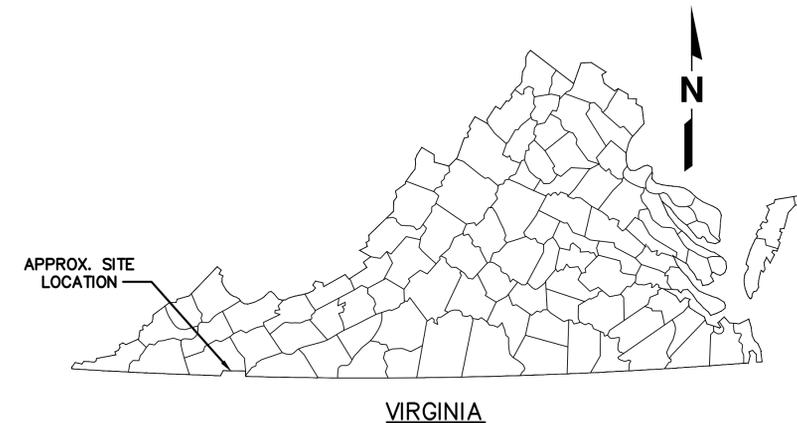


BRISTOL, VIRGINIA INTEGRATED SOLID WASTE MANAGEMENT FACILITY SOLID WASTE PERMIT #498

FINAL COVER SYSTEM CONSTRUCTION PLANS

BRISTOL, VIRGINIA



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PREPARED FOR:

CITY OF BRISTOL, VIRGINIA
300 LEE STREET
BRISTOL, VIRGINIA 24201

INTEGRATED SOLID WASTE MANAGEMENT FACILITY

2655 VALLEY DRIVE
BRISTOL, VIRGINIA 24201

SCS ENGINEERS

STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
15521 MIDLOTHIAN TURNPIKE, SUITE 305
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SCS PROJECT NO. 02218208.17

AUGUST 18, 2023

TOTAL AREA FOR LIMITS OF DISTURBANCE:
19.14 ACRES



| NO. | REVISION | DATE |
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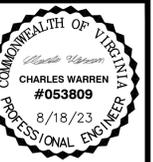
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| SHEET TITLE | COVER SHEET |
| PROJECT TITLE | SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS |

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| CLIENT | CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY 2655 VALLEY DRIVE BRISTOL, VA 24201 |
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| SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 15521 MIDLOTHIAN TURNPIKE - MIDLOTHIAN, VA 23113 PH. (804) 378-7440 FAX. (804) 378-7433 | DATE: 8/18/2023 |
| PROJECT NO. 02218208.05 DRAWN BY: TRW / LLH CHECKED BY: C/JW | SCALE: AS SHOWN |

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| CADD FILE: | 02218208.05 |
| DATE: | 8/18/2023 |
| SCALE: | AS SHOWN |

DRAWING NO. **1** of 26



LEGEND:

| | |
|---------------------|-------------------------------|
| — 1850 — | EXISTING CONTOUR, MAJOR (10') |
| - - - - | EXISTING CONTOUR, MINOR (2') |
| — 1850 — | PROPOSED CONTOUR, MAJOR (10') |
| — — — — | PROPOSED CONTOUR, MINOR (2') |
| - - - - | EXISTING 2" AIR LINE |
| - - - - | EXISTING 4" FORCE MAIN |
| — LFG — | EXISTING LFG HEADER |
| — 4G — | EXISTING 4" LFG HEADER |
| — 6G — | EXISTING 6" LFG HEADER |
| — 8G — | EXISTING 8" LFG HEADER |
| — 12G — | EXISTING 12" LFG HEADER |
| — | BUILDING |
| — L — | EXISTING LEACHATE PIPE |
| — L — | PROPOSED LEACHATE PIPE |
| — L — | LEACHATE CLEANOUT |
| — | STORMWATER PIPE |
| — | EXISTING GRAVEL ROAD |
| — | RIP RAP/ ROCKS/ AGGREGATE |
| — | FLEXAMAT |
| — > — | DIVERSION BERM |
| — SF — | SILT FENCE |
| — SSF — | SUPER SILT FENCE |
| △ GP-## | LANDFILL GAS PROBE |
| — LFG — | LANDFILL GAS PIPE |
| ⊕ P-## | PIEZOMETER |
| ● MW-## | MONITORING WELL |
| — L _{od} — | LIMITS OF DISTURBANCE |
| — S — | SOIL TYPE BOUNDARY |
| — — — — | DRAINAGE AREA |
| — — — — | STREAM OR WATERLINE |
| — — — — | CENTERLINE |
| — — — — | SURVEY BOUNDARY LINE |
| ⊙ TS | TEMPORARY SEEDING |
| ⊙ PS | PERMANENT SEEDING |
| ⊙ CIP | CULVERT INLET PROTECTION |
| ⊙ OP | OUTLET PROTECTION |
| ⊙ SF | SILT FENCE |
| ⊙ SSF | SUPER SILT FENCE |
| ⊙ CE | CONSTRUCTION ENTRANCE |
| ⊙ MU | MULCHING |
| ⊙ B/M | BLANKETS AND MATTING |
| ➔ | RUNOFF FLOW DIRECTION |

LEGEND:

| | |
|---------|---------------------------------------|
| TP-3 | EXISTING TEMPERATURE PROBE |
| ⊕ | EXISTING WELLHEAD |
| ✱ | EXISTING AIR RELEASE VALVE |
| ⊕ | EXISTING ISOLATION VALVE |
| ○ | EXISTING LEACHATE CLEANOUT |
| ○ | EXISTING U-TRAP |
| □ | EXISTING CONDENSATE PUMP STATION |
| ⊕ | EXISTING HORIZONTAL COLLECTOR SUMP |
| ⊕ | EXISTING LFG LIQUIDS CONTAINMENT TANK |
| GP-5 | EXISTING GAS PROBE |
| MW-110 | EXISTING GROUNDWATER MONITORING WELL |
| ⊕ | EXISTING MANHOLE |
| HC-## | PROPOSED LFG WELLHEAD |
| EW-## | PROPOSED AIR RELEASE VALVE |
| DP-## | PROPOSED DRAINAGE PIT |
| ⊕ | PROPOSED LFG ISOLATION VALVE |
| ✱ | PROPOSED AIR ISOLATION VALVE |
| ⊕ | PROPOSED FORCE MAIN ISOLATION VALVE |
| ⊕ | PROPOSED CONDENSATE SUMP |
| ★ | EXISTING BENCHMARK |
| — — — — | PROPERTY LINE |
| — — — — | FACILITY BOUNDARY |
| — — — — | WASTE MANAGEMENT UNIT BOUNDARY |
| — — — — | APPROXIMATE LOCATION OF SIDEWALL |
| — — — — | EXISTING ROAD OUTLINE |
| — — — — | EXISTING LFG HORIZONTAL COLLECTOR |
| — — — — | PROPOSED LFG HORIZONTAL COLLECTOR |
| — LFG — | EXISTING LFG COLLECTION PIPING |
| — LFG — | PROPOSED LFG COLLECTION PIPING |
| — 4G — | PROPOSED 4" LFG COLLECTION PIPING |
| — 8G — | PROPOSED 8" LFG COLLECTION PIPING |
| — 12G — | PROPOSED 12" LFG COLLECTION PIPING |
| — — — — | PROPOSED 2" AIR LINE |
| — — — — | PROPOSED 4" FORCE MAIN |

GENERAL NOTES:

- OWNER/DEVELOPER: CITY OF BRISTOL, VIRGINIA
- CONSULTING ENGINEER: SCS ENGINEERS, 15521 MIDLOTHIAN TURNPIKE #305, MIDLOTHIAN, VA 23113
- LOCATION OF EXISTING SEWER, WATER, OR GAS LINES, CONDUITS, OR OTHER STRUCTURES ACROSS, UNDERNEATH, OR OTHERWISE ALONG THE LINE OF PROPOSED WORK ARE NOT NECESSARILY SHOWN ON THE PLANS, AND IF SHOWN ARE ONLY APPROXIMATELY CORRECT. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF UNDERGROUND UTILITIES SHOWN ON THE PLANS IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK. CONTACT ENGINEER IMMEDIATELY IF LOCATION OF ELEVATION IS DIFFERENT FROM THAT SHOWN ON THE PLANS, IF THERE APPEARS TO BE A CONFLICT, OR UPON DISCOVERY OF A UTILITY NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL OBTAIN FIELD UTILITY LOCATIONS BY CALLING "MISS UTILITY" FORTY EIGHT (48) HOURS PRIOR TO WORKING IN THE VICINITY OF EXISTING UTILITIES.
- BOUNDARY INFORMATION TAKEN FROM OTHERS.
- HORIZONTAL DATA IS BASED ON US STATE PLANE NAD 1983 VIRGINIA SOUTH ZONE. VERTICAL DATA BASED ON NAVD 88.
- EXISTING LFG HEADER WAS PARTIALLY OBTAINED FROM SCS CONSTRUCTION DRAWINGS, LAST UPDATED JULY 6, 2022. EXISTING LFG HEADER LOCATIONS WITHIN THE SWP #498 AREA ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.
- THE LOCATIONS OF THE EXISTING GAS PROBES AND EXISTING MANHOLES SHOWN ARE APPROXIMATE BASED ON DATA PROVIDED BY OTHERS. THE EXACT LOCATIONS OF THESE EXISTING WELLFIELD COMPONENTS MAY NEED IN-FIELD VERIFICATION.
- THE LOCATIONS OF WELLS EW-16, EW-17, EW-19, EW-20, AND EW-21 WERE MEASURED USING MAPPING GRADE POSITIONING EQUIPMENT UTILIZING GEOGRAPHIC INFORMATION SYSTEM SOFTWARE.
- HYDRAULICALLY ADEQUATE ALTERNATIVE MATERIALS FOR THE STORMWATER PIPES, CULVERTS, SEWERS, JUNCTIONS, AND DOWNCHUTES MAY BE SUBSTITUTED AT OWNER'S DISCRETION.
- THESE DRAWINGS ARE INTENDED TO BE PLOTTED IN COLOR.
- THE SWP#498 WASTE MANAGEMENT UNIT BOUNDARY IS AN APPROXIMATION BASED UPON DRAWINGS PREPARED BY OTHERS.

LANDFILL GAS PROJECT DESCRIPTION:

THIS PROJECT INCLUDES A COMPREHENSIVE EXPANSION OF THE EXISTING LANDFILL GAS (LFG) COLLECTION AND CONTROL SYSTEM AT THE BRISTOL #498 LANDFILL LOCATED IN BRISTOL, VA.

LANDFILL GAS GENERAL NOTES:

- THE WORK TO BE PERFORMED INVOLVES, BUT IS NOT LIMITED TO, THE CONSTRUCTION AND INSTALLATION OF THE LANDFILL GAS COLLECTION SYSTEM DEPICTED ON THESE CONSTRUCTION DRAWINGS. WORK SHALL INCLUDE THE INSTALLATION OF LANDFILL GAS EXTRACTION WELLS, WELLHEADS, HEADER AND LATERAL PIPING, VALVES, AND ANY OTHER ITEMS NEEDED TO MAKE THE PROPOSED LFG SYSTEM CONNECT TO THE EXISTING LFG SYSTEM AND OPERATE PROPERLY.
- CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, TESTING, TOOLS, EQUIPMENT, SUPERVISION AND INSTALLATION SERVICES REQUIRED TO CONSTRUCT THE LFG COLLECTION SYSTEM DEPICTED ON THESE CONSTRUCTION DRAWINGS.
- CONTRACTOR SHALL RECOGNIZE THAT MULTIPLE PROJECTS ARE UNDERWAY AT THE SOLID WASTE MANAGEMENT FACILITY AND SHALL COORDINATE HIS ACTIVITIES WITH OWNER AND OTHER CONTRACTORS SO AS TO NOT HINDER OR OBSTRUCT WORKING ACTIVITIES ASSOCIATED WITH LANDFILL PROJECTS.
- CONTRACTOR SHALL MINIMIZE LAND DISTURBANCE RELATED TO CONSTRUCTION ACTIVITIES TO THE GREATEST EXTENT POSSIBLE. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS INSIDE AND OUTSIDE THE LANDFILL FOOTPRINT TO ITS ORIGINAL CONDITION OR SPECIFIED FINAL CONDITION.
- CONTRACTOR SHALL PROPERLY STORE ALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS IN AREAS DESIGNATED BY OWNER.
- ALL LANDFILL WASTE EXCAVATED DURING CONSTRUCTION SHALL EITHER BE REPOSITIONED WITHIN THE EXISTING SWP#498 LANDFILL WASTE MASS OR HAULED BY THE CONTRACTOR TO AN ACTIVE SOLID WASTE DISPOSAL FACILITY. REPOSITIONED WASTE SHALL REMAIN WITHIN THE WASTE MANAGEMENT UNIT BOUNDARY, UNDERNEATH THE FINAL CLOSURE SYSTEM INTERMEDIATE/DAILY COVER BEDDING LAYER. ALL EXCAVATED TRENCHES AND WASTE MUST BE COVERED AT THE END OF EACH WORKING DAY. NO EXPOSED REFUSE WILL REMAIN OVERNIGHT.
- THE CONTRACTOR SHALL PREPARE A WRITTEN SITE-SPECIFIC HEALTH AND SAFETY PLAN THAT ADDRESSES THE POTENTIAL HAZARDS ASSOCIATED WITH LANDFILL GAS CONSTRUCTION ACTIVITIES AT SOLID WASTE MANAGEMENT FACILITIES AND IMPLEMENT THE PROCEDURES AND PROTOCOLS NECESSARY TO MAINTAIN A SAFE WORK ENVIRONMENT.
- THE CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS DOWNSTREAM OF THE DISTURBED AREAS AS REQUIRED BY THE FACILITY'S EROSION AND SEDIMENT CONTROL PLAN, AND APPLICABLE STATE REGULATIONS.
- IF FIELD CONDITIONS DIFFER FROM NOTES AND DETAILS SHOWN ON THESE DRAWINGS, CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER AND OWNER FOR CLARIFICATION.

LANDFILL GAS PIPE REQUIREMENTS:

- ALL LFG SYSTEM HEADER AND LATERAL PIPING SHALL BE HIGH DENSITY POLYETHYLENE (HDPE), SDR-17, PE 4710, UNLESS OTHERWISE NOTED.
- ALL PNEUMATIC SUPPLY PIPING SHALL BE HDPE SDR-9, PE4710.
- ALL LIQUID FORCEMAIN PIPING SHALL BE HDPE SDR-11, PE4710.
- FLANGES FOR THE HDPE SHALL BE CONVOLUTED DUCTILE IRON BACK-UP RINGS FINISHED WITH AN IRON OXIDE PRIMER. FLANGE NUTS AND BOLTS SHALL BE GALVANIZED STEEL AND COATED WITH ANTI-SIEZE COMPOUND. BURIED FLANGES SHALL BE WRAPPED IN 5-MIL POLYETHYLENE SHEETING PRIOR TO BACKFILLING TO HELP PREVENT CORROSION.
- PIPE INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ASTM D-2321, PPI TR-31/9-79, AND THE MANUFACTURER'S RECOMMENDATIONS.
- ALL HEADER AND LATERAL PIPING SHALL BE SUBJECTED TO AN AIR TEST TO DETECT ANY LEAKS. TESTING SHALL BE CONDUCTED WITH THE PIPE IN THE TRENCHES. CONTRACTOR SHALL TEST THE PIPE AT 5 PSIG FOR A PERIOD OF NOT LESS THAN 1 HOUR. PRESSURE DROP DURING THE TEST SHALL NOT EXCEED ONE-PERCENT OF THE TESTING PRESSURE.
- ALL PNEUMATIC SUPPLY AND LIQUID FORCEMAIN PIPING SHALL BE SUBJECTED TO AN AIR TEST TO DETECT ANY LEAKS. TESTING SHALL BE CONDUCTED WITH THE PIPE IN THE TRENCHES. CONTRACTOR SHALL TEST THE PIPE AT 10 PSIG FOR A PERIOD OF NOT LESS THAN 1 HOUR. PRESSURE DROP DURING THE TEST SHALL NOT EXCEED TEN-PERCENT OF THE TESTING PRESSURE.
- MAINTAIN A MINIMUM 2% SLOPE FOR LANDFILL GAS HEADER INSTALLED OUTSIDE LINER LIMITS AND 4% MINIMUM SLOPE FOR LANDFILL GAS HEADER WITHIN THE LINER LIMITS. WHERE LFG DESIGN PROFILES SHOW LESS THAN THE MIN. SLOPES, CONTRACTOR WILL SURVEY INSTALLED HEADER AT MAX. 10' INTERVALS TO VERIFY INSTALLED SLOPE.
- LFG SYSTEM HEADER, PNEUMATIC SUPPLY, AND LIQUID FORCE MAIN ISOLATION VALVES ARE CLUSTERED TOGETHER AT ALL PERTINENT INTERSECTIONS, UNLESS OTHERWISE SHOWN ON THE DRAWING.
- LFG SYSTEM HEADER ISOLATION VALVES SHALL BE BUTTERFLY ISOLATION VALVES WITH VITON SEAL AND STEM EXTENSION WITH GEAR BOX NO LESS THAN 3 FEET ABOVE FINAL GRADE. EITHER SIDE OF THE VALVE SHALL HAVE A STAINLESS STEEL BRAIDED SAMPLING PORT INSTALLED ON THE LFG HEADER.
- THE PNEUMATIC SUPPLY AND LIQUID FORCE MAIN ISOLATION VALVES SHALL BE HDPE TIMESAVER VALVES OR EQUIVALENT ABOVE GRADE OPERATING VALVES. THE AIR AND FORCE MAIN VALVES SHALL BE EQUIPPED WITH AIR BLEED OFF VALVES.

EXTRACTION WELLS:

- THE PROPOSED VERTICAL CAISSON LANDFILL GAS WELLS HEREIN ARE SHALLOW AND WILL BE EXCAVATED. EXCAVATION OF THE VERTICAL CAISSON LANDFILL GAS WELLS WILL PROCEED WITH CAUTION. RECORDS ARE NOT AVAILABLE FOR THE LOCATION OF THE EXISTING BOTTOM LINER SYSTEM, AND CARE MUST BE TAKEN TO AVOID DAMAGING THE EXISTING LINER DURING EXCAVATION OPERATIONS. IF THE EXISTING LINER IS ENCOUNTERED DURING EXCAVATION, THE DESIGN AND CQA ENGINEER WILL BE NOTIFIED IMMEDIATELY. CONTRACTOR SHALL OBTAIN AUTHORIZATION FROM OWNER, DESIGN ENGINEER, AND CQA ENGINEER PRIOR TO PROCEEDING WITH EXCAVATION IN THE VICINITY OF THE EXPOSED LINER.
- CONTRACTOR SHALL SURVEY AND STAKE THE PROPOSED VERTICAL CAISSON WELLS LOCATIONS AND SOIL EXTRACTION WELL PRIOR TO EXCAVATING. THE SOIL EXTRACTION WELL SCHEDULE WILL BE REVISED AND FINALIZED BASED ON THE SURVEY FOR SIGNATURE BY THE DRILLER, CONTRACTOR, OWNER, DESIGN ENGINEER, AND CQA ENGINEER PRIOR TO THE COMMENCEMENT OF DRILLING. WELL LOCATIONS MAY BE ADJUSTED BY THE ENGINEER OR OWNER PRIOR TO DRILLING.
- CONTRACTOR SHALL PROVIDE WELL LOCATION ELEVATIONS TO ENGINEER PRIOR TO DRILLING. THE BORING DEPTHS MAY BE ADJUSTED BY THE ENGINEER OR OWNER.
- LANDFILL OWNER RESERVES THE RIGHT TO ADD OR DELETE ANY PROPOSED WELLS.
- CONTRACTOR SHALL KEEP DETAILED WELL LOGS FOR ALL WELLS DRILLED, INCLUDING THE TOTAL DEPTH OF WELL, THE STATIC WATER LEVEL (IF ANY), AND THE DEPTH, THICKNESS, AND DESCRIPTION OF SOIL OR WASTE STRATA. THE WELL LOGS SHALL INCLUDE DIMENSIONS THAT INDICATE TOTAL WELL DEPTH, LENGTH OF SLOTTED PIPE, LENGTH OF SOLID PIPE, THICKNESS OF BENTONITE PLUG, AND THICKNESS OF SOIL.
- FOLLOWING REVIEW OF ADJUSTED WELL SCHEDULE, CONTRACTOR SHALL OBTAIN AUTHORIZATION FROM OWNER AND CQA CONSULTANT PRIOR TO DRILLING.

