SOIL A MINIMUM OF 4 INCHES IN THICKNESS SHALL BE SPREAD BETWEEN UNIAxIAL GEOGRID LAYERS IN THE AREA TO BE OVERLAPPED, OR AS DIRECTED.

### F. PLACEMENT OF FILL AND BACKFILL

- 1. FILL MATERIALS SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS.
- 2. AT THE TIME OF COMPACTION, FILL MATERIALS SHALL BE WITHIN ±2% TO +4% OF THE OPTIMUM MOISTURE CONTENT, AND SHALL BE COMPACTED TO A MINIMUM OF 92% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH ASTM SPECIFICATION D-1557, THE MODIFIED PROCTOR METHOD.
- 3. BACKFILL SHALL BE PLACED, SPREAD, AND COMPACTED IN SUCH A MANNER THAT MINIMIZES THE DEVELOPMENT OF WRINKLES IN AND/OR MOVEMENT OF THE GEOGRID. PLACE BACKFILL FROM FRONT OF GEOGRID AND SPREAD TO BACK OF GEOGRID.
- 4. THE LIFT OF BACKFILL IMMEDIATELY BELOW A LAYER OF GEOGRID SHALL BE SCARIFIED TO A DEPTH OF 2 INCHES IMMEDIATELY AFTER COMPLETION OF LIFT COMPACTED. THE GEOGRID SHALL BE PLACED AND THE SUBSEQUENT LIFT OF SOIL PLACED AND COMPACTED THE SAME DAY AS THE UNDERLYING LIFT IS SCARIFIED.
- 5. ONLY HAND-OPERATED COMPACTOR EQUIPMENT SHALL BE ALLOWED WITHIN 4 FEET OF THE WALL FACE.
- 6. BACKFILL SHALL BE PLACED FROM THE WALL OUTWARD TO ENSURE THAT THE GEOGRID REMAINS TIGHT.
- 7. TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED WITHIN THE REINFORCED ZONE BEHIND THE WALL.
- 8. RUBBER-TIRED EQUIPMENT MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHOULD BE AVOIDED.
- 9. ALL FILL AND BACKFILL OPERATIONS SHALL BE OBSERVED ON A FULL-TIME BASIS BY A QUALIFIED SOIL TECHNICIAN TO DETERMINE IF MINIMUM COMPACTOR REQUIREMENTS ARE BEING MET AND THAT MATERIALS MEETING OR EXCEEDING THE SPECIFICATION REQUIREMENTS ARE USED.
- 10. IN-PLACE DENSITY TESTS SHALL BE PERFORMED WITH A MINIMUM OF 1 TEST PER 2,000 SQUARE FEET OF FILL AREA FOR EACH LIFT OF FILL PLACED. THE ELEVATION AND LOCATION OF THE TESTS SHALL BE CLEARLY IDENTIFIED AT THE TIME OF FILL PLACEMENT.
- 11. THE BACKFILL MATRIX MUST BE CONSTRUCTED SO THAT FINE GRAIN SOILS DO NOT TRAP WATER.

### G. DRAINAGE

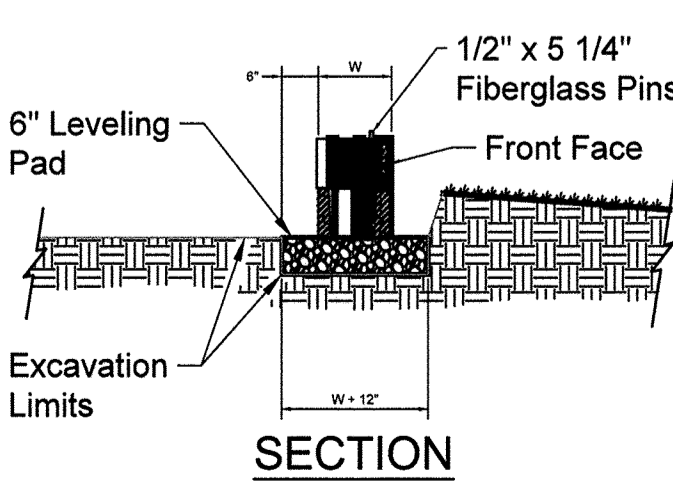
- 1. DRAINAGE FILL SHALL BE PLACED BEHIND THE WALL TO THE LIMITS SHOWN. THE DRAINAGE FILL SHALL BE A MINIMUM OF 12-INCHES THICK AND SHALL MEET THE REQUIREMENTS OF AASHTO #57 STONE. THE DRAINAGE FILL SHALL BE WRAPPED IN FILTER FABRIC (MIRAFI 140N OR EQUAL) AS SHOWN ON THE DRAWINGS.
- 2. POSITIVE DRAINAGE SHALL BE MAINTAINED DURING AND AFTER CONSTRUCTION. SOILS WITHIN THE REINFORCED ZONE THAT BECAME WET DURING CONSTRUCTION SHALL BE DRIED OR REMOVED.
- 3. INSTALL THE PERFORATED DRAINAGE PIPES AND LATERAL DRAINAGE PIPES, INCREMENTALLY ALONG WITH THE INSTALLATION OF CONCRETE UNITS AND PLACEMENT OF FILL.

### H. FENCE

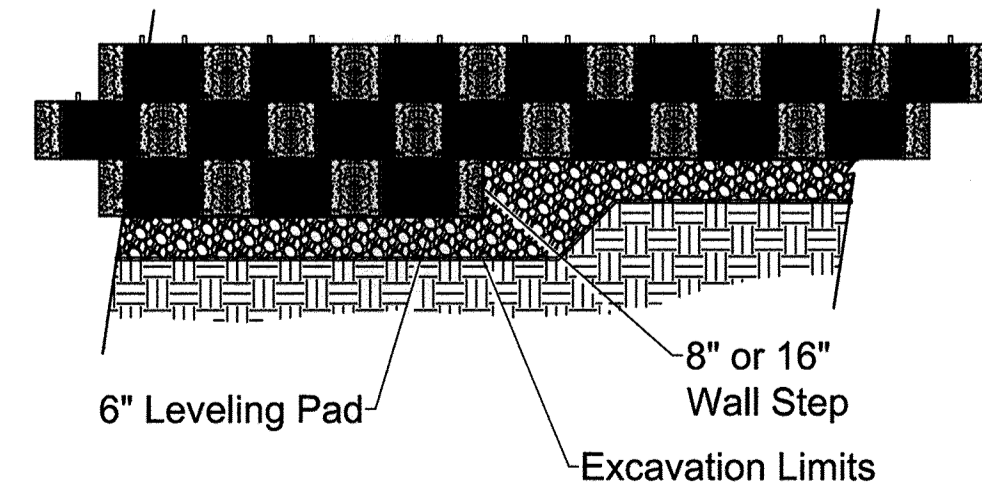
SONOTUBES OR SLEEVE-ITS SHALL BE INSTALLED BEHIND THE BLOCK CELLS AT FENCE POST HOLDER LOCATIONS. SONOTUBES OR SLEEVE-ITS SHALL BE FILLED WITH GROUT OR CONCRETE TO A DEPTH OF 28".

#### Note:

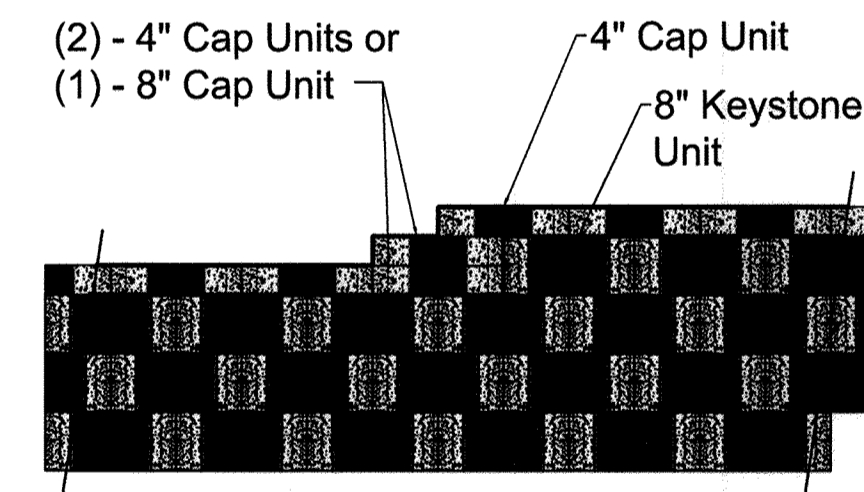
- 1. The leveling pad is to be constructed of crushed stone or 2000 psi ± unreinforced concrete.