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| SHEET TITLE | GENERAL NOTES AND LEGEND |
| PROJECT TITLE | SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS |

| | |
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| CLIENT | CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY |
| | 2655 VALLEY DRIVE |
| | BRISTOL, VA 24201 |

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|--|----------|---------|
| SCS ENGINEERS | OWN: BT | D/A: RW |
| STEARNES, CONRAD AND SCHMIDT | DRW: TRW | CJM/DBK |
| CONSULTING ENGINEERS, INC. | CHK: TRW | CJM/DBK |
| 15521 MIDLOTHIAN TURNPIKE #305 | APP: BT | CJM |
| BRISTOL, VIRGINIA 23113 | | |
| PH: (804) 376-7440 FAX: (804) 376-7435 | | |
| PROJ. NO. 02218208.05 | | |
| DATE: 8/18/2023 | | |

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VIRGINIA MINIMUM STANDARDS FOR EROSION AND SEDIMENT CONTROL:
PER 9VAC25-840-40:

A VESCP MUST BE CONSISTENT WITH THE FOLLOWING CRITERIA, TECHNIQUES AND METHODS:

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

2. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

3. A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.

4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

5. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

6. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.

A. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.

B. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST WHILE THE SEDIMENT BASIN IS UTILIZED.

7. CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

8. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.

9. WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.

10. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.

11. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.

12. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.

13. WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL SHALL BE PROVIDED.

14. ALL APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

15. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

16. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:

A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.

B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.

C. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.

D. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION.

E. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THIS CHAPTER.

F. APPLICABLE SAFETY REQUIREMENTS SHALL BE COMPLIED WITH.

17. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.

18. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE VESCP AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

19. PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE

PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS:

A. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEM. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR PIPE SYSTEM, DOWNSTREAM STABILITY ANALYSES AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED.

B. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING MANNER:

(1) THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS 100 TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION; OR

(2) (A) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF A TWO-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS;

(B) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STORMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND

(C) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE OR SYSTEM.

C. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL:

(1) IMPROVE THE CHANNELS TO A CONDITION WHERE A 10-YEAR STORM WILL NOT OVERTOP THE BANKS AND A TWO-YEAR STORM WILL NOT CAUSE EROSION TO THE CHANNEL, THE BED, OR THE BANKS;

(2) IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE 10-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES;

(3) DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A 10-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL; OR

(4) PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMWATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE VESCP AUTHORITY TO PREVENT DOWNSTREAM EROSION.

D. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.

E. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT CONDITION OF THE SUBJECT PROJECT.

F. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION, HE SHALL OBTAIN APPROVAL FROM THE VESCP OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE.

G. OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATORS SHALL BE PLACED AT THE OUTFALL OF ALL DETENTION FACILITIES AS NECESSARY TO PROVIDE A STABILIZED TRANSITION FROM THE FACILITY TO THE RECEIVING CHANNEL.

H. ALL ON-SITE CHANNELS MUST BE VERIFIED TO BE ADEQUATE.

I. INCREASED VOLUMES OF SHEET FLOWS THAT MAY CAUSE EROSION OR SEDIMENTATION ON ADJACENT PROPERTY SHALL BE DIVERTED TO A STABLE OUTLET, ADEQUATE CHANNEL, PIPE OR PIPE SYSTEM, OR TO A DETENTION FACILITY.

J. IN APPLYING THESE STORMWATER MANAGEMENT CRITERIA, INDIVIDUAL LOTS OR PARCELS IN A RESIDENTIAL, COMMERCIAL OR INDUSTRIAL DEVELOPMENT SHALL NOT BE CONSIDERED TO BE SEPARATE DEVELOPMENT PROJECTS. INSTEAD, THE DEVELOPMENT, AS A WHOLE, SHALL BE CONSIDERED TO BE A SINGLE DEVELOPMENT PROJECT. HYDROLOGIC PARAMETERS THAT REFLECT THE ULTIMATE DEVELOPMENT CONDITION SHALL BE USED IN ALL ENGINEERING CALCULATIONS.

K. ALL MEASURES USED TO PROTECT PROPERTIES AND WATERWAYS SHALL BE EMPLOYED IN A MANNER WHICH MINIMIZES IMPACTS ON THE PHYSICAL, CHEMICAL AND BIOLOGICAL INTEGRITY OF RIVERS, STREAMS AND OTHER WATERS OF THE STATE.

L. ANY PLAN APPROVED PRIOR TO JULY 1, 2014, THAT PROVIDES FOR STORMWATER MANAGEMENT THAT ADDRESSES ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS SHALL SATISFY THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS IF THE PRACTICES ARE DESIGNED TO (I) DETAIN THE WATER QUALITY VOLUME AND TO RELEASE IT OVER 48 HOURS; (II) DETAIN AND RELEASE OVER A 24-HOUR PERIOD THE EXPECTED RAINFALL RESULTING FROM THE ONE YEAR, 24-HOUR STORM; AND (III) REDUCE THE ALLOWABLE PEAK FLOW RATE RESULTING FROM THE 1.5, 2, AND 10-YEAR, 24-HOUR STORMS TO A LEVEL THAT IS LESS THAN OR EQUAL TO THE PEAK FLOW RATE FROM THE SITE ASSUMING IT WAS IN A GOOD FORESTED CONDITION, ACHIEVED THROUGH MULTIPLICATION OF THE FORESTED PEAK FLOW RATE BY A REDUCTION FACTOR THAT IS EQUAL TO THE RUNOFF VOLUME FROM THE SITE WHEN IT WAS IN A GOOD FORESTED CONDITION DIVIDED BY THE RUNOFF VOLUME FROM THE SITE IN ITS PROPOSED CONDITION, AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS AS DEFINED IN ANY REGULATIONS PROMULGATED PURSUANT TO § 62.1-44.15:54 OR 62.1-44.15:65 OF THE ACT.

M. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 62.1-44.15:52 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (§ 62.1-44.15:24 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES (I) ARE IN ACCORDANCE WITH PROVISIONS FOR TIME LIMITS ON APPLICABILITY OF APPROVED DESIGN CRITERIA IN 9VAC25-870-47 OR GRANDFATHERING IN 9VAC25-870-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSWP) REGULATION, IN WHICH CASE THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 62.1-44.15:52 A OF THE ACT SHALL APPLY, OR (II) ARE EXEMPT PURSUANT TO § 62.1-44.15:34 C 7 OF THE ACT.

N. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 9VAC25-870-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSWP) REGULATION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF THIS SUBDIVISION 19.

EROSION CONTROL NARRATIVE:

PROJECT DESCRIPTION:

THE EXISTING LANDFILL (SOLID WASTE PERMIT NO. 498) IS LOCATED WITHIN THE CITY OF BRISTOL, VIRGINIA, ON SHAKESVILLE ROAD. THE SITE ADDRESS IS 2655 VALLEY DRIVE, BRISTOL, VIRGINIA 24201.

THE PROJECT CONSISTS OF THE CONSTRUCTION OF A FINAL COVER SYSTEM FOR THE SWP#498 LANDFILL. THE FINAL COVER SYSTEM IS DESIGNED IN ACCORDANCE WITH THE PERMIT DOCUMENTS. THE PROJECT INCLUDES THE CONSTRUCTION OF NEW ACCESS ROAD, NEW STORMWATER MANAGEMENT FEATURES INCLUDING DIVERSION INCLUDING BERMS, STORM SEWER PIPES AND DROP INLETS, SLOPE DRAINS, CONVEYANCE CHANNELS, A STORMWATER BASIN AND OUTLET STRUCTURE, AND CULVERTS. THE INTENT OF THE STORMWATER MANAGEMENT DESIGN IS TO DIRECT RUNOFF FROM THE PROPOSED PROJECT TO THE EXPANDED STORMWATER BASIN, LOCATED TO THE NORTHEAST OF THE LANDFILL. PROJECT INCLUDES NEW TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES. FOLLOWING COMPLETION OF THE FINAL COVER SYSTEM CONSTRUCTION, THE POST-CLOSURE CARE PERIOD WILL COMMENCE IN ACCORDANCE WITH THE FACILITY'S SOLID WASTE PERMIT (#498).

AREAS DISTURBED BY THE PROJECT WILL BE PERMANENTLY STABILIZED WITH EITHER PERMANENT VEGETATION, TEMPORARY VEGETATION, OR GRAVEL AT THE COMPLETION OF THE PROJECT. THE PROPOSED PROJECT DISTURBANCE IS 19.14 ACRES.

SOILS

LIST BY MAP UNIT SYMBOL, SOIL NAME/SLOPE, AND HYDROLOGIC SOIL GROUP:

70 UDORTHTENTS, REFUSE, NO GROUP

EXISTING CONDITIONS

THE EXISTING PROJECT SITE CONSISTS OF THE AREA WITHIN THE PROPOSED FINAL COVER SYSTEM FOOTPRINT AND ITS SURROUNDINGS, INCLUDING THE EXISTING STORMWATER BASIN, CONVEYANCE CHANNELS, AND OTHER AREAS NECESSARY FOR STORMWATER MANAGEMENT. ADDITIONAL AREA INCLUDES THE FOOTPRINT OF THE NEW LANDFILL GAS MONITORING PROBES. SOIL COVER WAS PLACED OVER THE SWP#498 LANDFILL DURING THE LAST SIX MONTHS AND THE SITE THEREFORE CONTAINS RECENTLY DISTURBED SOIL AREAS.

THE SWP#498 LANDFILL AREA TOPOGRAPHY GENERALLY SLOPES DOWNWARDS FROM WEST TO EAST, AND TO THE NORTH, AT AN APPROXIMATE MAXIMUM SLOPE OF 40% AND A MINIMUM SLOPE OF 1%.

STORMWATER MANAGEMENT WAS DESIGNED AS INCLUDED IN THE PERMIT DOCUMENTS. THE LANDFILL DISCHARGES STORMWATER TO THE EXISTING SLOPE DRAIN LOCATED AT THE LOW POINT ALONG THE EAST FACE.

ADJACENT AREAS

THE PROPOSED PROJECT SHALL NOT DISTURB ANY OFF-SITE AREAS. OFFSITE SOIL WILL BE REQUIRED FOR THIS PROJECT.

CRITICAL EROSION AREAS

CRITICAL EROSION AREAS MAY BE ENCOUNTERED DURING GRADING OPERATIONS AS FOLLOWS:

- OUTLETS OF DRAINAGE SWALES OR CONVEYANCES

INSTALLATION AND MAINTENANCE OF THE PROPOSED EROSION AND SEDIMENT CONTROLS WILL MINIMIZE THE POTENTIAL FOR STORMWATER RUNOFF TO CREATE EROSION OF THE DISTURBED SOIL AREAS

STOCKPILING

ALL ON-SITE STOCKPILING SHALL INCLUDE TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL MEASURES INCLUDING BUT NOT LIMITED TO SILT FENCE AND VEGETATIVE STABILIZATION.

POSITIVE DRAINAGE SHALL BE MAINTAINED. SLOPES SHALL NOT EXCEED 3H:1V STEEPNESS. IF SEDIMENT-LADEN RUNOFF BECOMES CONCENTRATED AND OVERWHELMS THE SILT FENCE, ADDITIONAL CONTROLS WILL BE REQUIRED.

EROSION AND SEDIMENT CONTROL MEASURES

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

LIST OF STRUCTURAL PRACTICES AND VESCH STD. & SPEC. NUMBER

| | |
|-------------------------------------|-------|
| CONSTRUCTION ENTRANCE (CE) | #3.02 |
| SUPER SILT FENCE (SSF) | #3.05 |
| CULVERT INLET PROTECTION (CIP) | #3.08 |
| STORMWATER CONVEYANCE CHANNEL (SCC) | #3.17 |
| OUTLET PROTECTION (OP) | #3.18 |

VEGETATIVE PRACTICES

| | |
|------------------------|-------|
| TEMPORARY SEEDING (TS) | #3.31 |
| PERMANENT SEEDING (PS) | #3.32 |
| MULCHING (MU) | #3.35 |

EROSION CONTROL SEQUENCE OF CONSTRUCTION

PHASE 1

1. CONTACT THE ENVIRONMENTAL INSPECTOR TO SCHEDULE A PRE-CONSTRUCTION MEETING. A PRE-CONSTRUCTION MEETING WITH THE ENVIRONMENTAL INSPECTOR MUST OCCUR PRIOR TO ANY LAND DISTURBANCE ON THE SITE. IF CONSTRUCTION DOES NOT COMMENCE FOR 180 DAYS FOLLOWING THE PRE-CONSTRUCTION MEETING OR IF THE PROJECT IS DORMANT FOR 180 DAYS DURING THE CONSTRUCTION PHASE, A NEW PRE-CONSTRUCTION MEETING IS REQUIRED BEFORE CONSTRUCTION CAN RE-START.

2. FOLLOWING THE PRE-CONSTRUCTION MEETING, INSTALL ALL EROSION CONTROL DEVICES LOCATED WITHIN THE LIMITS OF DISTURBANCE (SILT FENCE, CONSTRUCTION ENTRANCES).

3. AFTER THE ENVIRONMENTAL INSPECTOR HAS APPROVED THE PHASE 1 EROSION CONTROL DEVICE INSTALLATION, PERFORM CLEARING & GRUBBING AND COMPLETE WORK AS INDICATED.

PHASE II

1. CONDUCT PROPOSED GRADING PER THE DESIGN.

2. INSTALL DIVERSION BERMS AND STORMWATER CONVEYANCES AND STABILIZE DISTURBED AREAS IMMEDIATELY AFTER INSTALLATION.

3. INSTALL INLET PROTECTION AT NEWLY CONSTRUCTED INLETS AS THEY ARE INSTALLED.

4. DURING CONSTRUCTION INSPECT AND MAINTAIN AS NECESSARY ALL EROSION CONTROL DEVICES IN ORDER TO MAINTAIN PROPER FUNCTION IN ACCORDANCE

WITH THE VESCH.

5. STABILIZE SITE DURING AND AT THE CONCLUSION OF CONSTRUCTION PER VESCH STANDARDS.

6. NO EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED WITHOUT APPROVAL OF THE ENVIRONMENTAL INSPECTOR FOR THE PROJECT.

ESC MANAGEMENT STRATEGIES:

1. THE CONTRACTOR WILL DESIGNATE AN EMPLOYEE CERTIFIED AS THE "RESPONSIBLE LAND DISTURBER" (RLD), BY THE COMMONWEALTH OF VIRGINIA, DEPARTMENT OF ENVIRONMENTAL QUALITY (VDEQ), WHO IS IN CHARGE OF AND IS RESPONSIBLE FOR CARRYING OUT THE LAND-DISTURBING ACTIVITIES ON THIS PROJECT. THIS EMPLOYEE SHALL ALSO INSPECT FOR DEFICIENCIES IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL, AND AT LEAST WEEKLY WHEN NO RAINFALL OCCURS. THE CONTRACTOR SHALL PROVIDE THE NAME OF THE RLD TO VDEQ PRIOR TO LAND DISTURBANCE.

2. AS A FIRST STEP MEASURE, SILT FENCE SHALL BE INSTALLED AS INDICATED PRIOR TO UP-SLOPE LAND DISTURBANCE.

3. STABILIZATION SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

4. INLET PROTECTION AS INDICATED ON THE PLAN SHALL BE INSTALLED FOR NEW INLETS AS THEY BECOME OPERATIONAL.

5. ON-SITE STOCKPILES SHALL HAVE APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING BUT NOT LIMITED TO VEGETATIVE STABILIZATION AND SILT FENCE.

6. AREAS THAT ARE NOT TO BE DISTURBED SHALL BE CLEARLY MARKED BY FLAGS, SIGNS, ETC.

7. INSTALL ADDITIONAL ESC MEASURES IN ACCORDANCE WITH THE VESCH IF REQUIRED BY THE INSPECTOR OR THE OWNER.

8. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL ESC AND SWM ADMINISTRATOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

9. GRADED PORTIONS OF THE SITE NOT TO BE CONSTRUCTED UPON SHALL BE SEEDING WITHIN 30 DAYS OF FINAL GRADING OF THAT AREA.

10. WHEREVER POSSIBLE, NATURAL VEGETATION SHALL REMAIN INTACT TO AID IN EROSION CONTROL

INSPECTIONS:

THE RLD SHALL CONDUCT INSPECTIONS OF THE SITE AT A FREQUENCY OF AT LEAST ONCE EVERY FIVE BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (0.25 INCHES). IN THE EVENT THAT A MEASURABLE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS, THE INSPECTION SHALL BE CONDUCTED ON THE NEXT BUSINESS DAY.

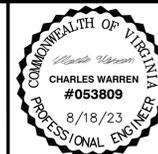
MAINTENANCE:

1. CONSTRUCTION ENTRANCE: MAINTAIN PER VESCH #3.02. MAINTAIN IN A CONDITION TO PREVENT TRACKING TO FLOW OF MUD BEYOND THE SITE. PERIODIC TOP DRESSING WITH STONE, OR WASHING AND/OR REWORKING OF EXISTING STONE AS NECESSARY. REMOVE THE CE FOLLOWING CONSTRUCTION AS DIRECTED BY THE SPECIFICATIONS.

2. SILT FENCE: MAINTAIN PER VESCH #3.05. INSPECT IMMEDIATELY AFTER EACH RAINFALL AND DURING PROLONG RAINFALL EVENTS. PERFORM REPAIRS CAUSED BY DAMAGED OR DEGRADED FABRIC OR POSTS IMMEDIATELY. REMOVE SEDIMENT DEPOSITS FOLLOWING STORM EVENTS EQUAL TO ONE-HALF THE HEIGHT OF THE BARRIER. REMOVE SILT FENCE FOLLOWING SITE STABILIZATION AND DISPOSE AS DIRECTED BY THE SPECIFICATIONS.

3. INLET PROTECTION: MAINTAIN PER VESCH #3.08. INSPECT IMMEDIATELY AFTER EACH RAINFALL EVENT AND REPAIR AS NECESSARY. REMOVE ACCUMULATED SEDIMENT FROM EACH TRAP ONCE ONE HALF OF THE DESIGN DEPTH OF THE TRAP IS FILLED.

4. PERMANENT AND TEMPORARY SEEDING: MAINTAIN PER VESCH #3.32. INSPECT AREAS OF TEMPORARY AND PERMANENT SEEDING UNTIL SUBSTATION VEGETATION IS ESTABLISHED. RE-SEED AND MULCH BARE SOIL AREAS AS NEEDED IN ACCORDANCE WITH THE SPECIFICATIONS.



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| SHEET TITLE | EROSION AND SEDIMENT CONTROL NARRATIVE AND NOTES |
|---------------|---|
| PROJECT TITLE | SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS |

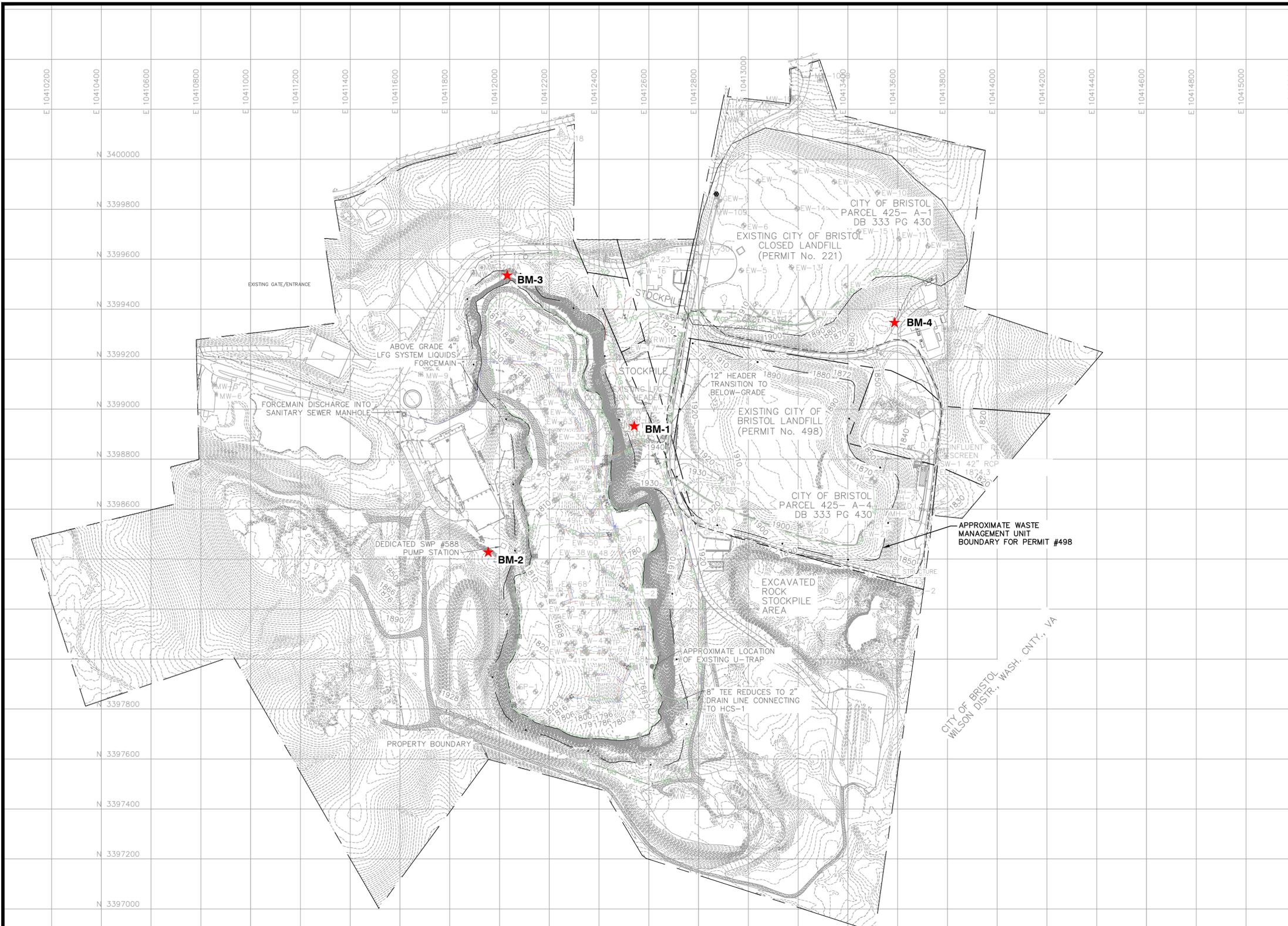
| CLIENT | CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY |
|---------------|--|
| PROJECT TITLE | 2655 VALLEY DRIVE BRISTOL, VA 24201 |

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|---|--------------|--------------|
| SCS ENGINEERS | OWA: RWW/LLH | APP: BFC/CLW |
| STEARNES, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. | ONE: BFC/CLW | APP: BFC/CLW |
| 15200 WOODBURN AVENUE, SUITE 100, BRISTOL, VA 24201 | ONE: BFC/CLW | APP: BFC/CLW |
| PH: (804) 376-1440 FAX: (804) 376-1435 | ONE: BFC/CLW | APP: BFC/CLW |
| PROJ. NO. 02218208.05 | ONE: BFC/CLW | APP: BFC/CLW |
| DATE: 8/18/2023 | ONE: BFC/CLW | APP: BFC/CLW |

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| CADD FILE: | 02218208.05 |
| DATE: | 8/18/2023 |
| SCALE: | AS SHOWN |
| DRAWING NO. | 3 |

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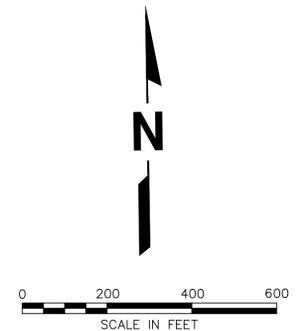
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BRISTOL VIRGINIA SOLID WASTE FACILITY CONTROL MONUMENTS 9-10-2020

| BENCHMARK | NORTHING | EASTING | ELEVATION | DESCRIPTION |
|-----------|--------------|---------------|-----------|--|
| BM-1 | 3398930.8510 | 10412541.7390 | 1945.9200 | BOLT IN CONCRETE MONUMENT |
| BM-2 | 3398427.2980 | 10411954.6380 | 1880.3510 | BOLT IN CONCRETE MONUMENT |
| BM-3 | 3399535.2420 | 10412031.2950 | 1864.1110 | TOP OF ANCHOR BOLT FOR ROCK PROTECTION FENCING |
| BM-4 | 3399345.9430 | 10413587.4720 | 1852.0750 | 1/2" REBAR IN CONCRETE AT FENCE CORNER |

BENCHMARK INFORMATION PROVIDED BY THE CITY OF BRISTOL, VIRGINIA



GENERAL NOTES

- EXISTING GRADES SHOWN AS DASHED
HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022.



| NO. | REVISION | DATE |
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SHEET TITLE: **OVERALL SITE MAP**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 1825 MIDWAY DRIVE, SUITE 200
 PH: (804) 376-7440 FAX: (804) 376-7435

DWG. BY: TRW/LLH
 C.U.W.
 O/A. R.W. BY: C.U.W./DBK
 APP. BY: C.U.W.
 DATE: 02/21/2025

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO.



| DATE | REVISION | NO. |
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SHEET TITLE
EXISTING CONDITIONS

PROJECT TITLE
SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

CIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK., MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
DWG. NO. SWP/LLH
CHK. BY: C/JW
APP. BY: C/JW

CADD FILE:
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DATE:
8/18/2023

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SHEET TITLE **PHASE 1 EROSION AND SEDIMENT CONTROL PLAN**
 PROJECT TITLE **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK., MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433
 PROJ. NO. 2208.05 DWL: TRW/LLH G/A: CWM/DBK
 DES. BY: TRW CHK. BY: CWM APP. BY: CWM

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO. **6** of 26



- GENERAL NOTES**
- WITHIN THE SURVEY BOUNDARY LINE, EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AN SCS DRONE FLYOVER DATED MAY 11, 2023.
 - OUTSIDE OF THE SURVEY BOUNDARY LINE, EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022.



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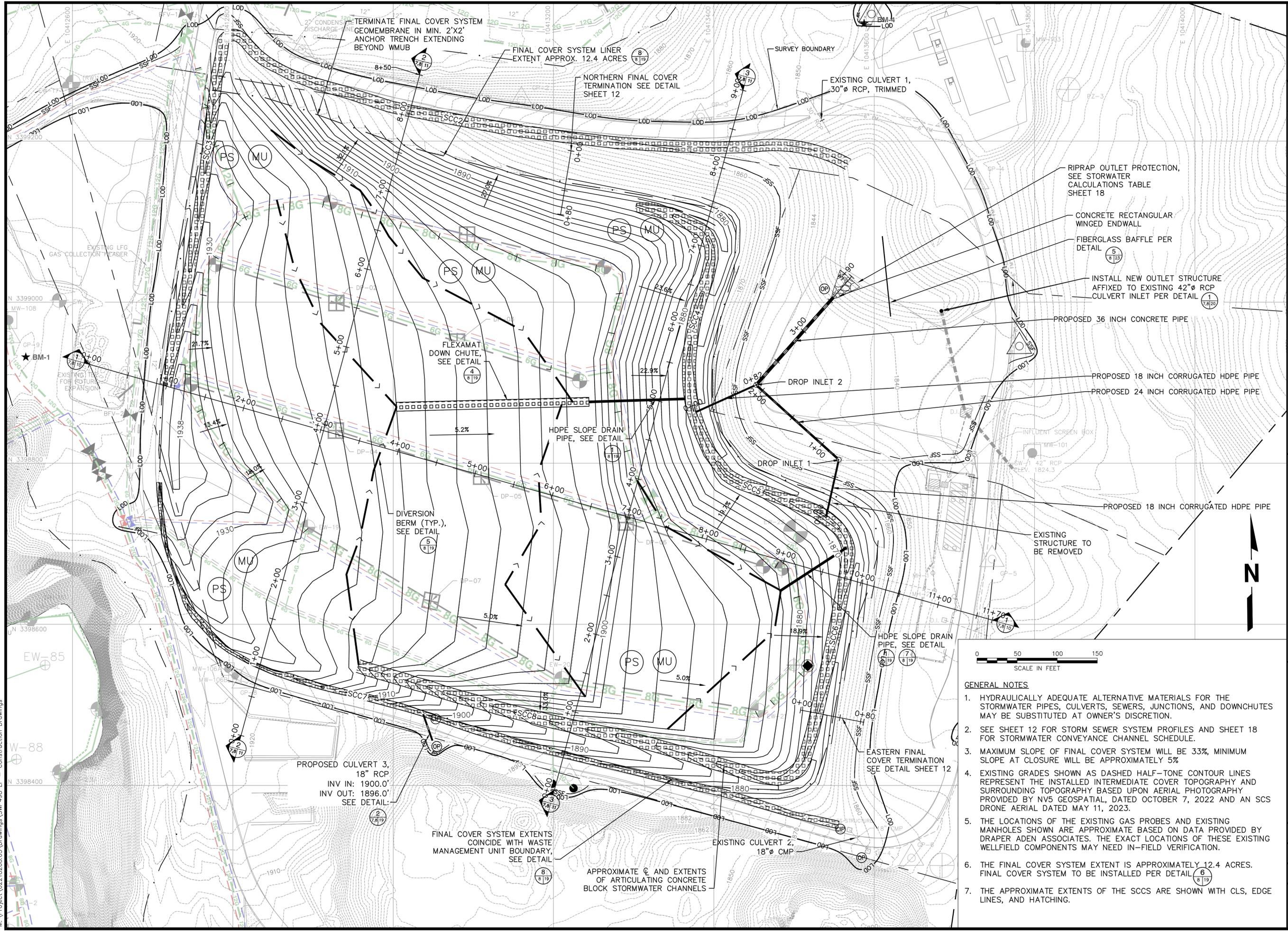
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SHEET TITLE: FINAL COVER GRADE AND STORMWATER FEATURES
 PROJECT TITLE: SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

CLIENT: CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

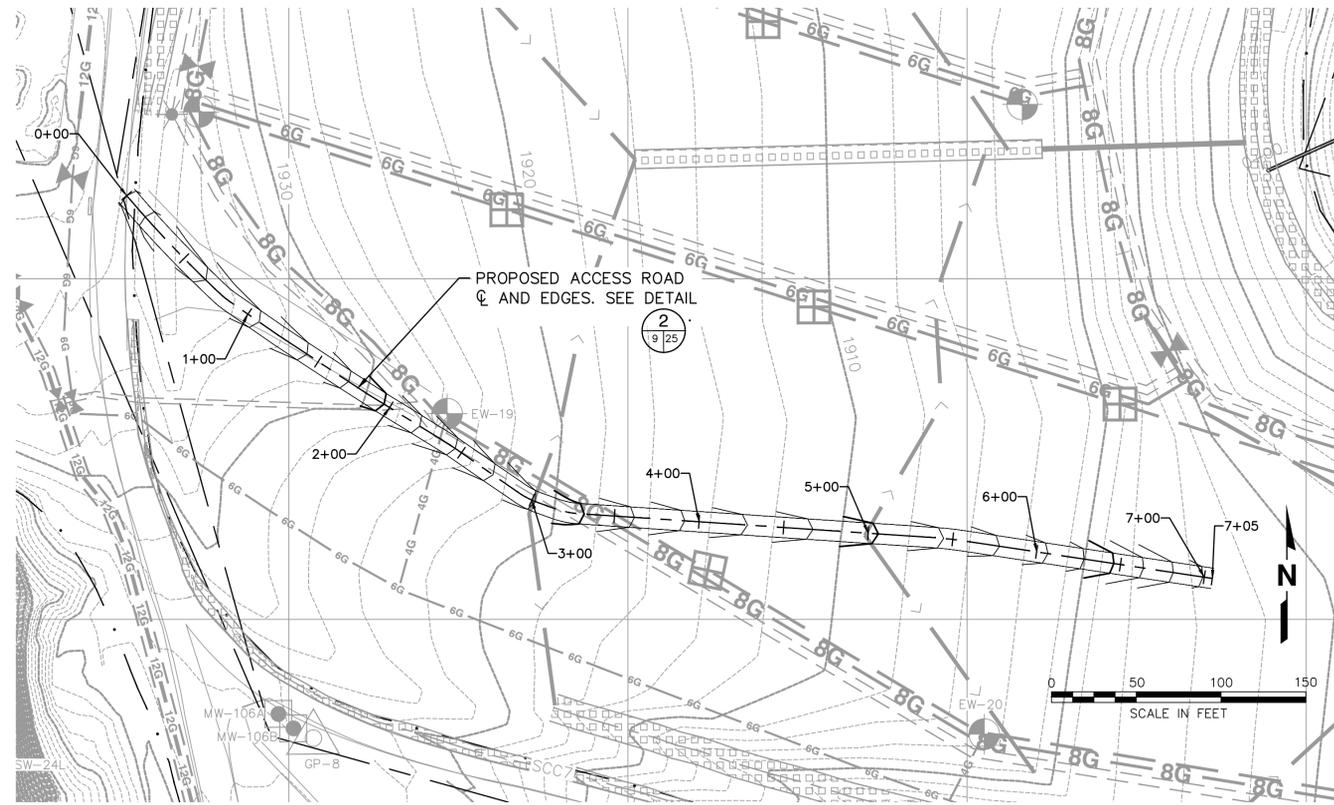
SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK., MIDLOTHIAN, VA 23113
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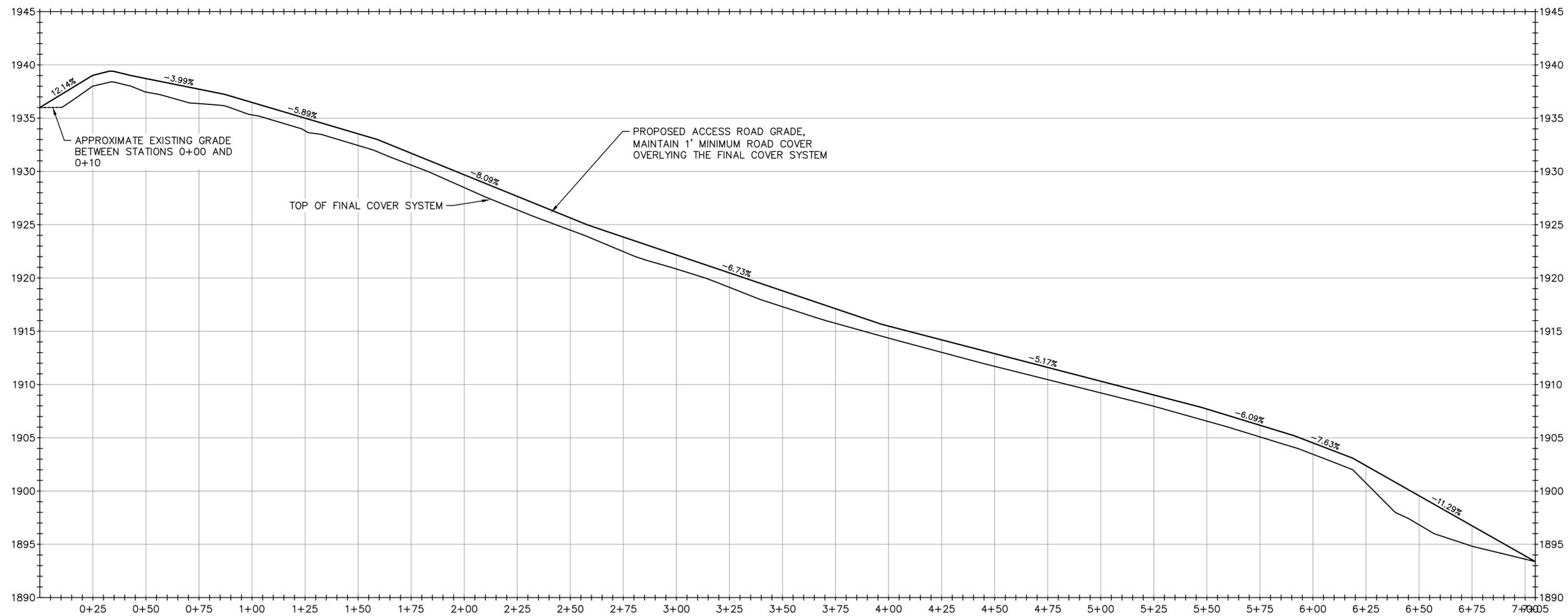
- GENERAL NOTES**
- HYDRAULICALLY ADEQUATE ALTERNATIVE MATERIALS FOR THE STORMWATER PIPES, CULVERTS, SEWERS, JUNCTIONS, AND DOWNCHUTES MAY BE SUBSTITUTED AT OWNER'S DISCRETION.
 - SEE SHEET 12 FOR STORM SEWER SYSTEM PROFILES AND SHEET 18 FOR STORMWATER CONVEYANCE CHANNEL SCHEDULE.
 - MAXIMUM SLOPE OF FINAL COVER SYSTEM WILL BE 33%, MINIMUM SLOPE AT CLOSURE WILL BE APPROXIMATELY 5%
 - EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE INSTALLED INTERMEDIATE COVER TOPOGRAPHY AND SURROUNDING TOPOGRAPHY BASED UPON AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022 AND AN SCS DRONE AERIAL DATED MAY 11, 2023.
 - THE LOCATIONS OF THE EXISTING GAS PROBES AND EXISTING MANHOLES SHOWN ARE APPROXIMATE BASED ON DATA PROVIDED BY DRAPER ADEN ASSOCIATES. THE EXACT LOCATIONS OF THESE EXISTING WELLFIELD COMPONENTS MAY NEED IN-FIELD VERIFICATION.
 - THE FINAL COVER SYSTEM EXTENT IS APPROXIMATELY 12.4 ACRES. FINAL COVER SYSTEM TO BE INSTALLED PER DETAIL 6/8/19
 - THE APPROXIMATE EXTENTS OF THE SCCS ARE SHOWN WITH CLS, EDGE LINES, AND HATCHING.