**LEVELING PAD DETAIL-COMPAC III UNIT**  
NOT TO SCALE



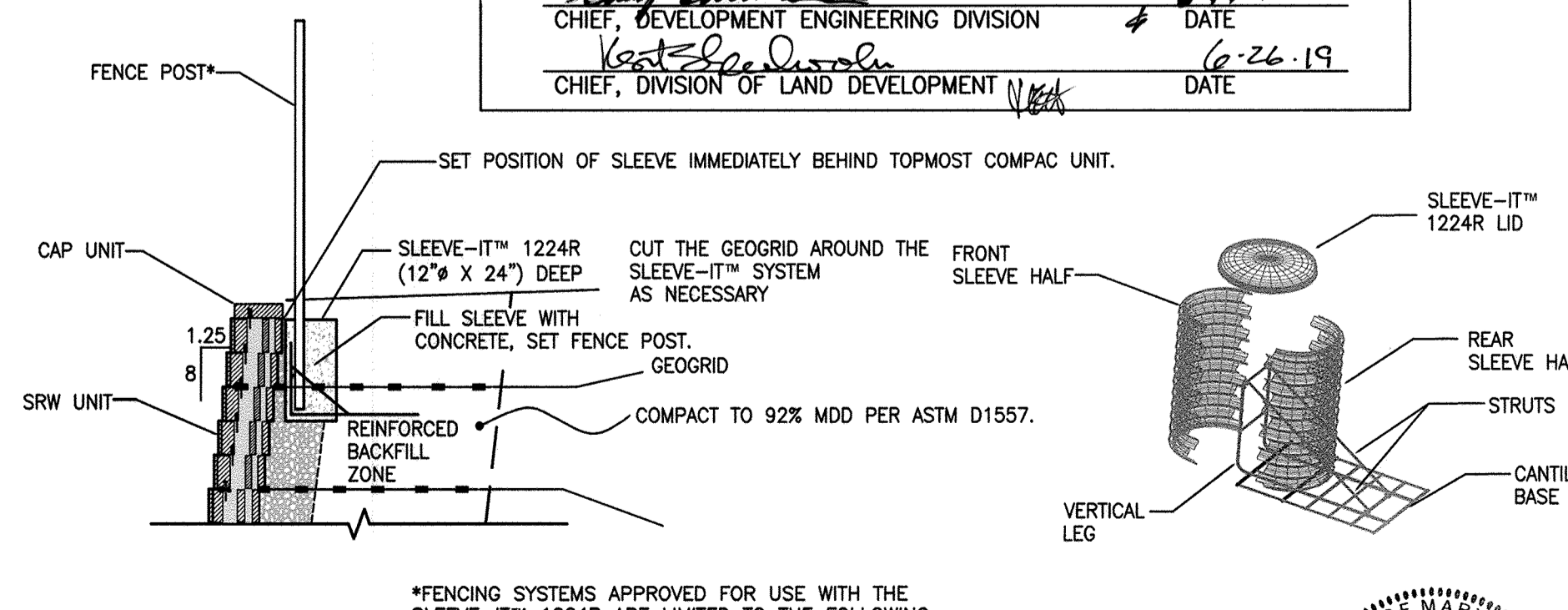
**ELEVATION**



#### Note:

- 1. Secure all cap units with Keystone Kapseal or equal.

## Top of Wall Steps



\*FENCING SYSTEMS APPROVED FOR USE WITH THE SLEEVE-IT™ 1224R ARE LIMITED TO THE FOLLOWING HEIGHTS: CHAIN LINK - UP TO 8-FT, PRIVACY - UP TO 6-FT (WOODEN, PVC, METAL). POST SIZE 4"x4" MAX.

**DETAIL OF FENCE POST INSTALLATION USING SLEEVE-IT™ 1224R**  
NOT TO SCALE

## PART 4 - CONSTRUCTION OBSERVATION AND TESTING

- A. THE RETAINING WALLS SHOULD ONLY BE CONSTRUCTED UNDER THE OBSERVATION OF GTA TO CONFIRM THAT THE SOIL AND MATERIALS USED DURING CONSTRUCTION MEET THE REQUIREMENTS SPECIFIED HEREIN. IF GTA IS NOT CONTRACTED TO PROVIDED CONSTRUCTION OBSERVATION AND TESTING SERVICES DURING WALL CONSTRUCTION, GTA IS RELIEVED OF ALL RESPONSIBILITY FOR THE PERFORMANCE OF THE WALLS.
- B. THE REQUIRED BEARING PRESSURE BENEATH THE FOOTING OF THE WALLS SHALL BE VERIFIED IN THE FIELD BY A CERTIFIED SOILS TECHNICIAN. TESTING DOCUMENTATION MUST BE PROVIDED TO THE GEOTECHNICAL ENGINEER PRIOR TO THE START OF WALL CONSTRUCTION. THE REQUIRED TEST PROCEDURE SHALL BE THE DYNAMIC CONE PENETROMETER (DCP) TEST ASTM STP-399.
- C. THE SUITABILITY OF FILL MATERIAL SHALL BE CONFIRMED BY THE ON-SITE SOILS TECHNICIAN.

## PART 5 - DESIGN PARAMETERS

WALL GEOMETRY	WALL #1	WALL #2
MAXIMUM EXPOSED WALL HEIGHT (FT.):	7.4'	10.1'
ANGLE OF FACE (DEG.):	8'	8'
BLOCK EMBEDMENT (FT.):	VARIES (SEE PROFILE)	VARIES (SEE PROFILE)
MAXIMUM BACKFILL SLOPE ANGLE (DEG.):	18.4°	NO SLOPE
MAXIMUM TOE SLOPE ANGLE (DEG.):	NO SLOPE	NO SLOPE

### REINFORCED FILL ZONE

DENSITY OF BACKFILL (PCF):	130
PHI (DEG.):	28
COHESION (PSF):	0

### RETAINED ZONE

DENSITY (PCF):	130
PHI (DEG.):	28
COHESION (PSF):	0

### FOUNDATION SOIL

DENSITY (PCF):	130
PHI (DEG.):	28
COHESION (PSF):	0
LEVELING PAD MATERIAL:	NO. 57 STONE
ALLOWABLE BEARING PRESSURE (PSF):	2,500

### MODULAR BLOCK DATA

KEYSTONE BLOCKS:	COMPAC III UNITS
KEYSTONE CAP BLOCKS:	4" HIGH CAP UNITS
UNIT FILL:	AGGREGATE, AASHTO NO. 57

### GEOGRID DATA

GEOGRID TYPE:	MIRAFI 3XT
COVERAGE OF GEOGRIDS:	100
WALL/SOIL INTERACTION COEFFICIENT:	0.8
DIRECT SHEAR COEFFICIENT:	0.8
CONSTRUCTION DAMAGE BASED ON:	CRUSHED STONE
GEOGRID LENGTH (FT.):	4 FEET TO 8 FEET
GEOTEXTILE:	MIRAFI 140 N, OR APPROVED EQUIVALENT

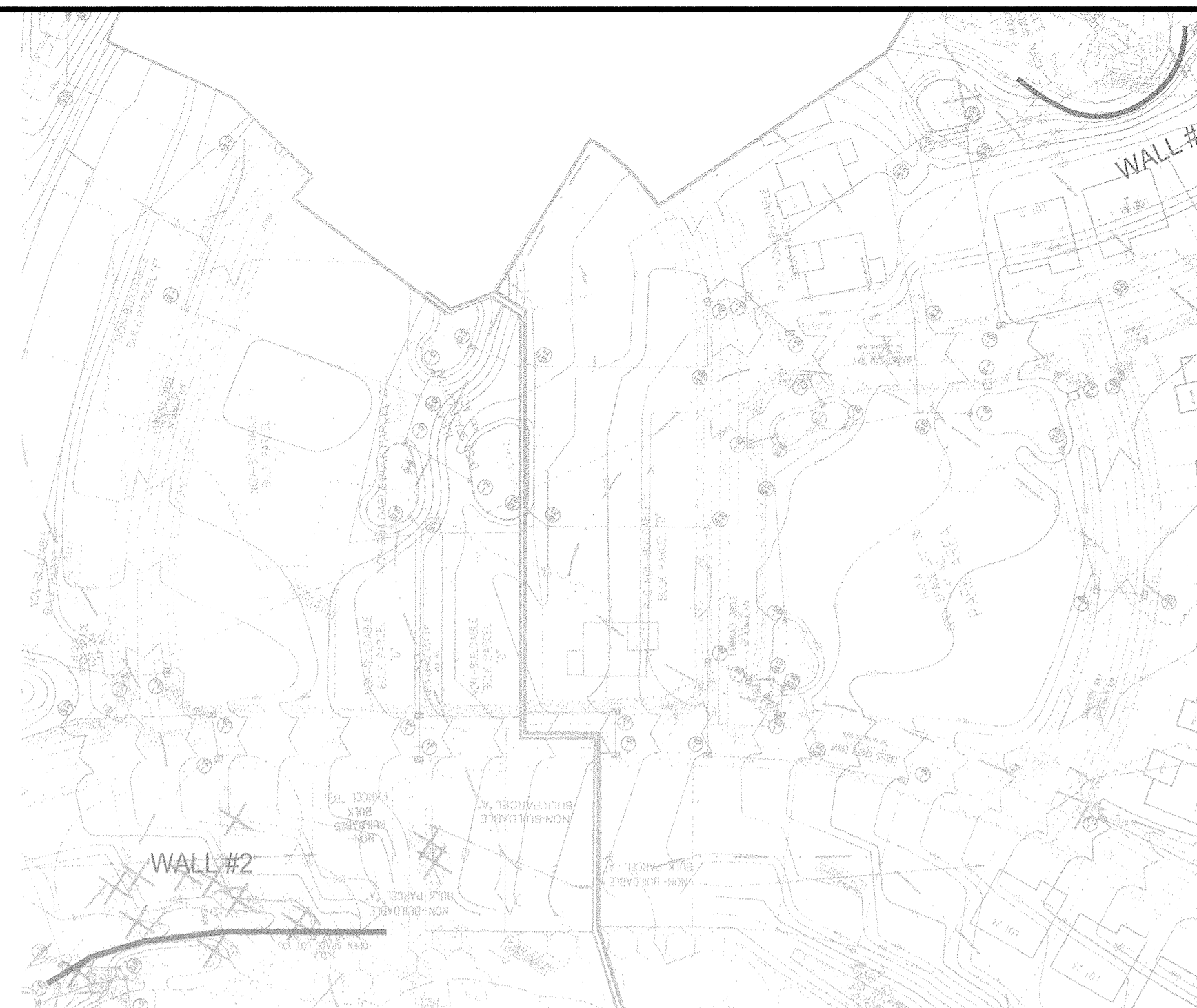
## PART 6 - DESIGN CRITERIA

- 1. DESIGN PARAMETERS
 

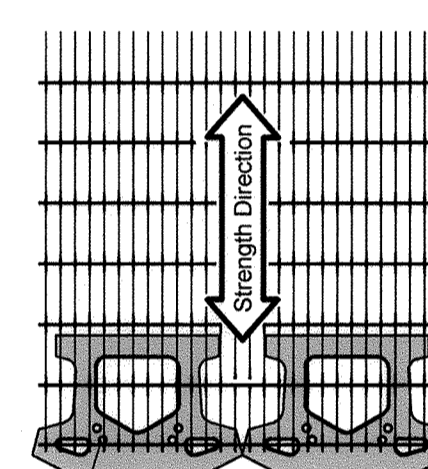
MIN. F.S. FOR SLIDING:	1.5	GEOGRID INSTALLATION DAMAGE REDUCTION FACTOR	1.10
MIN. F.S. FOR OVERTURNING:	2.0	GEOGRID DURABILITY REDUCTION FACTOR	1.10
MIN. F.S. FOR UNCERTAINTIES:	1.5	GEOGRID OVERALL SAFETY FACTOR	1.5
MIN. F.S. FOR GLOBAL STABILITY:	1.3	MIN. F.S. FOR BEARING	2.0
- 2. THESE WALLS ARE LOCATED ENTIRELY ON PRIVATE PROPERTY AND IS TO BE PRIVATELY MAINTAINED BY THE PROPERTY OWNER.
- 3. THE STRUCTURAL DESIGN OF THE FENCE IS TO BE PERFORMED BY OTHERS PER LOCAL CODE.
- 4. STOCKPILES SHALL NOT BE PLACED ON TOP OF ANY RETAINING WALL WITHIN THE REINFORCED OR RETAINED ZONES AT ANY TIME. STOCKPILES SHALL NOT BE PLACED AT THE BASE OF ANY RETAINING WALL WITHIN 20 FEET OF THE WALL FACE AT ANY TIME. STOCKPILE MATERIALS INCLUDE, BUT ARE NOT LIMITED TO SOIL, SNOW, AND LANDSCAPING MATERIAL.

## PART 7 - CONSTRUCTION SEQUENCE

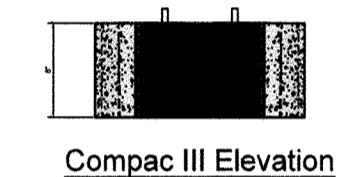
- A. OBTAIN BUILDING PERMITS AND INSTALL SEDIMENT AND EROSION CONTROL DEVICES.
- B. GRADE AREAS BELOW AND BEHIND THE WALLS.
- C. INSTALL ALL UTILITIES WITHIN 20' OF RETAINING WALL PRIOR TO WALL CONSTRUCTION.
- D. INSTALL 1-37 AND ASSOCIATED PIPE CONCURRENTLY WITH WALL CONSTRUCTION.
- E. CONSTRUCT LEVELING PAD.
- F. CONSTRUCT WALL INCLUDING BLOCK, GEOGRID, AND REINFORCED FILL.
- G. INSTALL SONOTUBES OR SLEEVE-ITS BEHIND THE BLOCK CELLS AS DETAILED. SONOTUBES OR SLEEVE-ITS SHALL BE INSTALLED WITH A MINIMUM DEPTH OF 28 INCHES AND BACKFILLED WITH GROUT OR CONCRETE.
- H. INSTALL CAP UNITS.



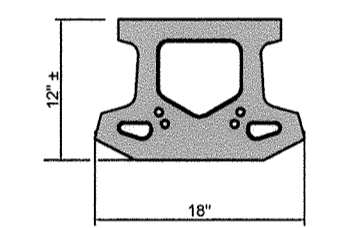
**SITE MAP**  
SCALE: 1" = 100'



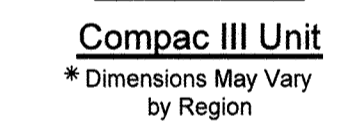
**Grid & Pin Connection**



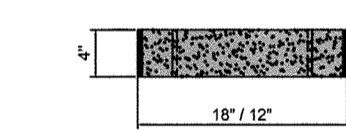
**Compac III Elevation**



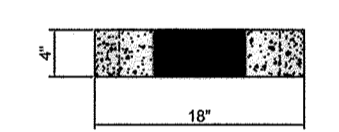
**Compac III Plan**



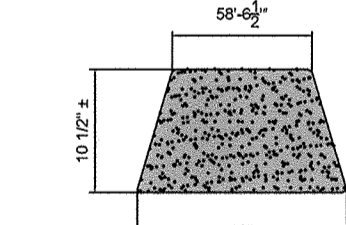
**Compac III Unit**  
\*Dimensions May Vary by Region



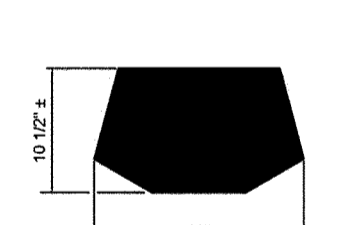
**Cap Unit Elevation**



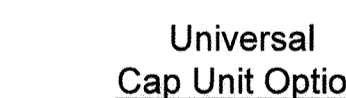
**Cap Unit Elevation**



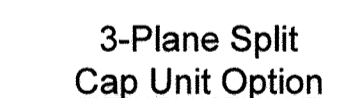
**Cap Unit Plan**



**Cap Unit Plan**



**Universal Cap Unit Option**  
\*Dimensions & Availability Will Vary by Region



**3-Plane Split Cap Unit Option**  
\*Dimensions & Availability Will Vary by Region

APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 \_\_\_\_\_ DATE 6/11/2019  
 CHIEF, BUREAU OF HIGHWAYS