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GENERAL NOTES

1. THE DASHED HALF-TONE CONTOUR LINES REPRESENT THE INSTALLED FINAL COVER SYSTEM TOPOGRAPHY AND SURROUNDING TOPOGRAPHY BASED UPON AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022 AND AN SCS DRONE AERIAL DATED MAY 11, 2023.
2. THE FULL-TONE CONTINUOUS CONTOUR LINES SHOW THE PROPOSED ACCESS ROAD INSTALLATION GRADE.



PROPOSED ACCESS ROAD

H: 1" = 25'
V: 1" = 5'

| NO. | REVISION | DATE |
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SHEET TITLE: **ACCESS ROAD**
PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

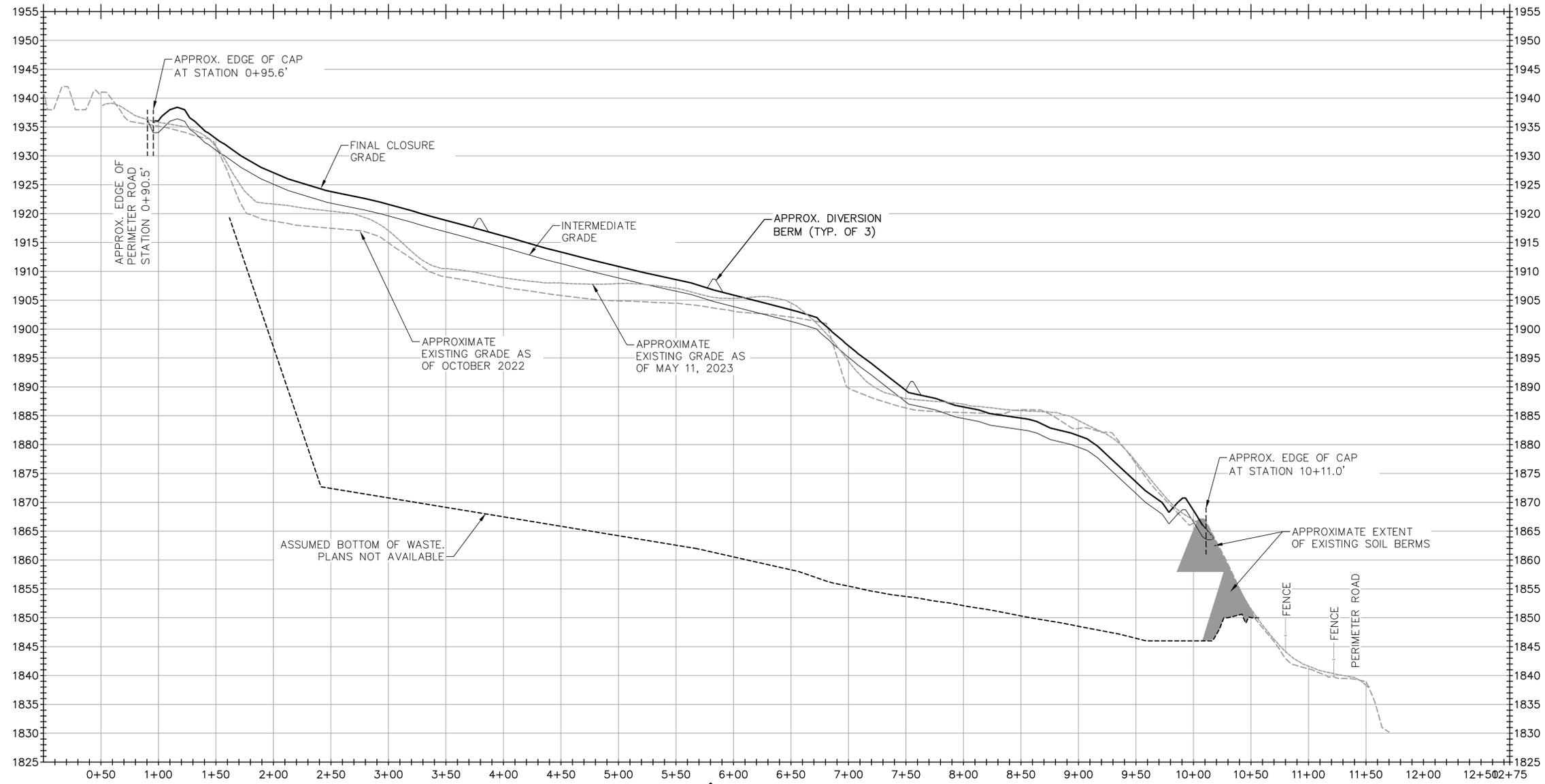
CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
1822 MILLERSVILLE ROAD
PH: (804) 376-1440 FAX: (804) 376-1435

DRAWN BY: TRW
CHECKED BY: C/JW
DATE: 02/21/2025

D/A: R/W/L/H
C/JW/DBK
APP: B/C/JW

CADD FILE: 02218208.05
DATE: 8/18/2023
SCALE: AS SHOWN
DRAWING NO.



SECTION 1
 H: 1" = 50'
 V: 1" = 10'

GENERAL NOTES

- EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022.
- EXISTING GRADES SHOWN AS DASHED FULL-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AN SCS ENGINEERS DRONE FLYOVER (DATE AS INDICATED).
- THE ASSUMED BOTTOM OF WASTE PROFILE IS BASED UPON DRAWINGS PREPARED BY OTHERS. THE ORIGINAL PLANS ARE NOT AVAILABLE.
- THE WRITTEN SCALES INDICATED UNDERNEATH THE PROFILE VIEW TITLES WILL VARY DEPENDING UPON PLOT SIZE. DRAWINGS ARE INTENDED TO BE PLOTTED ON 24" X 36" SHEETS.

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SHEET TITLE: **CROSS SECTIONS 1**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
 DES. BY: TRW
 CHG. BY: C.J.W.
 APP. BY: C.J.W.
 C/A SCS BY: DBK

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO.

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SHEET TITLE: **CROSS SECTIONS 2**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

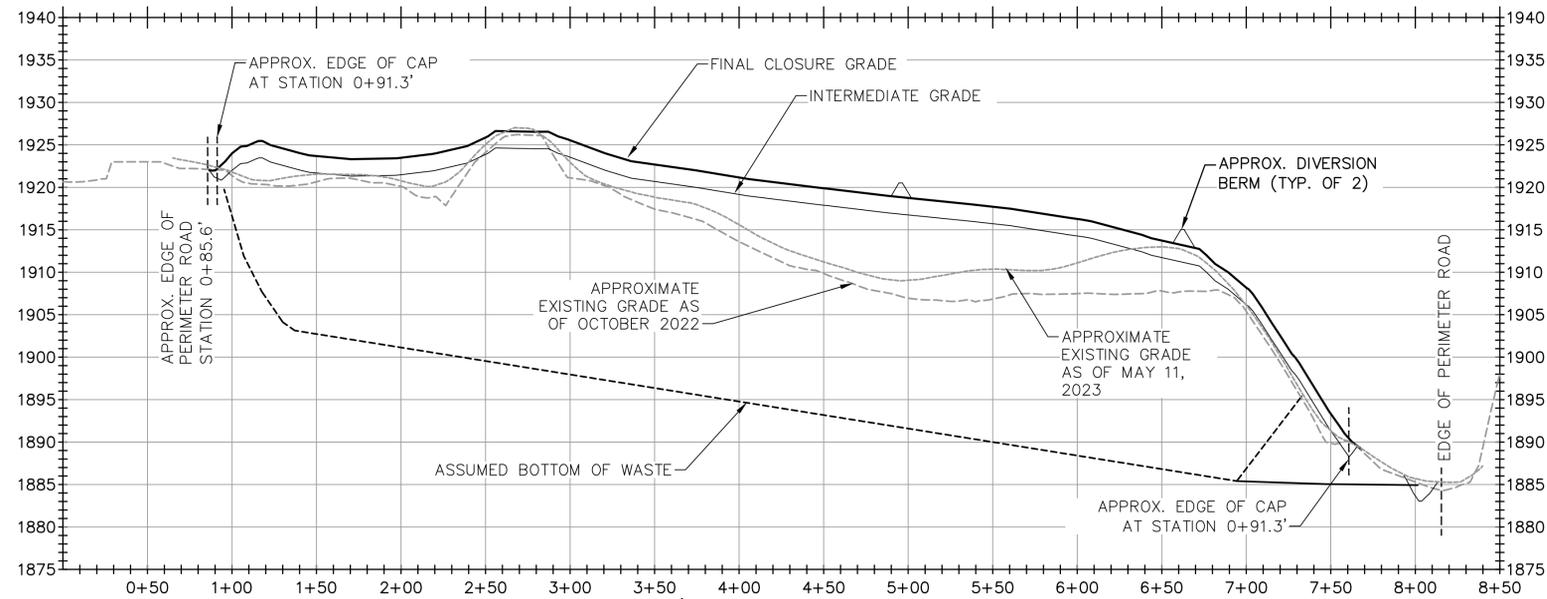
CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

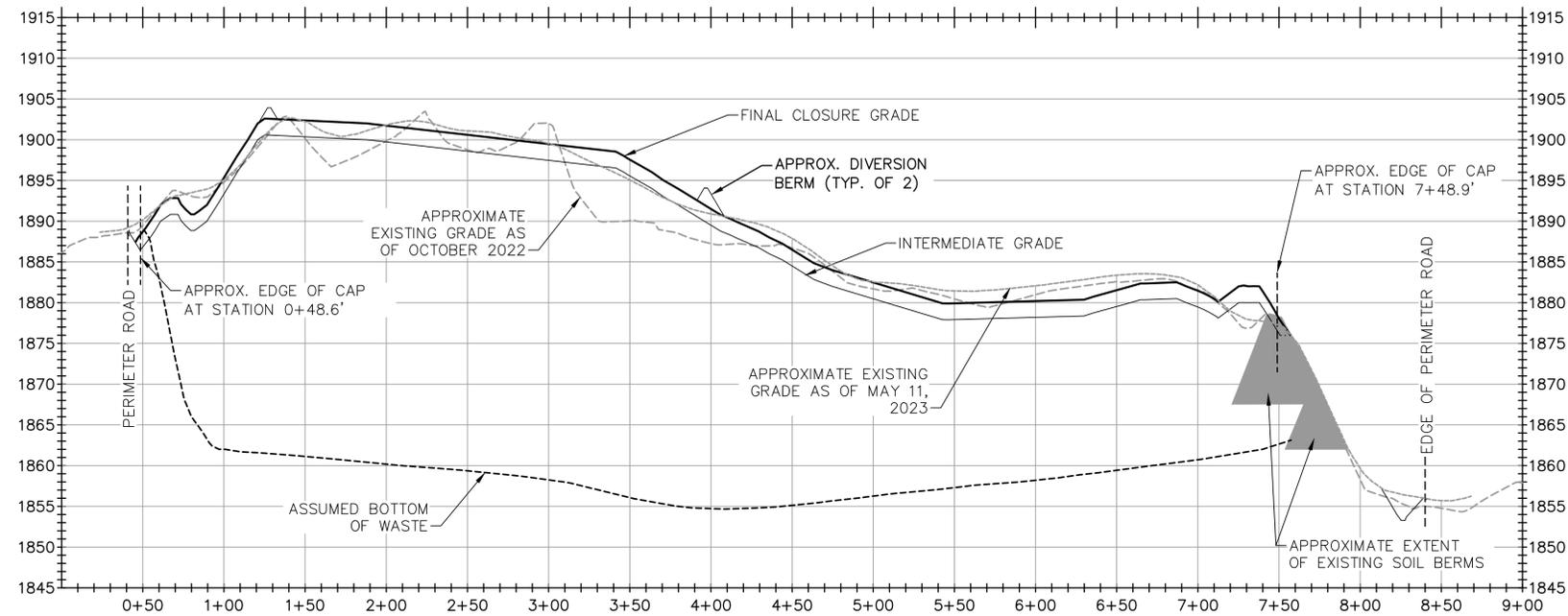
PROJ. NO. 02218208.05
 DES. BY: TRW
 C/A: C.J.W./DBK
 APP. BY: C.J.W.

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN

DRAWING NO. **11** of 26



SECTION 2
 H: 1" = 50'
 V: 1" = 10'



SECTION 3
 H: 1" = 50'
 V: 1" = 10'

GENERAL NOTES

- EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022.
- EXISTING GRADES SHOWN AS DASHED FULL-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AN SCS ENGINEERS DRONE FLYOVER (DATE AS INDICATED).
- THE ASSUMED BOTTOM OF WASTE PROFILE IS BASED UPON DRAWINGS PREPARED BY OTHERS. THE ORIGINAL PLANS ARE NOT AVAILABLE.
- THE WRITTEN SCALES INDICATED UNDERNEATH THE PROFILE VIEW TITLES WILL VARY DEPENDING UPON PLOT SIZE. DRAWINGS ARE INTENDED TO BE PLOTTED ON 24" X 36" SHEETS.



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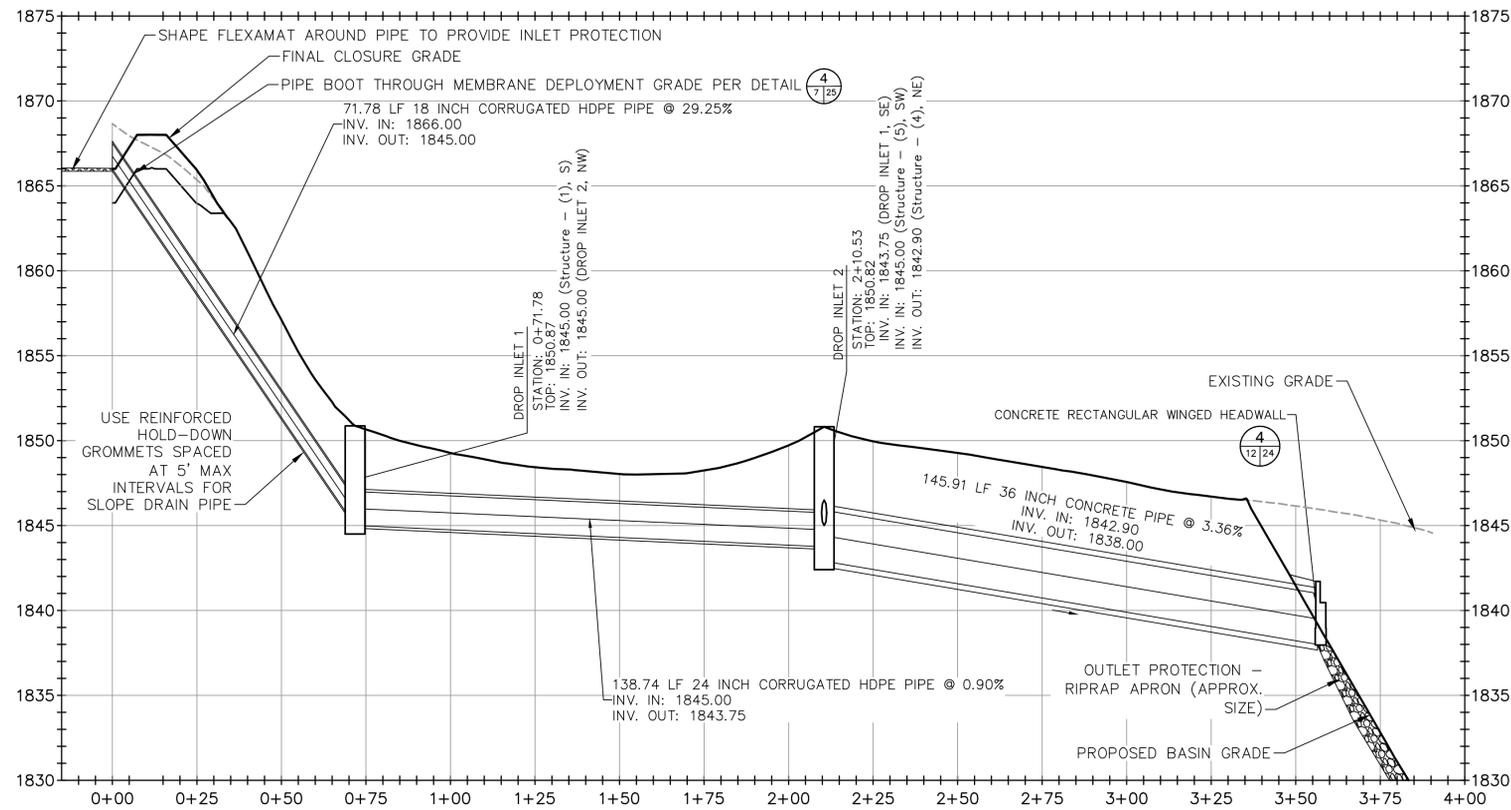
SHEET TITLE: **CROSS SECTIONS 3**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

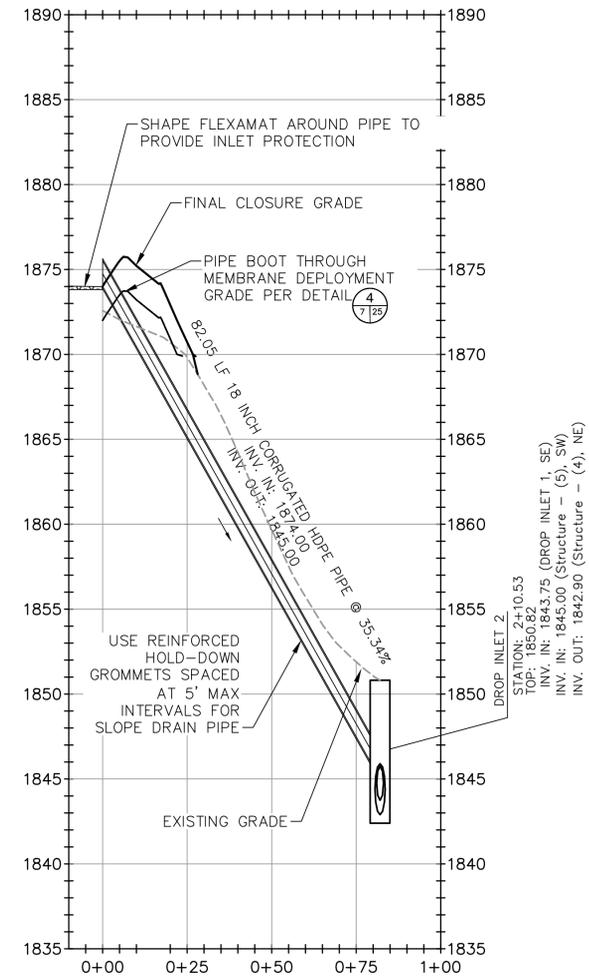
SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 20218208.05
 DES. BY: TRW / LLH / C.J.W.
 C.H.R. BY: C.J.W.
 APP. BY: C.J.W.