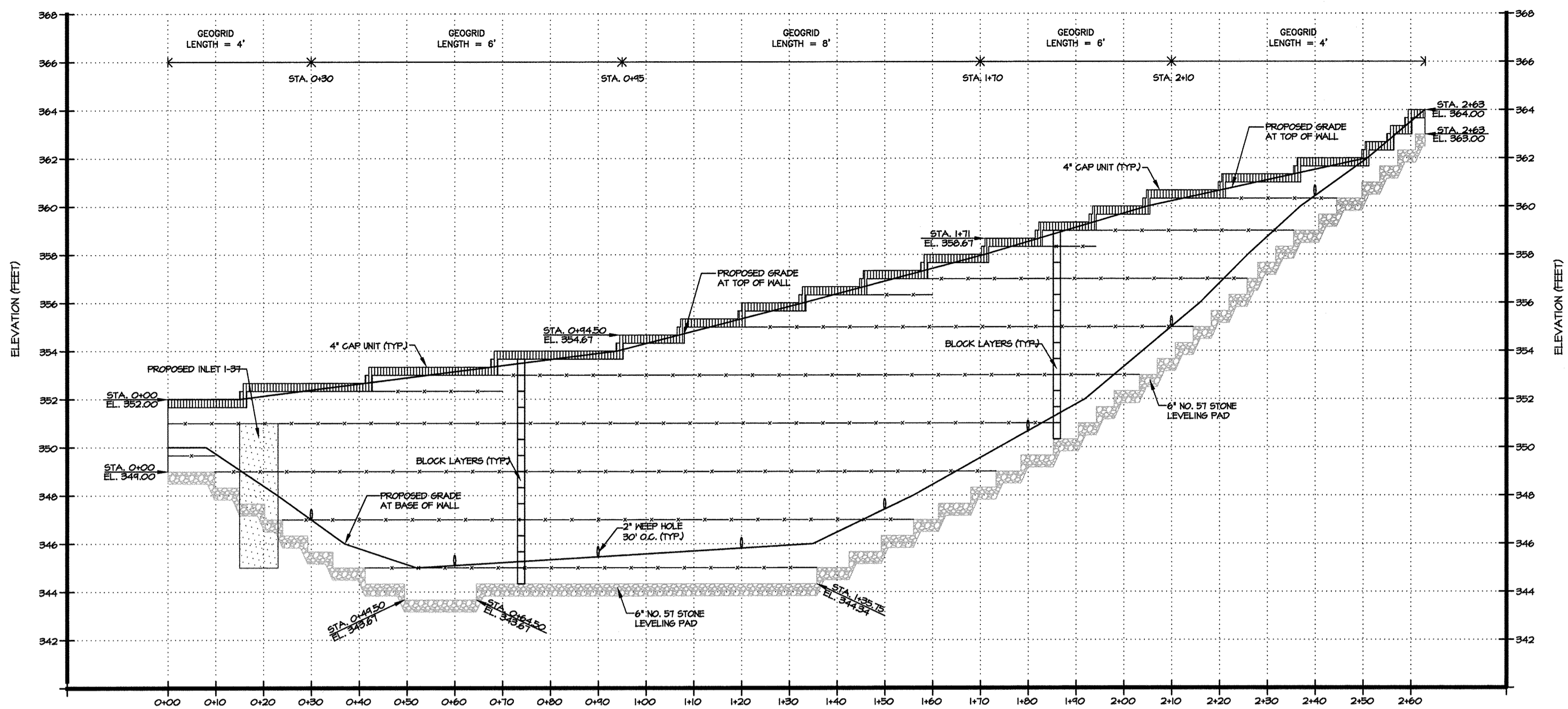
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 \_\_\_\_\_ DATE 6/17/19  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION

APPROVED: \_\_\_\_\_ DATE 6-26-19  
 CHIEF, DIVISION OF LAND DEVELOPMENT

**GEO-TECHNOLOGY ASSOCIATES, INC.**  
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS  
 3445-A BOX HILL CORPORATE CENTER DRIVE  
 ABINGDON, MARYLAND 21009  
 410-515-9446  
 FAX: 410-515-4895  
 WWW.GTAENG.COM  
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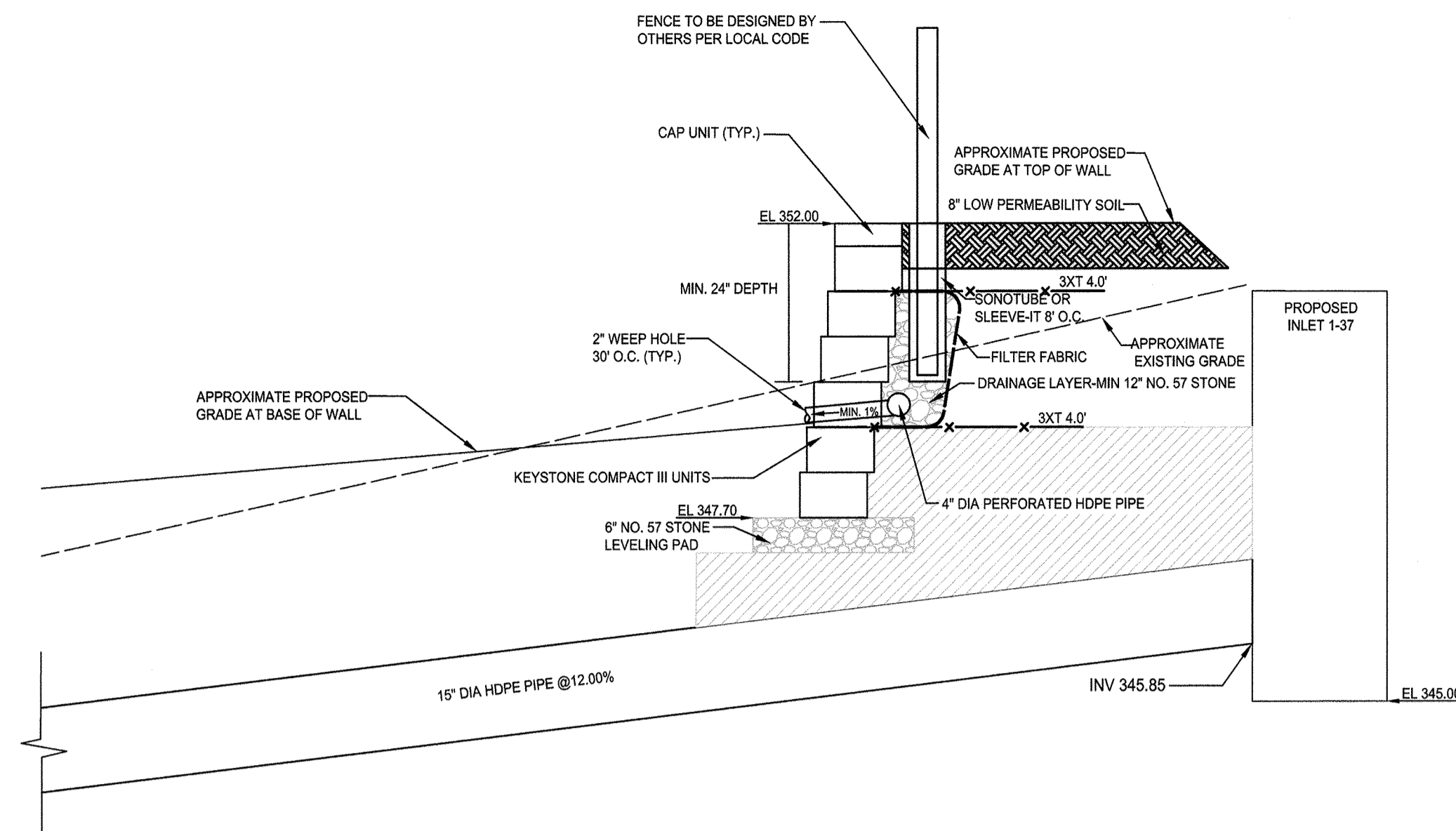
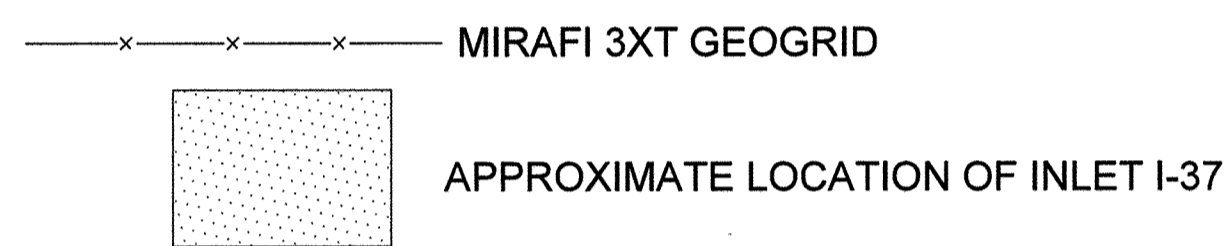






**RETAINING WALL #2 PROFILE**

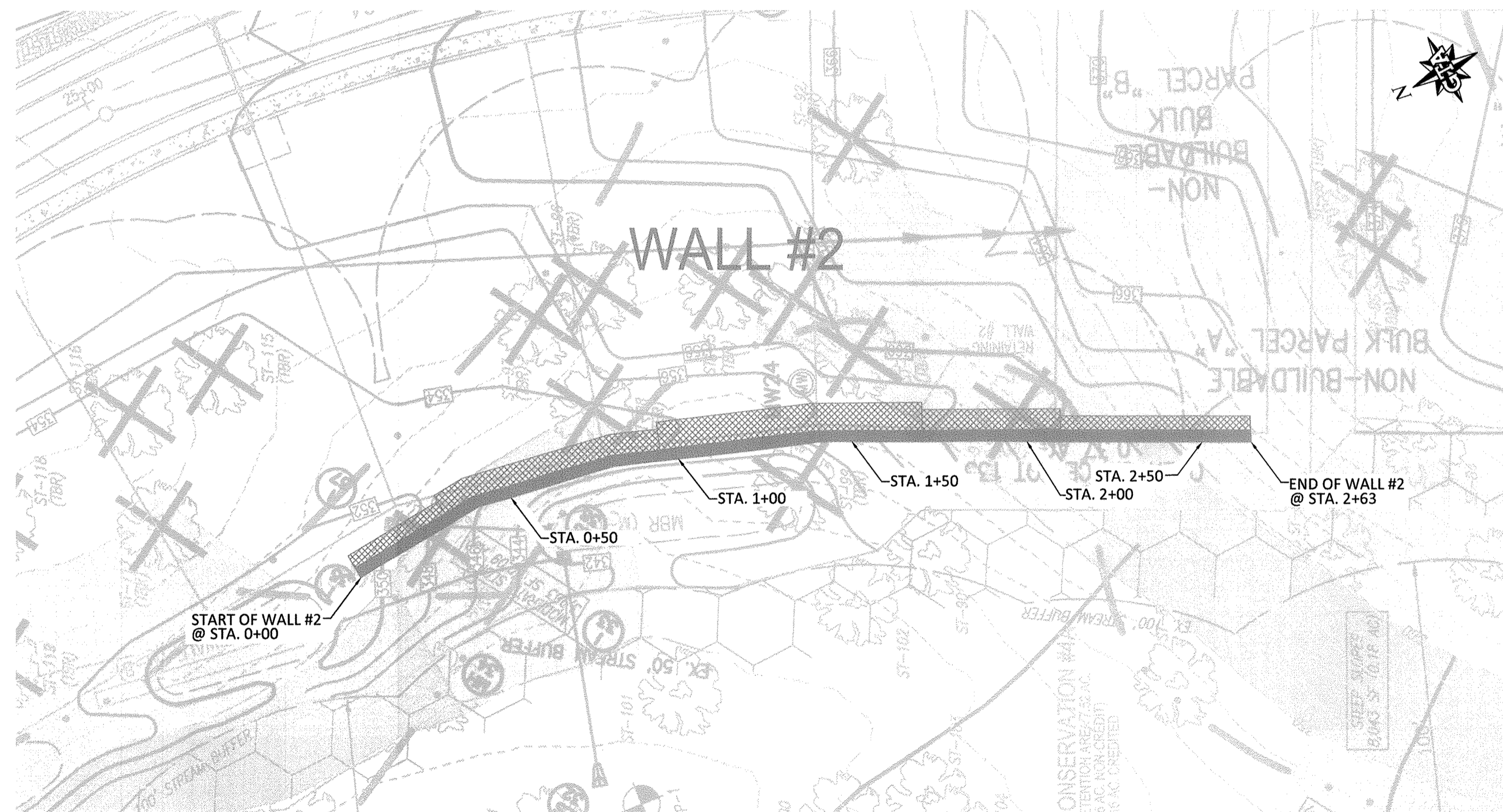
SCALE: HORIZ. 1" = 20'  
VERT. 1" = 4'



**RETAINING WALL #2 CROSS SECTION  
VIEW @ STA. 0+15**

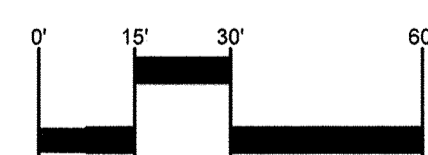
SCALE: 1" = 2'

BACKFILL PIPE IN ACCORDANCE WITH PART 2, ITEM F AND PART 3, ITEM F OF THE NOTES AND DETAILS PAGE

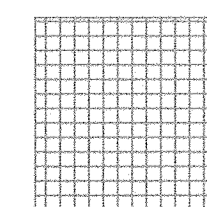


**RETAINING WALL #2  
LOCATION PLAN**

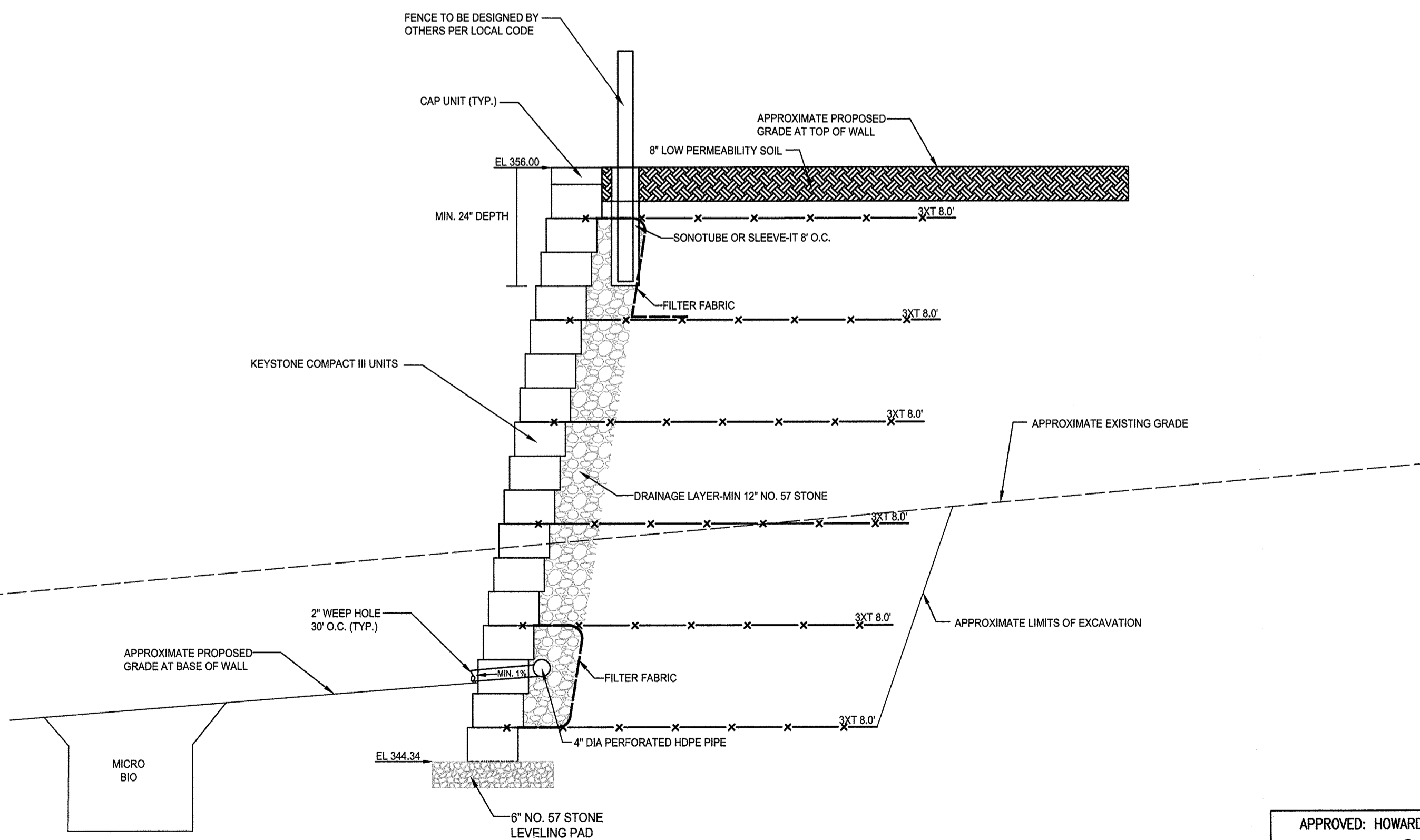
SCALE: 1" = 30'



SCALE: 1"=30'



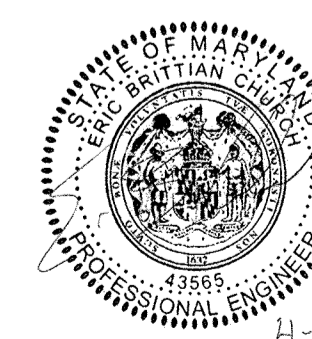
APPROXIMATE GRID LOCATION



**RETAINING WALL #2 CROSS SECTION  
VIEW @ STA. 1+25**

SCALE: 1" = 2'

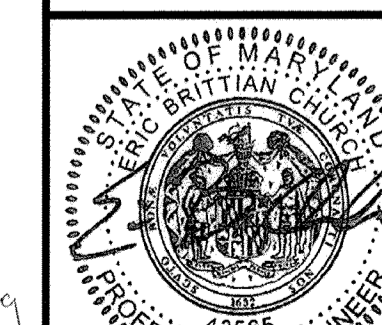
APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS	6/11/2019
<i>[Signature]</i> CHIEF, BUREAU OF HIGHWAYS	DATE
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	6/17/19
<i>[Signature]</i> CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE
<i>[Signature]</i> CHIEF, DIVISION OF LAND DEVELOPMENT	6-26-19
	DATE