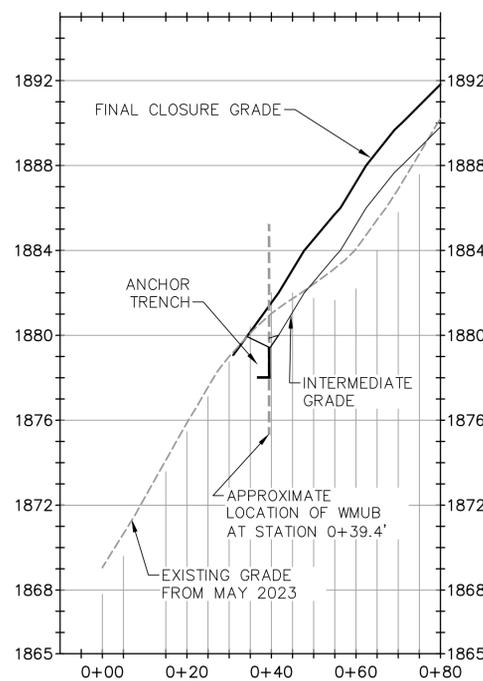
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 SCALE: AS SHOWN
 DRAWING NO.



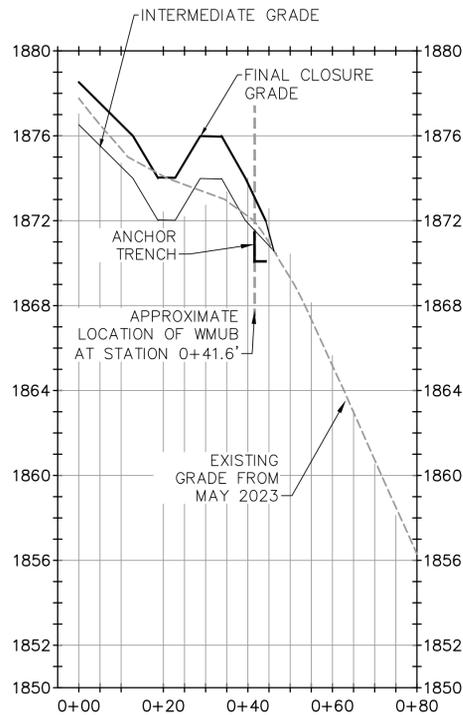
STORM SEWER 1
 H: 1" = 25'
 V: 1" = 5'



STORM SEWER 2
 H: 1" = 25'
 V: 1" = 5'



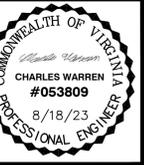
NORTH EDGE OF CAP DETAIL
 H: 1" = 20'
 V: 1" = 4'



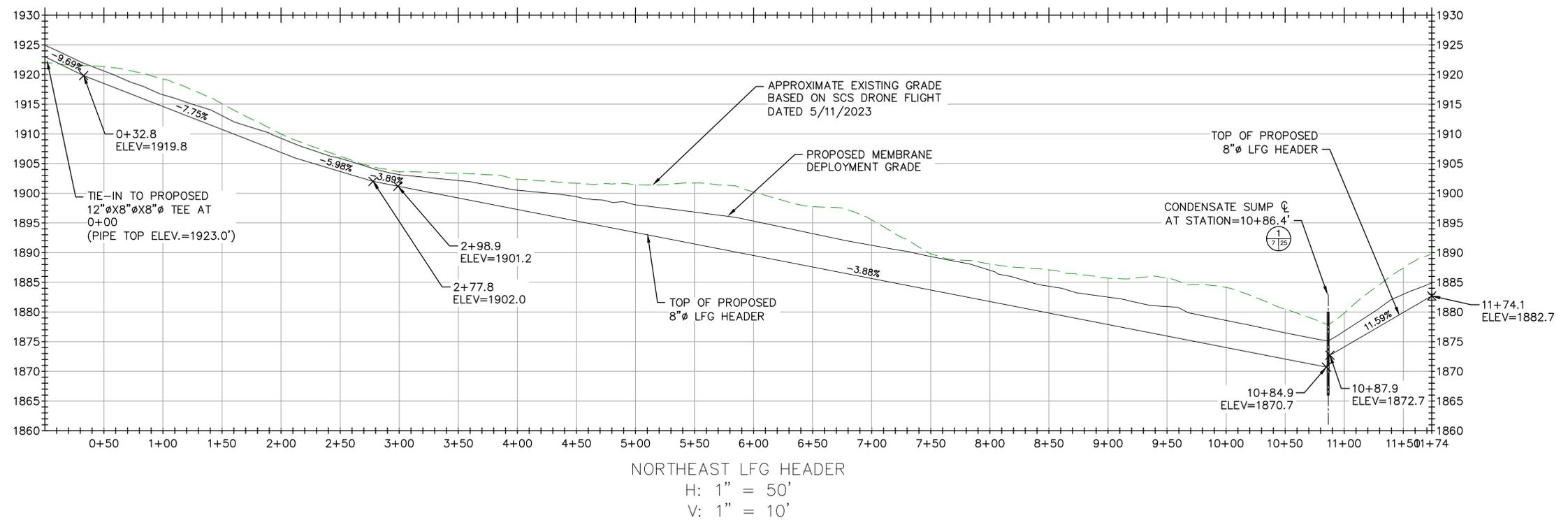
EAST EDGE OF CAP DETAIL
 H: 1" = 20'
 V: 1" = 4'

GENERAL NOTES

- BURIED STORMWATER PIPES TO BE INSTALLED PER DETAIL (2/8/19) OR PER MANUFACTURER'S GUIDANCE WITH ENGINEER'S APPROVAL.
- HYDRAULICALLY ADEQUATE ALTERNATIVE MATERIALS FOR THE STORMWATER PIPES, CULVERTS, SEWERS, JUNCTIONS, AND DOWNCHUTES MAY BE SUBSTITUTED AT OWNER'S DISCRETION.
- EXISTING GRADES SHOWN AS DASHED HALF-TONE LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022 AND AN SCS DRONE AERIAL DATED MAY 11, 2023.
- THE ASSUMED BOTTOM OF WASTE PROFILE IS BASED UPON DRAWINGS PREPARED BY OTHERS. THE ORIGINAL PLANS ARE NOT AVAILABLE.
- THE WRITTEN SCALE INDICATED UNDERNEATH THE PROFILE VIEW TITLES WILL VARY DEPENDING UPON PLOT SIZE. DRAWINGS ARE INTENDED TO BE PLOTTED ON 24" X 36" SHEETS



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GENERAL NOTES

- EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NVS GEOSPATIAL, DATED OCTOBER 7, 2022 AND AN SCS ENGINEERS DRONE FLYOVER DATED MAY 2023.
- THE ASSUMED BOTTOM OF WASTE PROFILE IS BASED UPON DRAWINGS PREPARED BY DRAPER ADEN ASSOCIATES. THE ORIGINAL PLANS ARE NOT AVAILABLE.
- THE WRITTEN SCALES INDICATED UNDERNEATH THE PROFILE VIEW TITLES WILL VARY DEPENDING UPON PLOT SIZE. DRAWINGS ARE INTENDED TO BE PLOTTED ON 24" X 36" SHEETS.

SHEET TITLE
LFG PROFILES 1

PROJECT TITLE
SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

CLIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
 DES. BY: TRW
 CHG. BY: C/JW
 APP. BY: C/JW
 C/A C/JW/DBK

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DATE:
8/18/2023

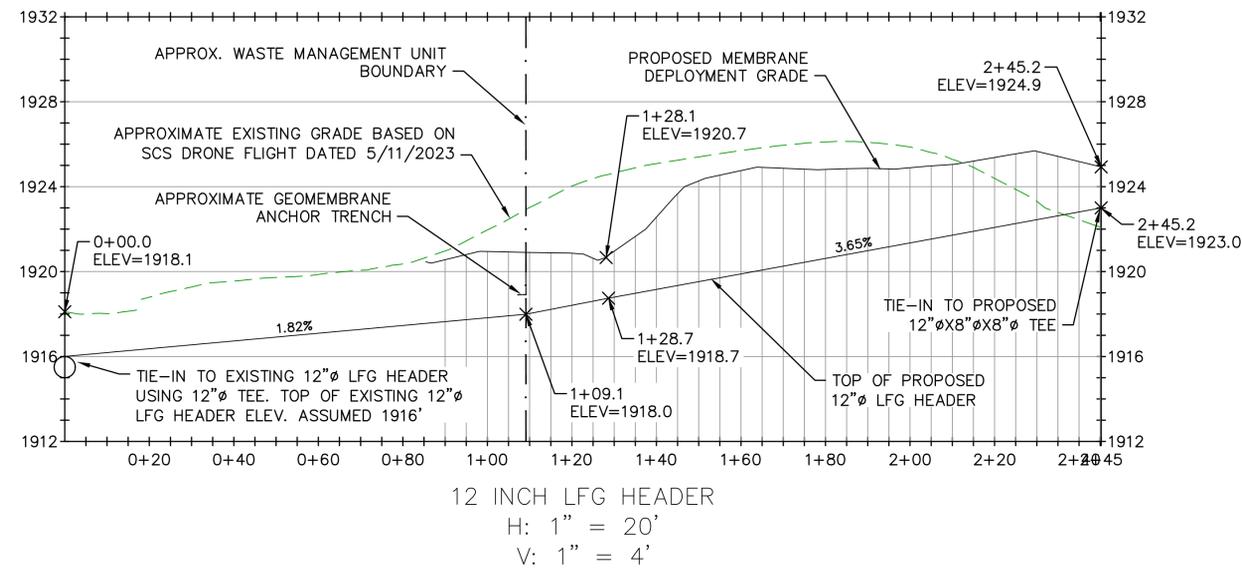
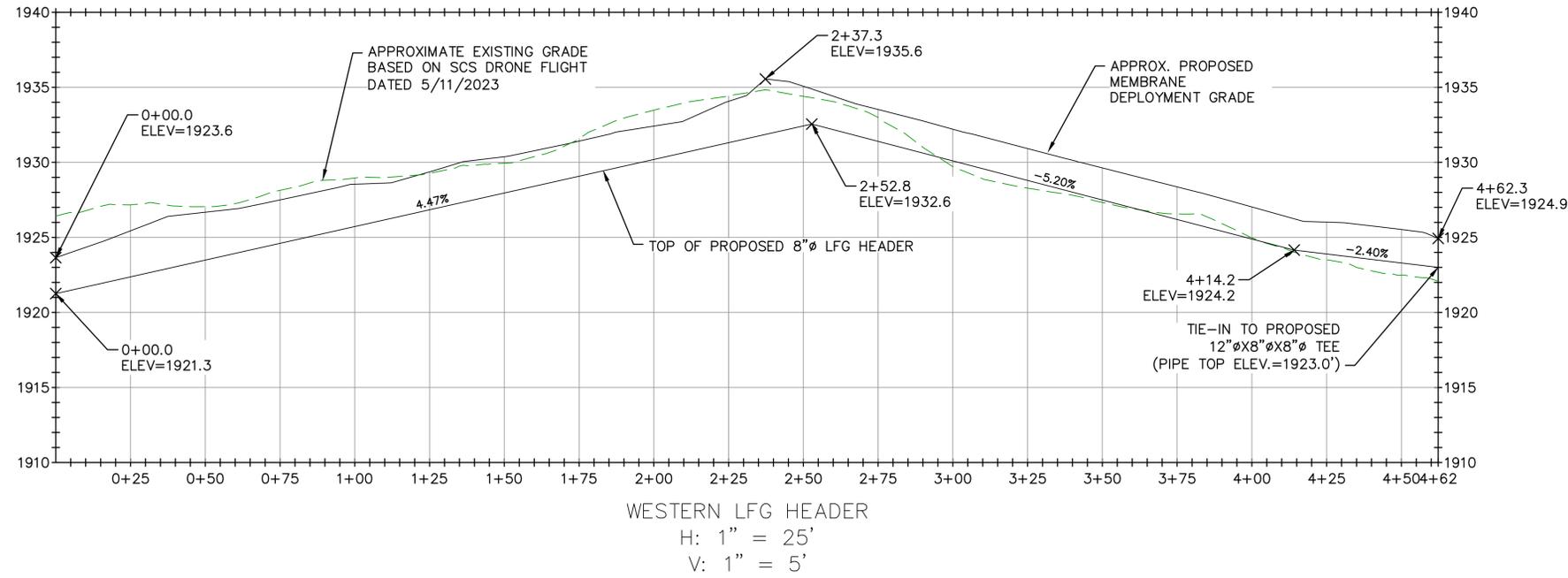
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GENERAL NOTES

- EXISTING GRADES SHOWN AS DASHED HALF-TONE CONTOUR LINES REPRESENT THE TOPOGRAPHY DEVELOPED FROM AERIAL PHOTOGRAPHY PROVIDED BY NV5 GEOSPATIAL, DATED OCTOBER 7, 2022 AND AN SCS ENGINEERS DRONE FLYOVER DATED MAY 2023.
- THE ASSUMED BOTTOM OF WASTE PROFILE IS BASED UPON DRAWINGS PREPARED BY DRAPER ADEN ASSOCIATES. THE ORIGINAL PLANS ARE NOT AVAILABLE.
- THE WRITTEN SCALES INDICATED UNDERNEATH THE PROFILE VIEW TITLES WILL VARY DEPENDING UPON PLOT SIZE. DRAWINGS ARE INTENDED TO BE PLOTTED ON 24" X 36" SHEETS.

SHEET TITLE: **LFG PROFILES 2**
PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
DATE: 8/18/23
APP. BY: C.J.W.
CHK. BY: C.J.W.
DES. BY: C.J.W.

CADD FILE: 02218208.05
DATE: 8/18/2023
SCALE: AS SHOWN
DRAWING NO.



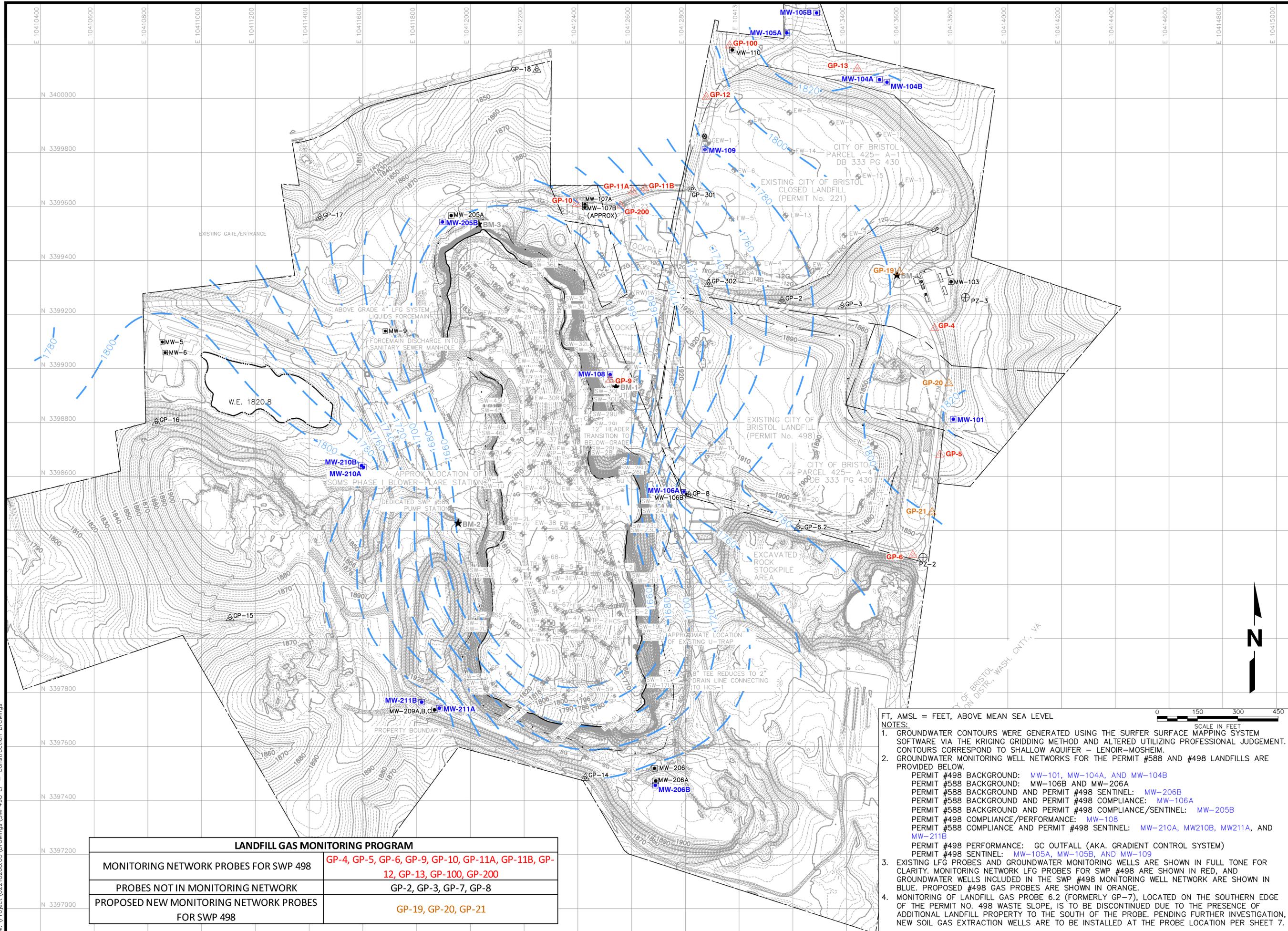
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SHEET TITLE: **SITE MONITORING PLAN**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO. **15** of 26