**GEO-TECHNOLOGY ASSOCIATES, INC.**  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

3445-A BOX HILL CORPORATE CENTER DRIVE  
ABINGDON, MARYLAND 21009  
410-515-9446  
FAX: 410-515-4895  
WWW.GTAENG.COM

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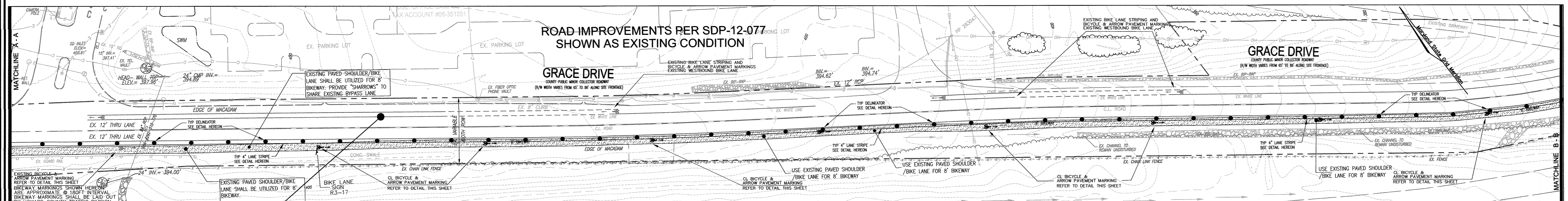
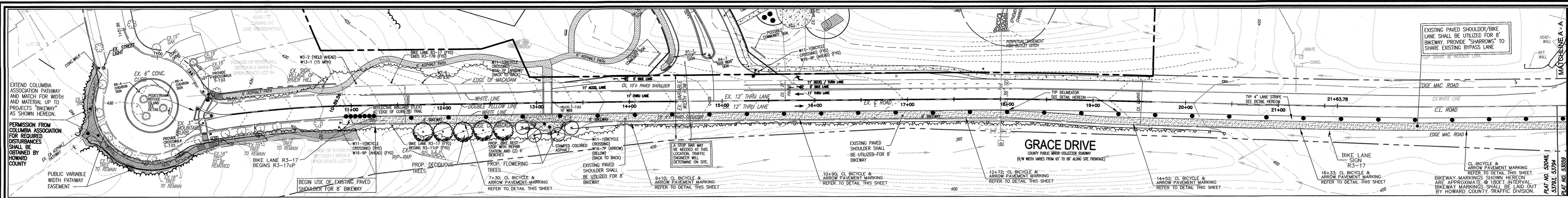