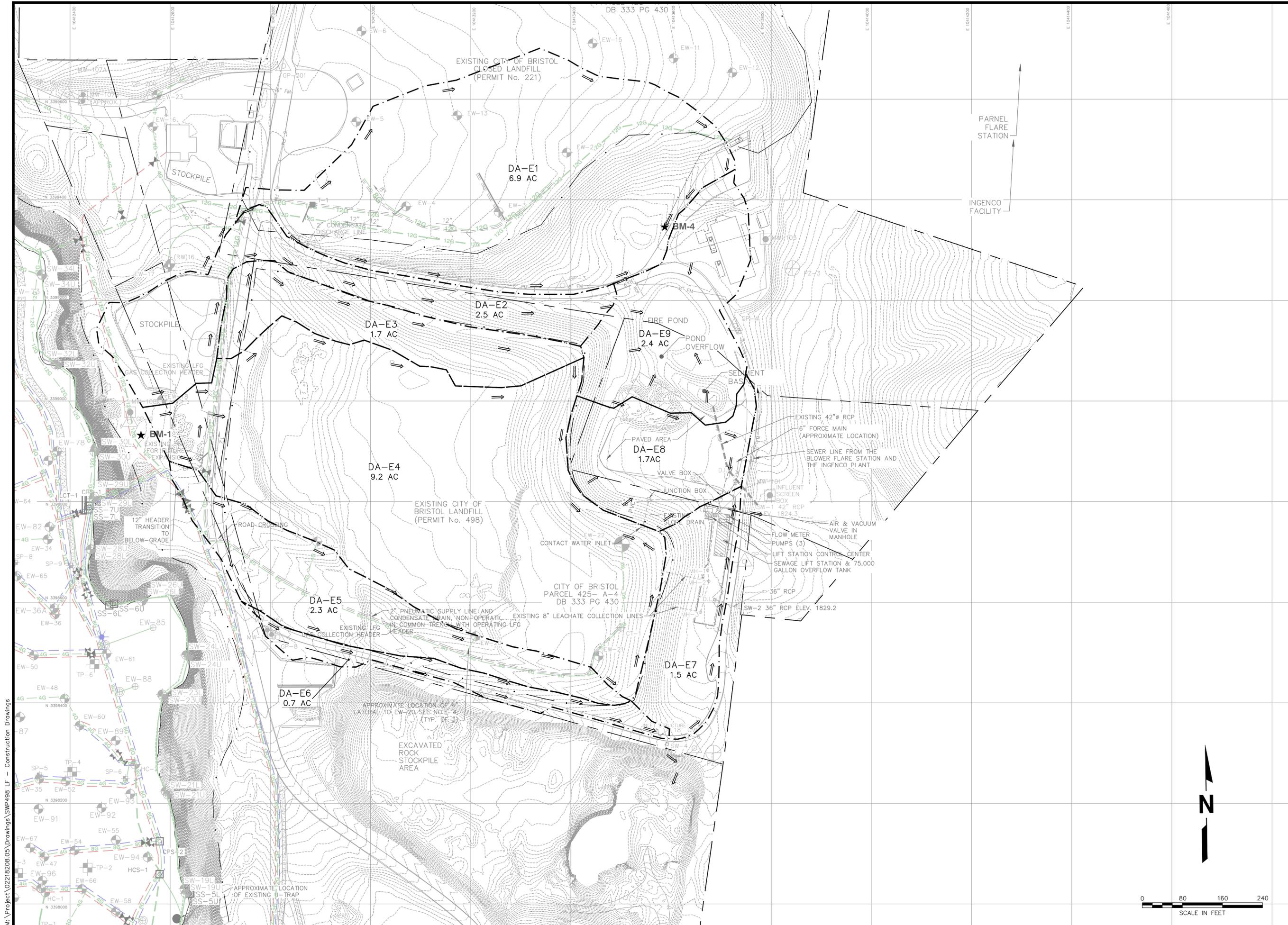
| LANDFILL GAS MONITORING PROGRAM | |
|--|---|
| MONITORING NETWORK PROBES FOR SWP 498 | GP-4, GP-5, GP-6, GP-9, GP-10, GP-11A, GP-11B, GP-12, GP-13, GP-100, GP-200 |
| PROBES NOT IN MONITORING NETWORK | GP-2, GP-3, GP-7, GP-8 |
| PROPOSED NEW MONITORING NETWORK PROBES FOR SWP 498 | GP-19, GP-20, GP-21 |

FT, AMSL = FEET, ABOVE MEAN SEA LEVEL

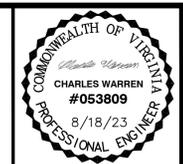
NOTES:

- GROUNDWATER CONTOURS WERE GENERATED USING THE SURFER SURFACE MAPPING SYSTEM SOFTWARE VIA THE KRIGING GRIDING METHOD AND ALTERED UTILIZING PROFESSIONAL JUDGEMENT. CONTOURS CORRESPOND TO SHALLOW AQUIFER - LENOIR-MOSHEIM.
- GROUNDWATER MONITORING WELL NETWORKS FOR THE PERMIT #588 AND #498 LANDFILLS ARE PROVIDED BELOW.
 - PERMIT #498 BACKGROUND: MW-101, MW-104A, AND MW-104B
 - PERMIT #588 BACKGROUND: MW-106B AND MW-206A
 - PERMIT #588 BACKGROUND AND PERMIT #498 SENTINEL: MW-206B
 - PERMIT #588 BACKGROUND AND PERMIT #498 COMPLIANCE: MW-106A
 - PERMIT #588 BACKGROUND AND PERMIT #498 COMPLIANCE/SENTINEL: MW-205B
 - PERMIT #498 COMPLIANCE/PERFORMANCE: MW-108
 - PERMIT #588 COMPLIANCE AND PERMIT #498 SENTINEL: MW-210A, MW210B, MW211A, AND MW-211B
 - PERMIT #498 PERFORMANCE: GC OUTFALL (AKA. GRADIENT CONTROL SYSTEM)
 - PERMIT #498 SENTINEL: MW-105A, MW-105B, AND MW-109
- EXISTING LFG PROBES AND GROUNDWATER MONITORING WELLS ARE SHOWN IN FULL TONE FOR CLARITY. MONITORING NETWORK LFG PROBES FOR SWP #498 ARE SHOWN IN RED, AND GROUNDWATER WELLS INCLUDED IN THE SWP #498 MONITORING WELL NETWORK ARE SHOWN IN BLUE. PROPOSED #498 GAS PROBES ARE SHOWN IN ORANGE.
- MONITORING OF LANDFILL GAS PROBE 6.2 (FORMERLY GP-7), LOCATED ON THE SOUTHERN EDGE OF THE PERMIT NO. 498 WASTE SLOPE, IS TO BE DISCONTINUED DUE TO THE PRESENCE OF ADDITIONAL LANDFILL PROPERTY TO THE SOUTH OF THE PROBE. PENDING FURTHER INVESTIGATION, NEW SOIL GAS EXTRACTION WELLS ARE TO BE INSTALLED AT THE PROBE LOCATION PER SHEET 7.

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SHEET TITLE
EXISTING DRAINAGE PLAN

PROJECT TITLE
SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

CLIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

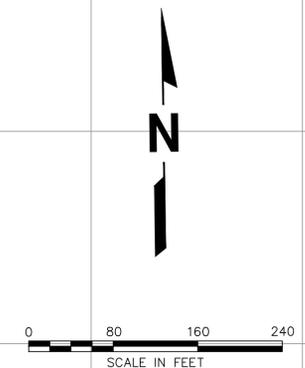
PROJ. NO. 02218208.05
DWG. BY: TRW / LLH
CHK. BY: C.J.W.
APP. BY: C.J.W.

CADD FILE:
02218208.05

DATE:
8/18/2023

SCALE:
AS SHOWN

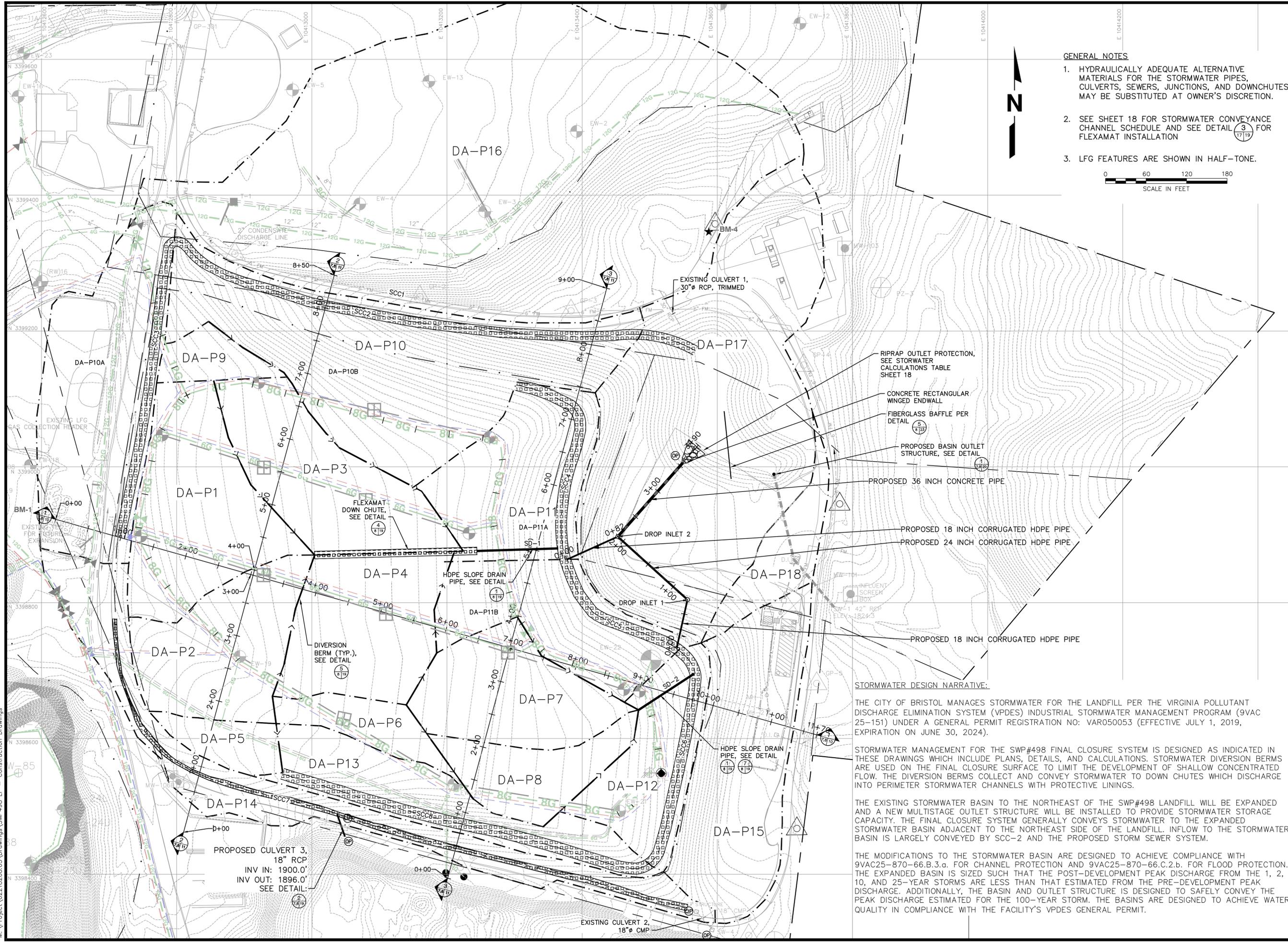
DRAWING NO.
16 of 26





GENERAL NOTES

1. HYDRAULICALLY ADEQUATE ALTERNATIVE MATERIALS FOR THE STORMWATER PIPES, CULVERTS, SEWERS, JUNCTIONS, AND DOWNCHUTES MAY BE SUBSTITUTED AT OWNER'S DISCRETION.
2. SEE SHEET 18 FOR STORMWATER CONVEYANCE CHANNEL SCHEDULE AND SEE DETAIL (3) FOR FLEXAMAT INSTALLATION
3. LFG FEATURES ARE SHOWN IN HALF-TONE.



RIPRAP OUTLET PROTECTION, SEE STORMWATER CALCULATIONS TABLE SHEET 18

CONCRETE RECTANGULAR WINGED ENDWALL

FIBERGLASS BAFFLE PER DETAIL

PROPOSED BASIN OUTLET STRUCTURE, SEE DETAIL

PROPOSED 36 INCH CONCRETE PIPE

PROPOSED 18 INCH CORRUGATED HDPE PIPE

PROPOSED 24 INCH CORRUGATED HDPE PIPE

PROPOSED 18 INCH CORRUGATED HDPE PIPE

STORMWATER DESIGN NARRATIVE:

THE CITY OF BRISTOL MANAGES STORMWATER FOR THE LANDFILL PER THE VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES) INDUSTRIAL STORMWATER MANAGEMENT PROGRAM (9VAC 25-151) UNDER A GENERAL PERMIT REGISTRATION NO: VAR050053 (EFFECTIVE JULY 1, 2019, EXPIRATION ON JUNE 30, 2024).

STORMWATER MANAGEMENT FOR THE SWP#498 FINAL CLOSURE SYSTEM IS DESIGNED AS INDICATED IN THESE DRAWINGS WHICH INCLUDE PLANS, DETAILS, AND CALCULATIONS. STORMWATER DIVERSION BERMS ARE USED ON THE FINAL CLOSURE SURFACE TO LIMIT THE DEVELOPMENT OF SHALLOW CONCENTRATED FLOW. THE DIVERSION BERMS COLLECT AND CONVEY STORMWATER TO DOWN CHUTES WHICH DISCHARGE INTO PERIMETER STORMWATER CHANNELS WITH PROTECTIVE LININGS.

THE EXISTING STORMWATER BASIN TO THE NORTHEAST OF THE SWP#498 LANDFILL WILL BE EXPANDED AND A NEW MULTISTAGE OUTLET STRUCTURE WILL BE INSTALLED TO PROVIDE STORMWATER STORAGE CAPACITY. THE FINAL CLOSURE SYSTEM GENERALLY CONVEYS STORMWATER TO THE EXPANDED STORMWATER BASIN ADJACENT TO THE NORTHEAST SIDE OF THE LANDFILL. INFLOW TO THE STORMWATER BASIN IS LARGELY CONVEYED BY SCC-2 AND THE PROPOSED STORM SEWER SYSTEM.

THE MODIFICATIONS TO THE STORMWATER BASIN ARE DESIGNED TO ACHIEVE COMPLIANCE WITH 9VAC25-870-66.B.3.a. FOR CHANNEL PROTECTION AND 9VAC25-870-66.C.2.b. FOR FLOOD PROTECTION. THE EXPANDED BASIN IS SIZED SUCH THAT THE POST-DEVELOPMENT PEAK DISCHARGE FROM THE 1, 2, 10, AND 25-YEAR STORMS ARE LESS THAN THAT ESTIMATED FROM THE PRE-DEVELOPMENT PEAK DISCHARGE. ADDITIONALLY, THE BASIN AND OUTLET STRUCTURE IS DESIGNED TO SAFELY CONVEY THE PEAK DISCHARGE ESTIMATED FOR THE 100-YEAR STORM. THE BASINS ARE DESIGNED TO ACHIEVE WATER QUALITY IN COMPLIANCE WITH THE FACILITY'S VPDES GENERAL PERMIT.

| DATE | REVISION | NO. |
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SHEET TITLE
STORMWATER MANAGEMENT PLAN

PROJECT TITLE
SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

CLIENT
CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK., MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
DWG. BY: TRW
CHK. BY: C.J.W.
APP. BY: C.J.W.

CADD FILE:
02218208.05

DATE:
8/18/2023

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AS SHOWN

DRAWING NO.

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SCS ENGINEERS
 Environmental Consultants & Contractors
 15521 Midlothian Turnpike
 Suite 305
 Midlothian, VA 23113-7313
 804 378-7440 FAX 804 378-7433
 www.scsengineers.com

JOB NO. 02218208.17
 SUBJECT Bristol 498 Stormwater Calculations
 SHEET NO. 1 OF 1
 CALCULATED BY TRW DATE 8/2/2023
 CHECKED BY DATE

| Drainage Area No. (Dwg. 11) | Drainage Area, AC | Curve No. | Overland Flow | | | Shallow Concentrated Flow | | | Total Tc, min | 2-Year Flow, cfs | 25-Year Flow, cfs |
|-----------------------------|-------------------|-----------|---------------|---------------------|----------|---------------------------|--------------------|----------|---------------|------------------|-------------------|
| | | | % Slope | Drainage Length, ft | Tc, min. | % Slope | Drainage Length ft | Tc, min. | | | |
| E1 | 6.9 | 74 | 1.5 | 100 | 18 | 9 | 715 | 2.4 | 20.4 | 4.3 | 10.8 |
| E2 | 2.5 | 74 | 6 | 100 | 7.1 | 10 | 775 | 2.5 | 9.6 | 2.4 | 5.7 |
| E3* | 1.7 | 74 | 6 | 100 | 7.1 | 10 | 680 | 2.2 | 9.3 | 1.6* | 3.9* |
| E4* | 9.2 | 74 | 15 | 100 | 2.4 | 5 | 830 | 3.8 | 10** | 8.8* | 21.1* |
| E5* | 2.3 | 74 | 8 | 100 | 2.5 | 7 | 800 | 3.1 | 10** | 2.2* | 5.3* |
| E6 | 0.7 | 74 | 5 | 100 | 7.6 | 5 | 460 | 2.1 | 9.7 | 0.7 | 1.6 |
| E7 | 1.5 | 74 | 10 | 100 | 8.4 | 5 | 415 | 1.5 | 9.9 | 1.4 | 3.4 |
| E8 | 1.7 | 87 | 25 | 100 | 5.8 | 5 | 240 | 0.9 | 10** | 3.7 | 6.5 |
| E9 | 2.4 | 81 | 25 | 100 | 4 | 5 | 290 | 1.3 | 10** | 3.7 | 7.5 |

*Within the existing landfill footprint, all runoff is assumed to enter the leachate collection system. Drainage areas E3, E4, and E5 are assumed to contribute no runoff to the existing outfall for the existing conditions stormwater calculations.
 Shallow Concentrated flow assumed in place of channel flow, to be conservative
 Manning's n value - 0.040 for riprap, 0.030 for tall grass
 **Assumed Tc

| Drainage Area No. (Dwg. 12) | Drainage Area, AC | Curve No. | Overland Flow | | | Shallow Concentrated Flow | | | Total Tc, min | 2-Year Flow, cfs | 25-Year Flow, cfs |
|-----------------------------|-------------------|-----------|---------------|---------------------|----------|---------------------------|--------------------|----------|---------------|------------------|-------------------|
| | | | % Slope | Drainage Length, ft | Tc, min. | % Slope | Drainage Length ft | Tc, min. | | | |
| P1 | 1.21 | 94 | 10 | 100 | 8.41 | 8 | 24 | 0.09 | 9 | 3.53 | 5.58 |
| P2 | 0.97 | 94 | 10 | 100 | 8.41 | 7 | 160 | 0.62 | 9 | 2.83 | 4.48 |
| P3 | 1.07 | 94 | 5 | 100 | 11.1 | 5 | 50 | 0.23 | 11 | 2.99 | 4.73 |
| P4 | 1.00 | 94 | 5 | 100 | 11.1 | 5 | 172 | 0.79 | 12 | 2.59 | 4.10 |
| P5 | 0.24 | 94 | 10 | 100 | 8.41 | 5 | 58 | 0.27 | 9 | 0.70 | 1.11 |
| P6 | 0.33 | 94 | 5 | 100 | 11.1 | 5 | 110 | 0.51 | 12 | 0.85 | 1.35 |
| P7 | 0.90 | 94 | 5 | 100 | 11.1 | 10* | 206 | 0.71 | 12 | 2.33 | 3.69 |
| P8 | 0.54 | 94 | 5 | 100 | 11.1 | 7* | 184 | 0.78 | 12 | 1.40 | 2.22 |
| P9 | 0.29 | 94 | 5 | 100 | 11.1 | 16* | 80 | 0.28 | 11 | 0.81 | 1.28 |
| P10A | 1.69 | 79 | 5 | 100 | 11.1 | 5 | 125 | 0.58 | 12 | 2.02 | 4.27 |
| P10B | 2.54 | 87 | 5 | 100 | 11.1 | 25 | 150 | 0.31 | 11 | 5.22 | 9.32 |
| P11A | 1.09 | 94 | 5 | 100 | 11.1 | 12 | 120 | 0.36 | 11 | 3.04 | 4.82 |
| P11B | 0.96 | 94 | 7 | 100 | 9.7 | 20 | 114 | 0.26 | 10 | 2.80 | 4.43 |
| P12 | 0.77 | 94 | 5 | 100 | 11.1 | 20 | 54 | 0.12 | 11 | 2.15 | 3.40 |
| P13 | 0.93 | 94 | 5 | 100 | 11.1 | 10 | 127 | 0.41 | 12 | 2.41 | 3.81 |
| P14 | 1.30 | 84 | 5 | 100 | 11.1 | 10 | 200 | 0.65 | 12 | 2.10 | 3.99 |
| P15 | 1.07 | 74 | 10 | 100 | 8.41 | 5 | 350 | 1.6 | 10 | 0.96 | 2.33 |
| P16 | 6.92 | 79 | 4 | 100 | 12.14 | 10 | 600 | 1.96 | 14 | 7.84 | 16.7 |
| P17 | 3.63 | 85 | 11 | 100 | 8.1 | 8 | 210 | 0.77 | 5** | 8.16 | 14.9 |
| P18 | 0.40 | 92 | 20 | 100 | 6.38 | 5 | 80 | 0.3 | 5** | 1.24 | 2.01 |