**RETAINING WALL #2 PROFILE VIEW,  
CROSS SECTION VIEWS, AND LOCATION PLAN**

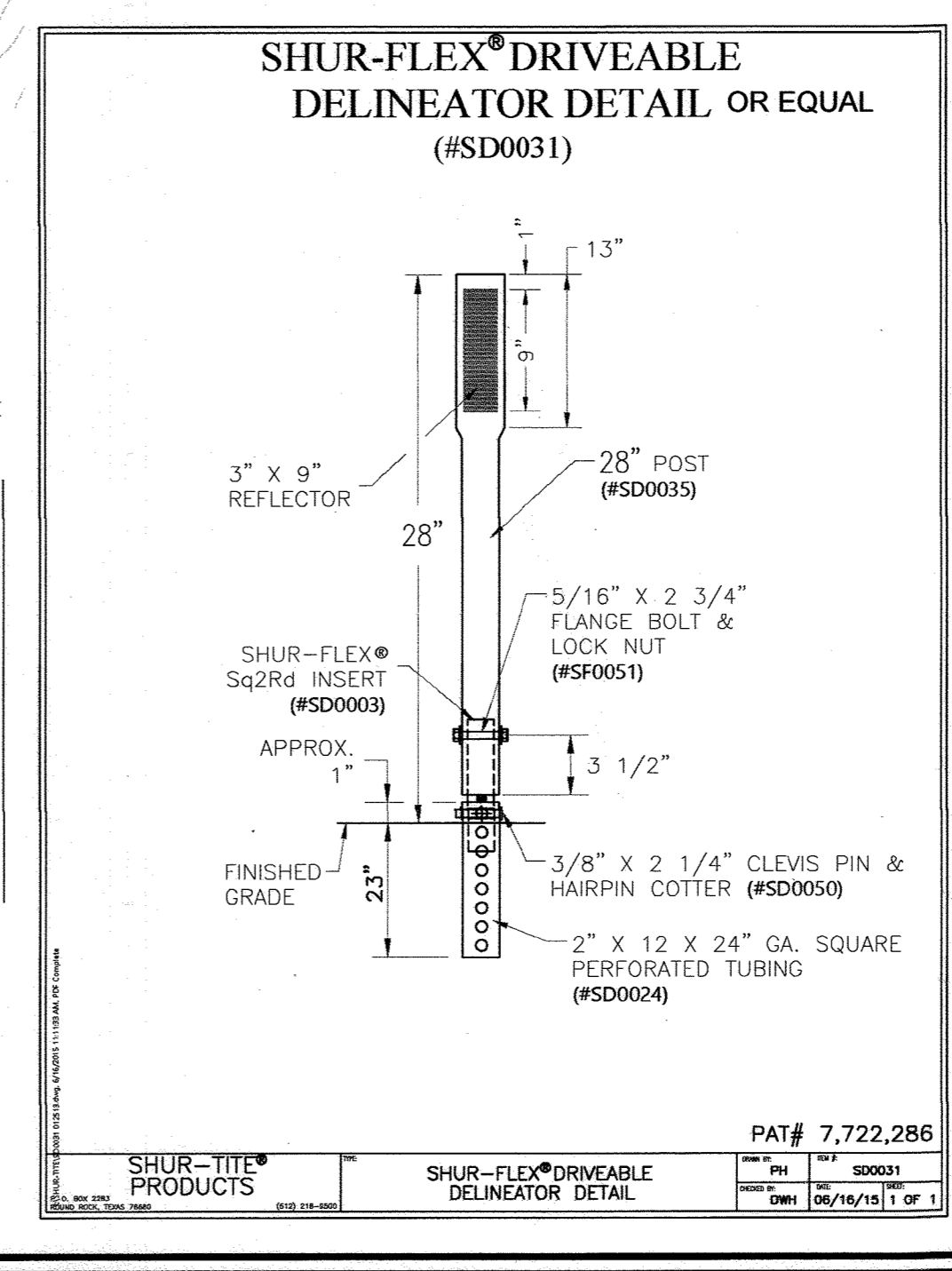
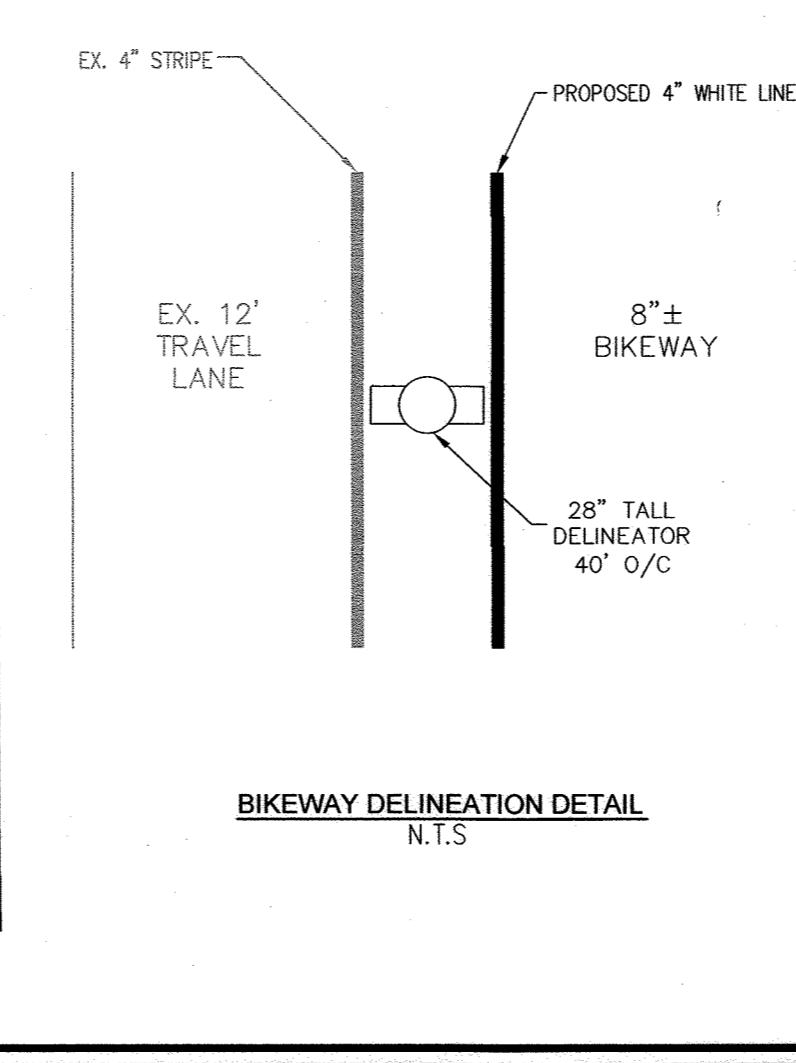
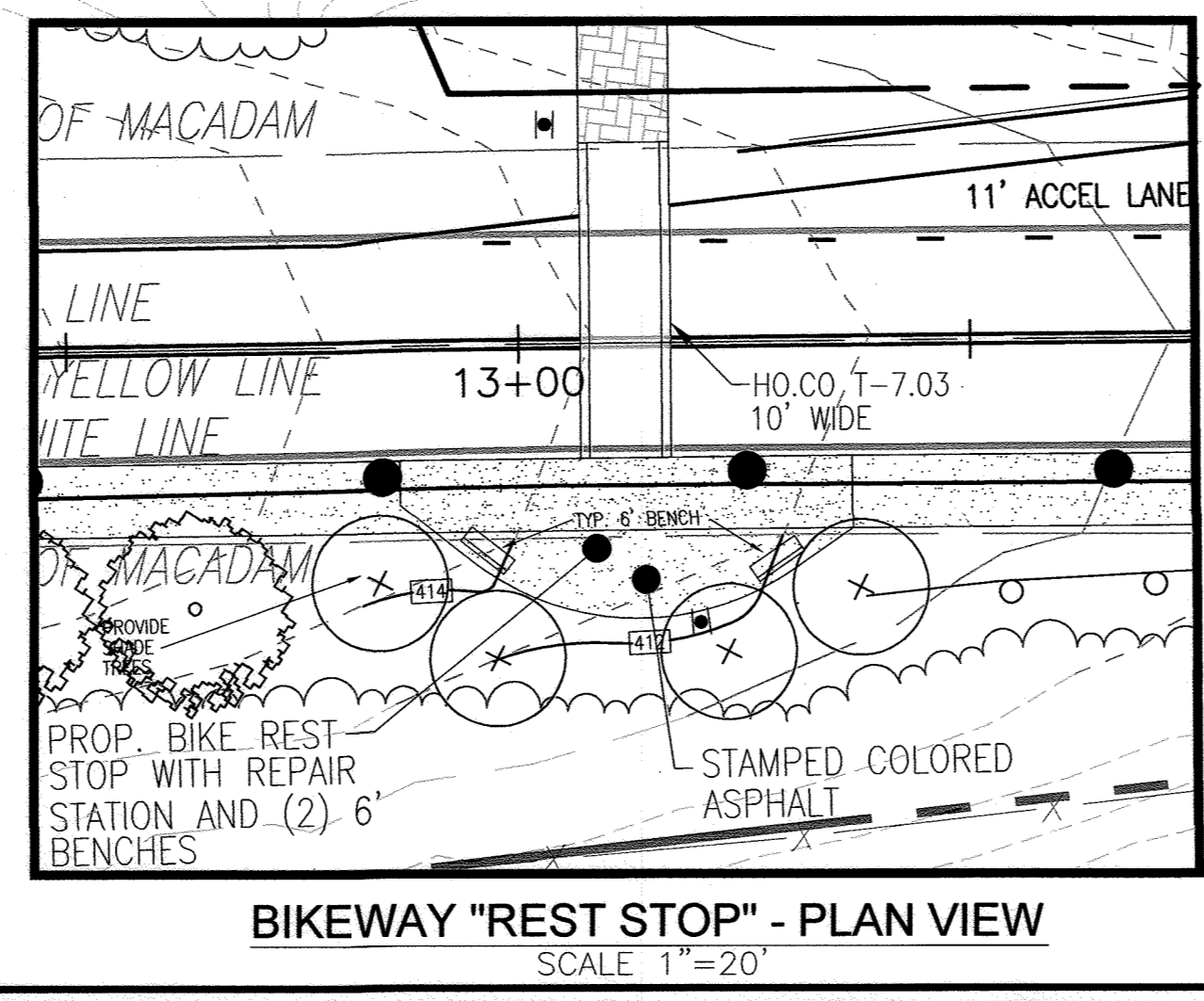
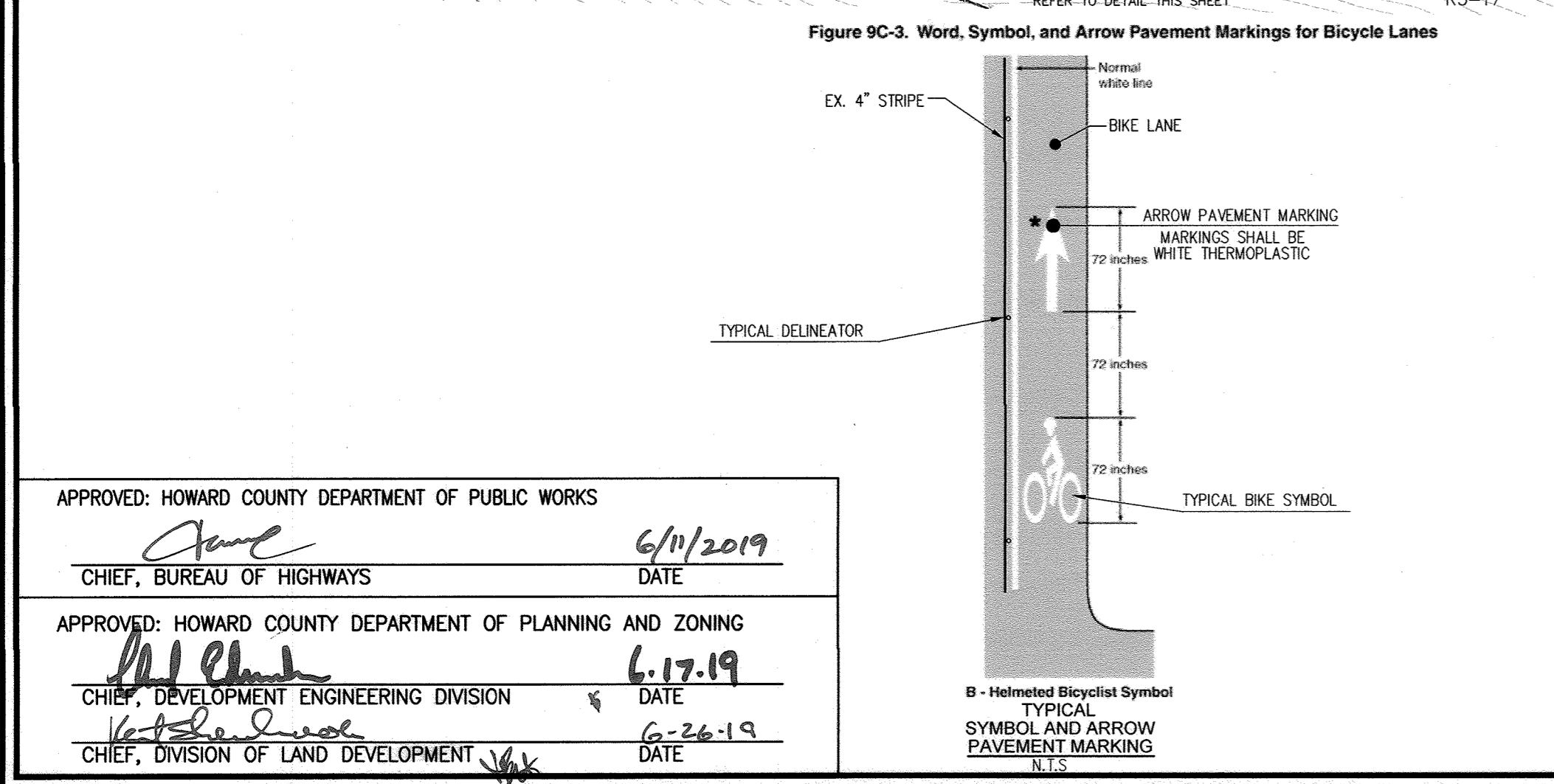
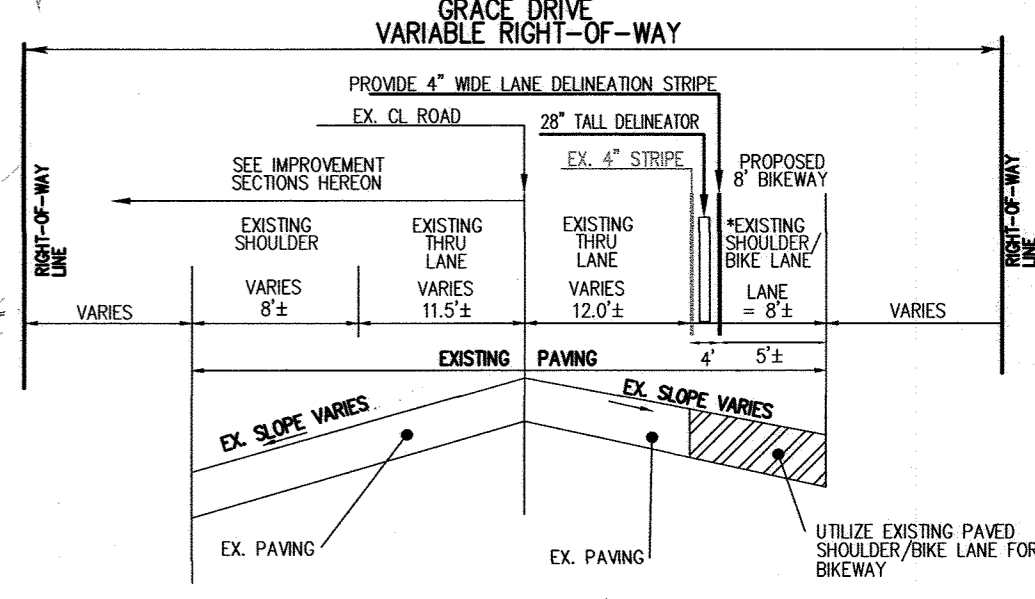
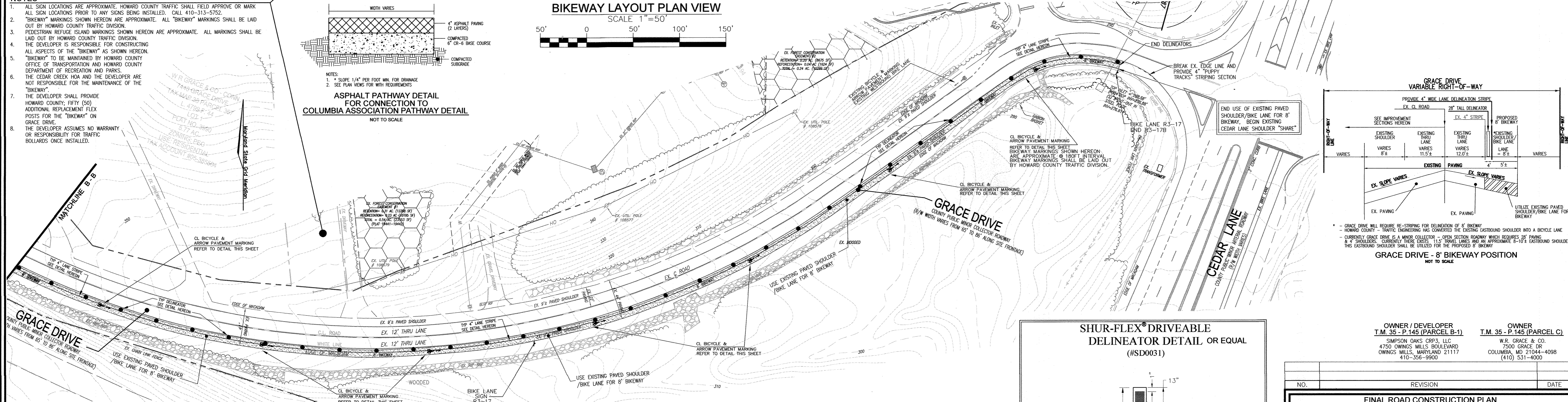
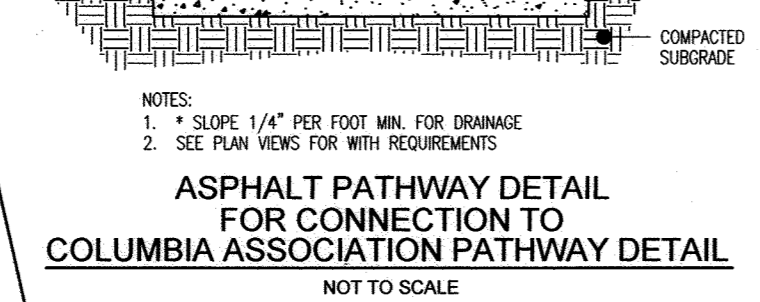
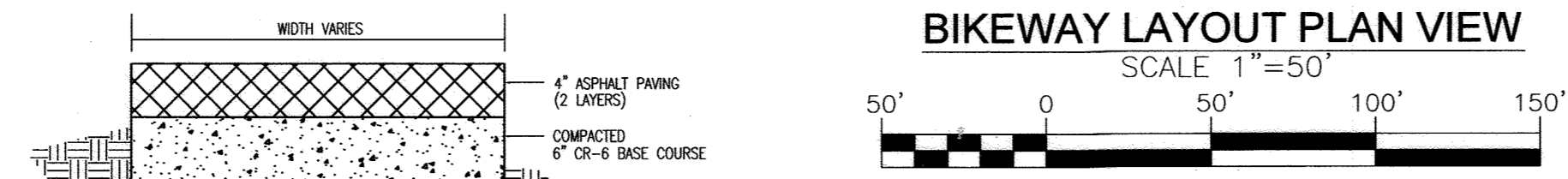
**CEDAR CREEK**