Curve Number assumed as 94 within final cover area due to infiltration layer. Group C soil assumed for surrounding areas.
 Concentrated flow not considered, to be conservative
 Manning's n value - 0.040 for riprap, 0.030 for tall grass
 Riprap is VDOT Class 1
 *Slope listed is a weighted average of slopes along the flow path. Actual Tc calculations utilized individual sections for paths with significant change in slope.
 **Assumed minimum Tc

Water Quantity Calculation 9VAC25-870-66.B.3.a. - Improvement Factor Calculation

Objective: Calculate the maximum allowable peak flow rate of runoff for the one-year 24-hour storm from the developed site per the improvement factor equation below:

$$Q_{Developed} \leq I.F. \times \left[\frac{Q_{Pre-Developed} RV_{Pre-Developed}}{RV_{Developed}} \right]$$

where:

- $Q_{Developed}$ = Allowable peak rate of runoff from the developed site for the one-year 24-hour storm
- $Q_{Pre-Developed}$ = Peak flow rate of runoff from the site in its existing condition
- $RV_{Pre-Developed}$ = Volume of runoff from the site in its existing condition
- $RV_{Developed}$ = Volume of runoff from the site in the developed condition
- I.F. = Improvement factor

and:

- $Q_{Pre-Developed}$ = 9.5 cfs
- $RV_{Pre-Developed}$ = 29200 cubic feet
- $RV_{Developed}$ = 67800 cubic feet
- I.F. = 0.8

Resulting in:

$$Q_{Developed} = \frac{9.500 \text{ cfs} \times 29,200 \text{ cubic feet}}{67,800 \text{ cubic feet}} \times 0.8 = 3.27 \text{ cfs}$$

$Q_{Developed}$ = 3.27 cfs Maximum allowable peak flow rate of runoff for the one-year 24-hour storm from the developed site

| Ditch Number | Drainage Area No. (Dwg. 11) | 25-Yr Flow, cfs | Ave. Slope, ft/ft | Ditch Type | Base Width, ft | Side Slopes | Ditch Depth, ft | Overtopping | Erosion | Lining |
|--------------|-----------------------------|-----------------|-------------------|------------|----------------|-------------|-----------------|--------------------------|--------------------------|----------|
| | | | | | | | | Flow Depth D_{25} , ft | Velocity V_{25} , ft/s | |
| SCC-1 | Partial P16 | 6.1 | 0.09 | Trapezoid | 2 | 3:1 | 1.5 | 0.48 | 3.71 | Flexamat |
| SCC-2 | P9 + P10 | 14.9 | 0.09 | Trapezoid | 2 | 3:1 | 2 | 0.74 | 4.76 | Flexamat |
| SCC-3 | P10A | 4.3 | 0.05 | Trapezoid | 2 | 3:1 | 2 | 0.46 | 2.75 | Flexamat |
| SCC-4 | P1+P2+P3+P4+P11A | 23.7 | 0.03 | Trapezoid | 4 | 3:1 | 2 | 0.97 | 3.54 | Flexamat |
| SCC-5 | P11B | 4.4 | 0.03 | Trapezoid | 4 | 3:1 | 2 | 0.4 | 2.13 | Flexamat |
| SCC-6 | P5 + P12 + P13 | 8.3 | 0.03 | Trapezoid | 4 | 3:1 | 2 | 0.56 | 2.62 | Flexamat |
| SCC-7 | P14 | 4.0 | 0.08 | Vee | 0 | 3:1 | 1.5 | 0.63 | 3.35 | Flexamat |
| SCC-8 | P5 + P13 | 4.9 | 0.07 | Trapezoid | 4 | 3:1 | 2 | 0.33 | 2.99 | Flexamat |
| SCC-9 | Partial P13 | 2.0 | 0.07 | VEE | 0 | 3:1 | 1.5 | 0.4 | 3.5 | Flexamat |
| FD-1* | P1, P2, P3, P4 | 18.9 | 0.05 | Trapezoid | 2 | 3:1 | 1.5 | 0.95 | 4.1 | Flexamat |

*Flexamat downchute

| Slope Drain No. | Drainage Areas | 25-Yr Flow, cfs | Ave. Slope, ft/ft | Pipe Dia., in | Flow Depth, in. | Flow Velocity, ft/s | Capacity, cfs |
|-----------------|----------------|-----------------|-------------------|---------------|-----------------|---------------------|---------------|
| SD-1 | P1, P2, P3, P4 | 18.9 | 0.2 | 18 | 7.6 | 26.6 | 51 |
| SD-2 | P7, P8 | 5.9 | 0.2 | 12 | 4.9 | 19.5 | 17 |

Manning's n value - 0.012 for corrugated hdpe pipe with smooth interior

| Pipe ID | Flow Sources | 25-Yr Flow, cfs | Slope, ft/ft | Pipe Dia., in | 25-yr Flow Depth*, ft | 25-yr Flow Velocity*, ft/s | Capacity, cfs |
|-----------------|-------------------|-----------------|--------------|---------------|-----------------------|----------------------------|---------------|
| 36" Outlet Pipe | SCC 4,5,6; SD-1,2 | 61.3 | 0.034 | 36 | 1.1 | 17.4 | 132 |
| 24" Sewer | SCC 5,6; SD-2 | 18.7 | 0.009 | 24 | 1.4 | 8.2 | 23.3 |
| 18" Pipe to DI1 | SCC 5,6; SD-2 | 18.7 | 0.29 | 18 | 0.6 | 30.2 | 61.5 |
| 18" Pipe to DI2 | SCC 4; SD-1 | 47.0 | 0.35 | 18 | 0.9 | 40.8 | 67.6 |

Manning's n value - 0.012 for corrugated hdpe pipe with smooth interior
 Based on open channel analysis

| Culvert Description | Pipe Diameter ft | 25-Yr Pipe Flow cfs | Length, ft | Inv. In, ft | Inv. Out | Inlet Control, 25-yr Flow | | | Outlet Control | | | | Open Channel Assumption | | | | | | | |
|---------------------|------------------|---------------------|------------|-------------|----------|---------------------------|------|---------|----------------|--------|------------|-----|-------------------------|-----|---------|-----------------|----------------------|---------------|-------------------|--------------------|
| | | | | | | HW/D | HWin | Elhi | TW,ft | Dc, ft | (Dc + D)/2 | ho | ke | H | Elho | Control HW Elev | 25-Yr Flow Depth, ft | Road Elev. Ft | Pipe Capacity cfs | Pipe Velocity ft/s |
| Existing Culvert 1 | 2.5 | 16.7 | 40 | 1847 | 1846 | 0.81 | 2.02 | 1849.02 | 1 | 1.4 | 1.7 | 1.7 | 0.2 | 0.6 | 1848.3 | 1849.2 | 0.83 | 1850 | 70.25 | 11.65 |
| Existing Culvert 2 | 1.5 | 2.6 | 32 | 1860 | 1859 | 0.55 | 0.83 | 1860.83 | 0.5 | 0.6 | 1.1 | 1.1 | 0.2 | 0.4 | 1860.45 | 1860.83 | 0.36 | 1861 | 20.13 | 11.39 |
| New Culvert 3 | 1.5 | 1.6 | 32 | 1897.5 | 1896.5 | 0.42 | 0.62 | 1898.12 | 0.4 | 0.7 | 1.1 | 1.1 | 0.2 | 0.4 | 1898 | 1898.12 | 0.29 | 1899 | 20.13 | 11.39 |

All pipe is assumed Class IV RCP
 ho is larger of TW or (Dc+D)/2

| Structure ID | Pipe Diameter ft | 25-Yr Peak Flow, cfs | L_p , ft | Initial Width, ft | End Width, ft | d_{50} , min., ft |
|--------------------|------------------|----------------------|------------|-------------------|---------------|---------------------|
| Existing Culvert 1 | 2.5 | 16.6 | 30 | 7.5 | 32.5 | 0.9 |
| Existing Culvert 2 | 1.5 | 2.55 | 10 | 4.5 | 5.5 | 0.9 |
| New Culvert 3 | 1.5 | 1.56 | 10 | 4.5 | 5.5 | 0.9 |
| 36" Sewer Outlet | 3 | 61.3 | 28 | 9 | 31 | 1 |

L_p and widths from VESCH Plate 3.18-4
 Use VDOT Class IA riprap. Discharge channels will be lined with flexamat, so additional OP is not needed

| Conditions | 1-Yr Storm Discharge, cfs | 2-Yr Storm Discharge, cfs | 10-Yr Storm Discharge, cfs | 25-Yr Storm Discharge, cfs |
|------------|---------------------------|---------------------------|----------------------------|----------------------------|
| Existing | 9.46 | 14.1 | 25.0 | 31.4 |
| Proposed | 1.90 | 2.56 | 6.09 | 18.1 |

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

SHEET TITLE: **STORMWATER CALCULATIONS**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 15521 MIDLOTHIAN TURNPIKE - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

PROJ. NO. 02218208.05
 DATE: 8/2/2023
 DES. BY: TRW
 CHK. BY: C.J.W.
 APP. BY: C.J.W.

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO.



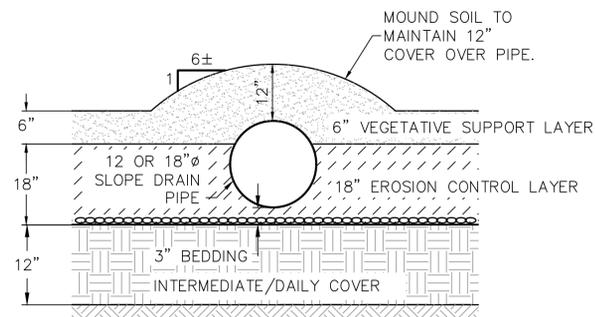
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|----------|--|
| DATE | |
| REVISION | |
| NO. | |

SHEET TITLE: **DETAILS 1**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

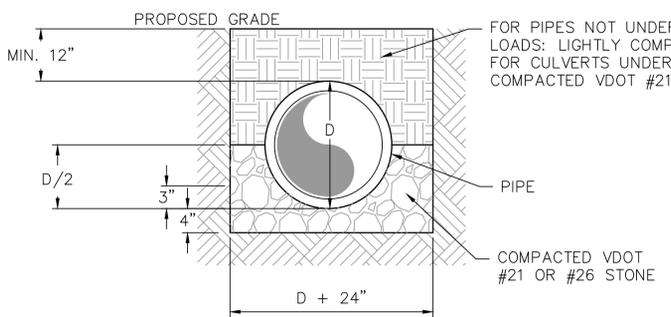
SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
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CADD FILE: 02218208.05
 DATE: 8/18/2023
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 DRAWING NO.



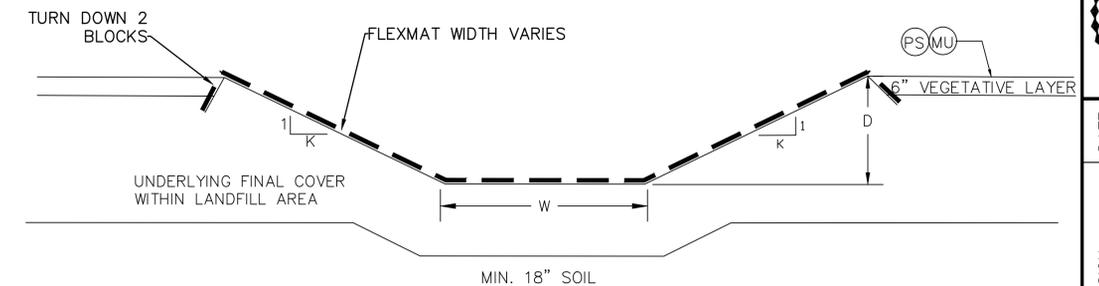
- NOTES:
1. ALL PIPE FITTINGS AND CONNECTIONS SHALL BE WATERTIGHT.
 2. PIPE ENTRANCES SHALL BE GRADED FOR A SMOOTH SWALE-TO-FLANGE TRANSITION.
 3. USE REINFORCED HOLD-DOWN GROMMETS SPACED AT 5' MAX INTERVALS FOR SLOPE DRAIN PIPE.

PERMANENT SLOPE DRAIN DETAIL
 NOT TO SCALE



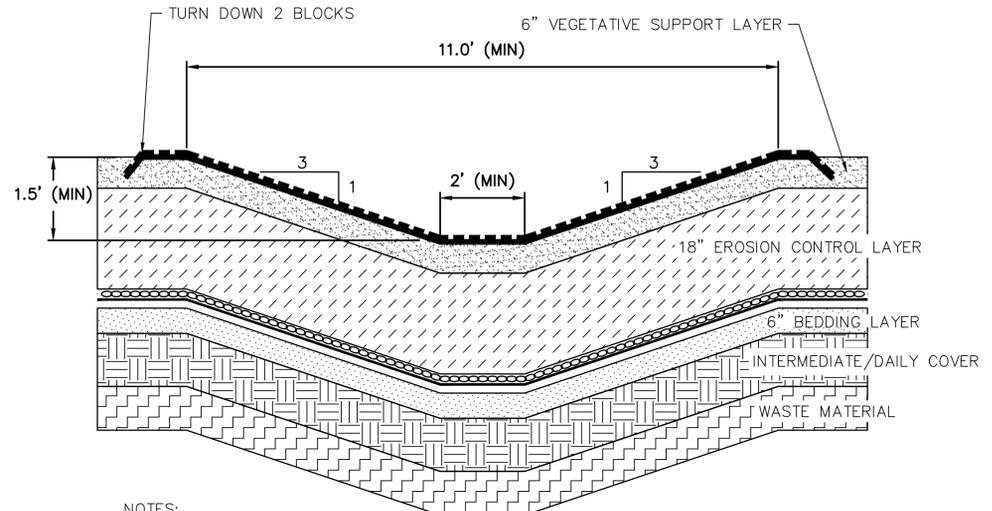
- NOTES:
1. SHOULD GROUNDWATER OR SATURATED SOILS BE EXPECTED, BEDDING SHALL BE VDOT #57 STONE IN LIEU OF VDOT #21 OR #26 STONE.

BURIED STORMWATER PIPE BEDDING AND BACKFILL
 NOT TO SCALE



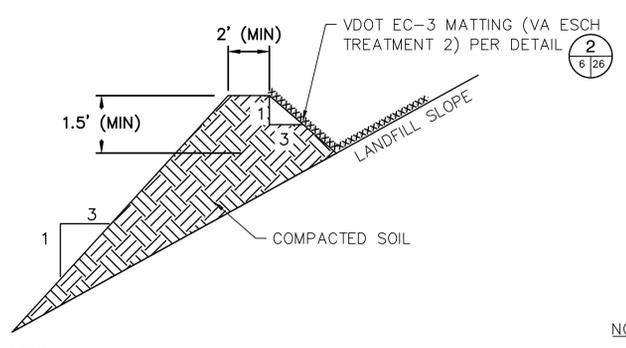
- NOTE:
1. FOR FLEXMAT LINED STORMWATER CONVEYANCE CHANNELS (SCC), CHANNEL DIMENSIONS SHALL BE PER THE FINAL GRADING PLAN AND SCC SCHEDULE ON THE STORMWATER CALCULATIONS SHEET..

STORMWATER CONVEYANCE CHANNEL FLEXAMAT INSTALLATION DETAIL
 NOT TO SCALE



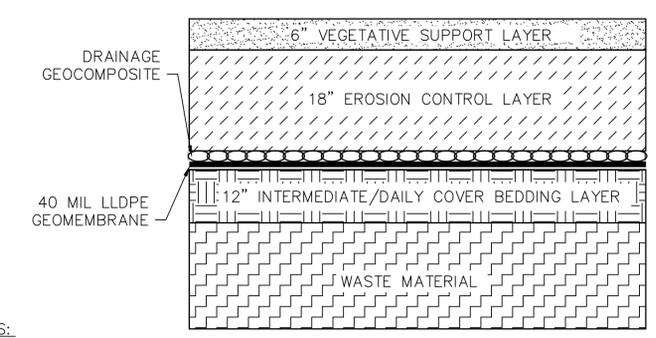
- NOTES:
1. WHERE DIVERSION BERMS ENTER INTO FLEXAMAT DOWN CHUTE, EXTEND FLEXAMAT 8 FEET INTO DIVERSION BERM TO CREATE TRANSITION.
 2. CHANNEL DIMENSIONS SHOWN FOR DOWN CHUTE ONLY. FOR FLEXAMAT LINED STORMWATER CONVEYANCE CHANNELS (SCC), SEE CHANNEL SCHEDULE AND FINAL GRADING PLAN.

FINAL COVER FLEXAMAT DOWNCHUTE INSTALLATION DETAIL
 NOT TO SCALE



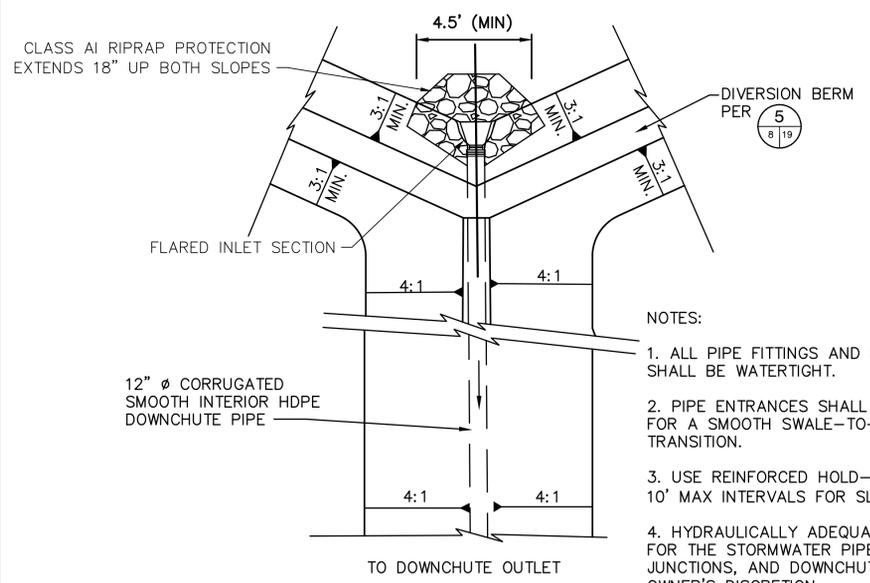
- NOTES:
1. FLOW SLOPE OF THE DIVERSION TO BE MIN. 2%
 2. SEE FINAL COVER DOWNCHUTE DETAIL FOR CONNECTION OF DIVERSION BERMS.