HOWARD COUNTY, MARYLAND

DATE	REVISIONS	JOB NO:
2019-04-12	● REVISED PROJECT NAME	100778X005
		SCALE: AS SHOWN
		DATE: JANUARY 2018
		DRAWN BY: KPR/KDJ
		DESIGN BY: KPR
		REVIEW BY: TMW
		SHEET: 73 OF 74



- NOTES**
1. ALL SIGN LOCATIONS ARE APPROXIMATE. HOWARD COUNTY TRAFFIC SHALL FIELD APPROVE OR MARK ALL SIGN LOCATIONS PRIOR TO ANY SIGNS BEING INSTALLED. CALL 410-313-5752.
  2. "BIKEWAY" MARKINGS SHOWN HEREON ARE APPROXIMATE. ALL "BIKEWAY" MARKINGS SHALL BE LAID OUT BY HOWARD COUNTY TRAFFIC DIVISION.
  3. PEDESTRIAN REFUGE ISLAND MARKINGS SHOWN HEREON ARE APPROXIMATE. ALL MARKINGS SHALL BE LAID OUT BY HOWARD COUNTY TRAFFIC DIVISION.
  4. THE DEVELOPER IS RESPONSIBLE FOR CONSTRUCTING ALL ASPECTS OF THE "BIKEWAY" AS SHOWN HEREON.
  5. "BIKEWAY" TO BE MAINTAINED BY HOWARD COUNTY OFFICE OF TRANSPORTATION AND HOWARD COUNTY DEPARTMENT OF RECREATION AND PARKS.
  6. THE CEDAR CREEK HOA AND THE DEVELOPER ARE NOT RESPONSIBLE FOR THE MAINTENANCE OF THE "BIKEWAY".
  7. THE DEVELOPER SHALL PROVIDE HOWARD COUNTY FIFTY (50) ADDITIONAL REPLACEMENT FLEX POSTS FOR THE "BIKEWAY" ON GRACE DRIVE.
  8. THE DEVELOPER ASSUMES NO WARRANTY OR RESPONSIBILITY FOR TRAFFIC COLLISIONS ONCE INSTALLED.



APPROVED: HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 CHIEF, BUREAU OF HIGHWAYS  
 DATE: 6/11/2019

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION  
 DATE: 6-17-19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 CHIEF, DIVISION OF LAND DEVELOPMENT  
 DATE: 6-26-19

OWNER / DEVELOPER: T.M. 35 - P.145 (PARCEL B-1)  
 SIMPSON OAKS CRPS, LLC  
 4750 OWINGS MILLS BOULEVARD  
 OWINGS MILLS, MARYLAND 21117  
 410-356-9900

OWNER: T.M. 35 - P.145 (PARCEL C)  
 W.R. GRACE & CO.  
 7500 GRACE DR  
 COLUMBIA, MD 21044-4098  
 (410) 531-8000

FINAL ROAD CONSTRUCTION PLAN  
 GRACE DRIVE - BIKEWAY  
**CEDAR CREEK - PHASE 1**  
 LOTS 1-129, OPEN SPACE LOTS 130-141, NON-BUILDABLE BULK PARCELS A-G AND PARCEL C-1  
 A RESUBDIVISION OF GRACE TECH PARK - PARCELS "B-1" & "C"

TAX MAP 35 GRID 21  
 5TH ELECTION DISTRICT  
 DPZ REFERENCE: SEE SITE DATA

ZONED: CEF-R P/O PARCEL 145  
 HOWARD COUNTY, MARYLAND

**ROBERT H. VOGEL ENGINEERING, INC.**  
 ENGINEERS • SURVEYORS • PLANNERS  
 3300 N. RIDGE ROAD, SUITE 110, ELIGOTT CITY, MD 21043  
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: VE+TG  
 DRAWN BY: VE+TG  
 CHECKED BY: RHV  
 DATE: APRIL 2019  
 SCALE: AS SHOWN  
 W.O. NO.: 15-55

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: 09-27-2020

74 SHEET OF 74