DIVERSION BERM DETAIL
 NOT TO SCALE



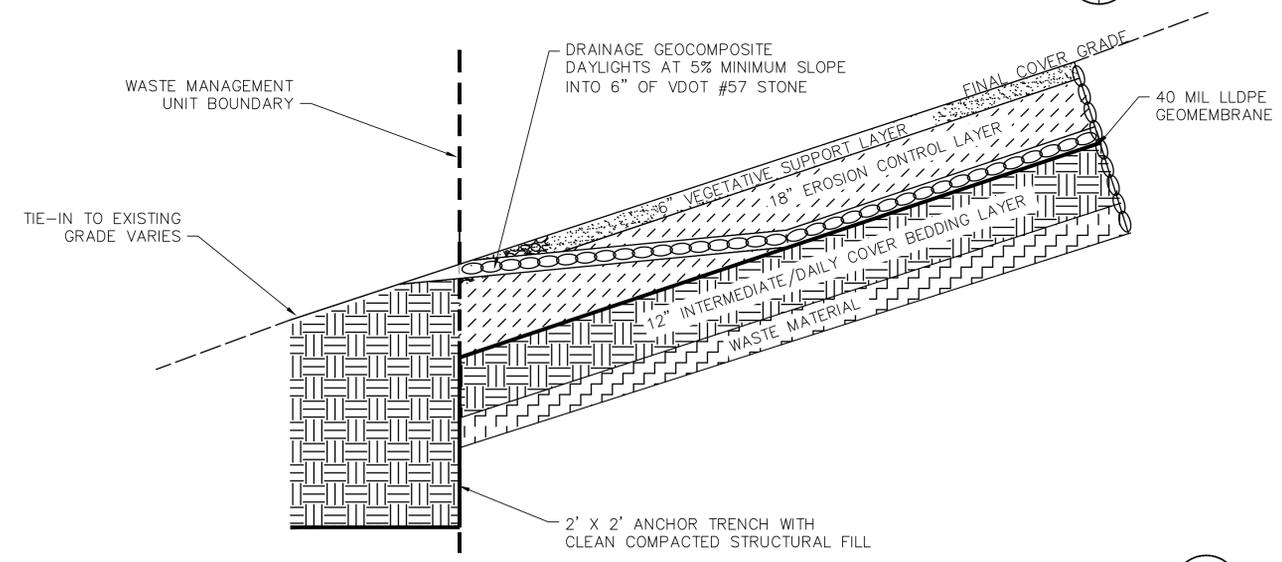
- NOTES:
1. THE TOP 6" OF INTERMEDIATE/DAILY COVER WILL FUNCTION AS A BEDDING LAYER. THE SURFACE SHALL BE SMOOTH AND FREE OF STICKS, ROCKS LARGER THAN 3/8 INCH, OR OTHER IRREGULARITIES WHICH COULD PUNCTURE THE SYNTHETIC CAP.
 2. THE SYNTHETIC CAP SHALL BE PLACED AS PER MANUFACTURER'S RECOMMENDATIONS. SEE CLOSURE SPECIFICATIONS FOR ALLOWABLE MATERIALS, INSTALLATION AND QUALITY CONTROL MEASURES.
 3. EROSION CONTROL LAYER SHALL BE PLACED IMMEDIATELY AFTER THE GEOCOMPOSITE. THE GEOCOMPOSITE MAY NOT BE EXPOSED TO SUNLIGHT FOR MORE THAN THE TIME LIMITED IN THE PROJECT SPECIFICATIONS.
 4. THE VEGETATIVE COVER SHALL BE PLACED AND SEEDING IMMEDIATELY AFTER INSTALLATION OF THE EROSION CONTROL LAYER. A TEMPORARY SEEDING MIXTURE MAY BE USED TO PROTECT THE AREA FROM EROSION. ONCE THE CLOSURE IS COMPLETED, FINAL SEEDING WILL OCCUR.
 5. THE GEOMEMBRANE DEPLOYMENT GRADE IS THE TOP OF THE BEDDING LAYER.

FINAL COVER SYSTEM DETAIL
 NOT TO SCALE



- NOTES:
1. ALL PIPE FITTINGS AND CONNECTIONS SHALL BE WATERTIGHT.
 2. PIPE ENTRANCES SHALL BE GRADED FOR A SMOOTH SWALE-TO-FLANGE TRANSITION.
 3. USE REINFORCED HOLD-DOWN GROMMETS SPACED AT 10' MAX INTERVALS FOR SLOPE DRAIN PIPE
 4. HYDRAULICALLY ADEQUATE ALTERNATIVE MATERIALS FOR THE STORMWATER PIPES, CULVERTS, SEWERS, JUNCTIONS, AND DOWNCHUTES MAY BE SUBSTITUTED AT OWNER'S DISCRETION.

HDPE DOWNCHUTE UPPER INLET WITH DIVERSION BERMS
 NOT TO SCALE



FINAL COVER SYSTEM ANCHOR TRENCH
 NOT TO SCALE

M:\Project\02218208.05\Drawings\SWP-498_LF - Construction Drawings

PS LIME AND FERTILIZER APPLICATION RATES
 IF POSSIBLE, DETERMINE BY SOILS TEST. WHERE NOT POSSIBLE TO OBTAIN A SOILS TEST, THE FOLLOWING SOIL AMENDMENTS WILL APPLY:

LIME

COASTAL PLAIN: 2 TONS

PIEDMONT AND APPALACHIAN REGION: 2 TONS/ACRE PULVERIZED AGRICULTURAL GRADE LIMESTONE (90 LBS./1000 FT.²)

NOTE: AN AGRICULTURAL GRADE OF LIMESTONE SHOULD ALWAYS BE USED.

FERTILIZER

MIXED GRASSES AND LEGUMES: 1000 LBS./ACRE 10-20-10 OR EQUIVALENT NUTRIENTS (23 LBS./1000 FT.²).

LEGUME STANDS ONLY: 1000 LBS./ACRE 5-20-10 (23 LBS./1000 FT.²) IS PREFERRED; HOWEVER, 1000 LBS./ACRE OF 10-20-10 OR EQUIVALENT MAY BE USED.

GRASS STANDS ONLY: 1000 LBS./ACRE 10-20-10 OR EQUIVALENT NUTRIENTS, (23 LBS./1000 FT.²).

OTHER FERTILIZER FORMATIONS, INCLUDING SLOW-RELEASE SOURCES OF NITROGEN (PREFERRED FROM A WATER QUALITY STANDPOINT), MAY BE USED PROVIDED THEY CAN SUPPLY THE SAME AMOUNTS AND PROPORTIONS OF PLANT NUTRIENTS.

INCORPORATION - LIME AND FERTILIZER SHALL BE INCORPORATED INTO THE TOP 4-6 INCHES OF SOIL FROM A WATER QUALITY STANDPOINT, MAY BE USED PROVIDED THEY CAN SUPPLY THE SAME AMOUNTS AND PROPORTIONS OF PLANT NUTRIENTS.

| ORGANIC MULCH MATERIALS AND APPLICATION RATES | | | |
|---|---|------------------|---|
| MULCHES: | RATES: | | NOTES: |
| | PER ACRE | PER 1000 SQ. FT. | |
| STRAW OR HAY | 1 1/2 - 2 TONS (MINIMUM 2 TONS OF WINTER COVER) | 70 - 90 LBS. | FREE FROM WEEDS AND COARSE MATTER. MUST BE ANCHORED. SPREAD |

PERMANENT SEEDING PS

VESCH STD & SPEC 3.32

**TABLE 3.32-C
 SITE SPECIFIC SEEDING MIXTURES
 FOR APPALACHIAN/MOUNTAIN AREA**

| MINIMUM CARE LAWN | TOTAL LBS. PER ACRE |
|---------------------------------------|---------------------|
| -COMMERCIAL OR RESIDENTIAL | 200-250 LBS. |
| -KENTUCKY 31 OR TURF-TYPE TALL FESCUE | 90-100% |
| -IMPROVED PERENNIAL RYEGRASS * | 0-10% |
| -KENTUCKY BLUEGRASS | 0-10% |

HIGH-MAINTENANCE LAWN

MINIMUM OF THREE (3) UP TO FIVE (5) VARIETIES OF BLUEGRASS FROM APPROVED LIST FOR USE IN VIRGINIA

125 LBS.

GENERAL SLOPE (3:1 OR LESS)

- KENTUCKY 31 FESCUE 128 LBS.
 - RED TOP GRASS 2 LBS.
 - SEASONAL NURSE CROP ** 20 LBS.

150 LBS.

LOW-MAINTENANCE SLOPE (STEEPER THAN 3:1)

- KENTUCKY 31 FESCUE 108 LBS.
 - RED TOP GRASS 2 LBS.
 - SEASONAL NURSE CROP ** 20 LBS.
 - CROWN VETCH *** 20 LBS.

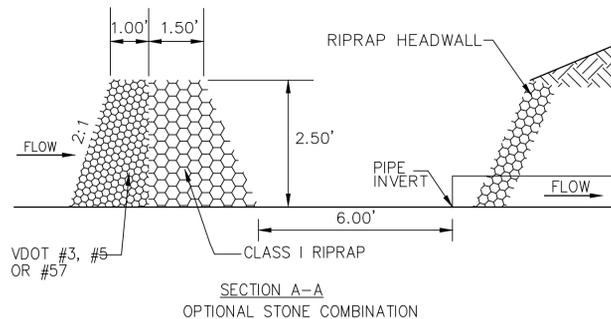
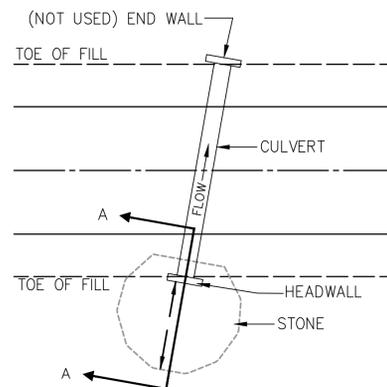
150 LBS.

* PERENNIAL RYEGRASS WILL GERMINATE FASTER AND AT LOWER SOIL TEMPERATURES THAN FESCUE, THEREBY PROVIDING COVER AND EROSION RESISTANCE FOR SEEDBED.

** USE SEASONAL NURSE CROP IN ACCORDANCE WITH SEEDING DATES AS STATED BELOW:
 MARCH, APRIL THROUGH MAY 15TH ANNUAL RYE
 MAY 16TH THROUGH AUGUST 15TH FOXTAIL MILLET
 AUGUST 16TH THROUGH SEPTEMBER, OCTOBER ANNUAL RYE
 NOVEMBER THROUGH FEBRUARY WINTER RYE

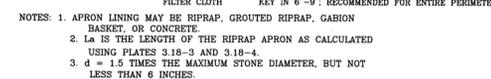
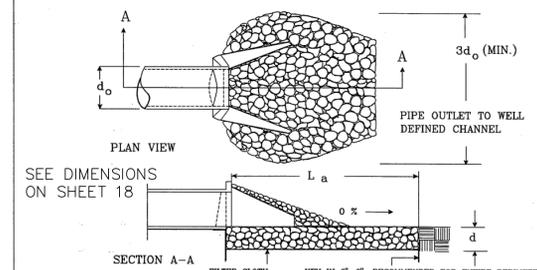
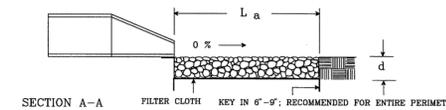
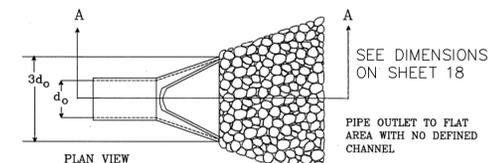
*** IF FLATPEA IS USED, INCREASE TO 30 LBS./ACRE. ALL LEGUME SEED MUST BE PROPERLY INOCULATED. WEEPING LOVEGRASS MAY ALSO BE INCLUDED IN ANY SLOPE OR LOW-MAINTENANCE MIXTURE DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES.

III - 302

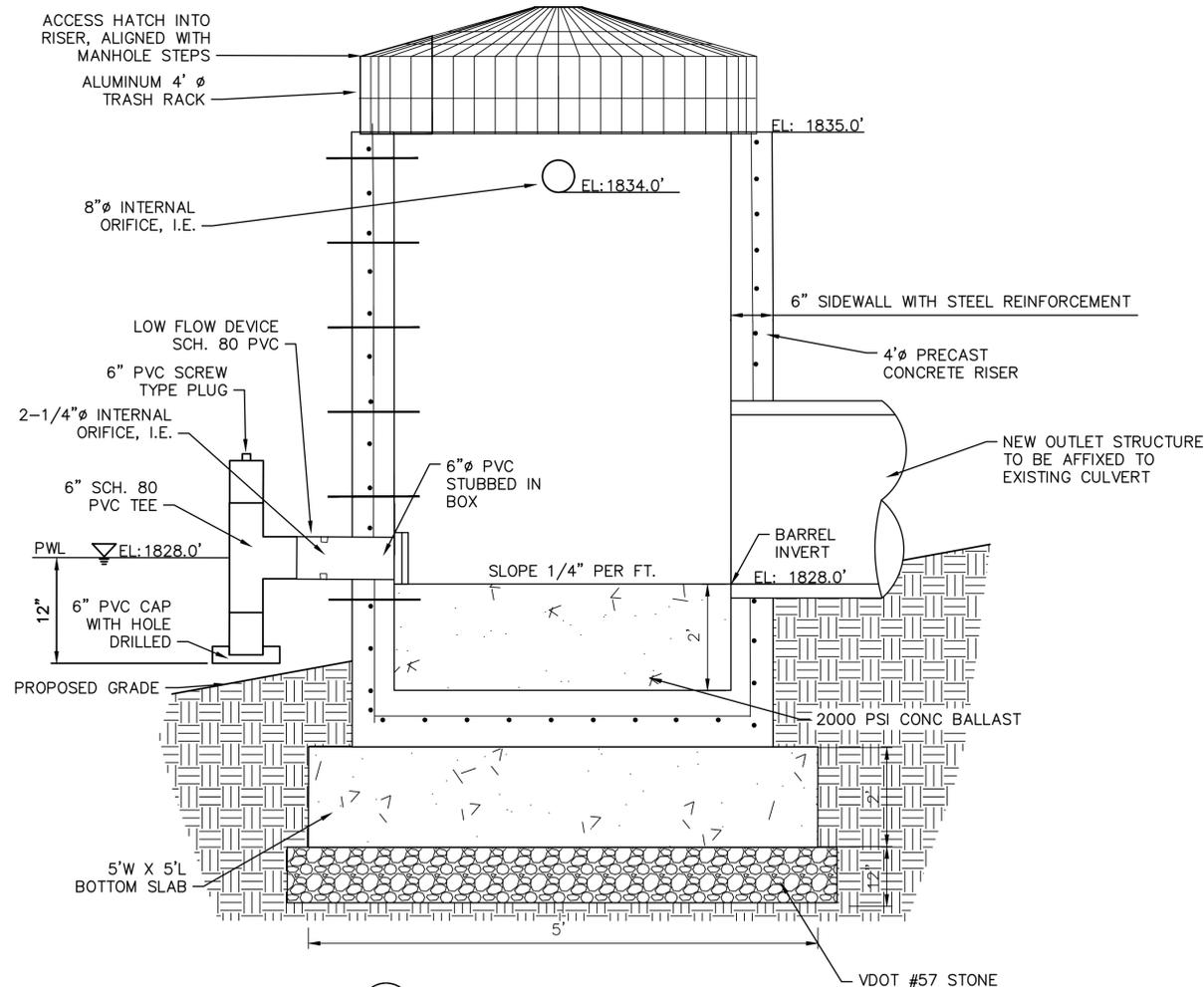


CIP CULVERT INLET PROTECTION DETAIL
 NOT TO SCALE

PIPE OUTLET CONDITIONS



OP OUTLET PROTECTION
 SOURCE: PLATE 3.18-1 VA ESCH
 NOT TO SCALE, SEE DIMENSIONS ON SHEET 18



1 BASIN OUTLET STRUCTURE
 7.8/20 NOT TO SCALE



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

DETAILS 2
 PROJECT TITLE
SWP #498 FINAL COVER SYSTEM
 CONSTRUCTION DRAWINGS

CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

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 DATE:
 8/18/2023
 SCALE:
 AS SHOWN
 DRAWING NO.

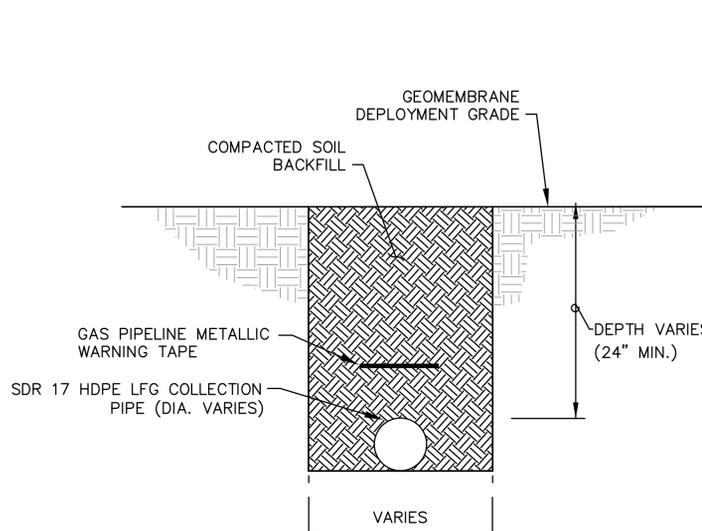
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| DATE | |
| REVISION | |
| NO. | |

SHEET TITLE: **DETAILS 3**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

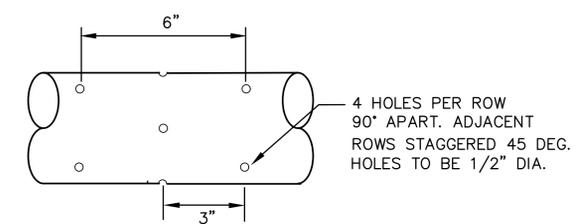
SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO.

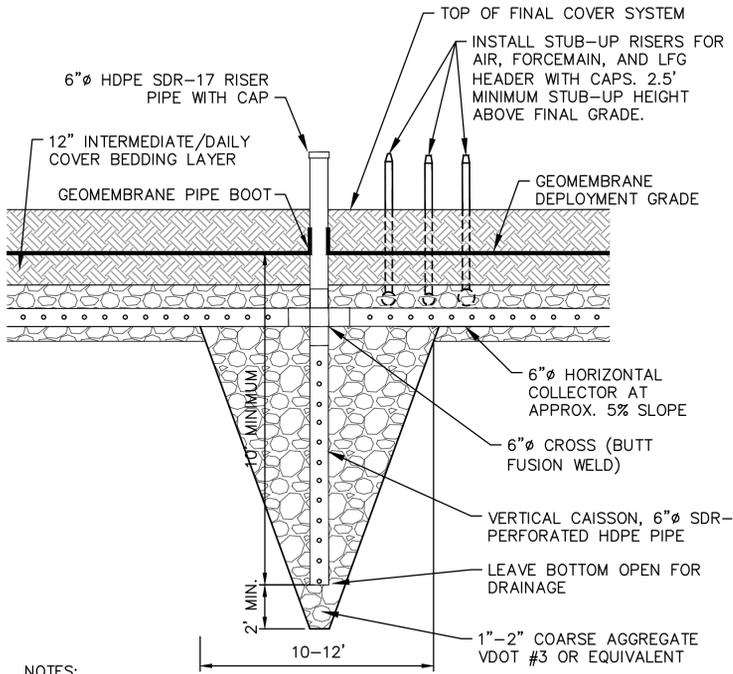


NOTE:
 1. SEE LFG REQUIREMENTS ON SHEET 2

1 LFG COLLECTION PIPE TRENCH DETAIL
 NOT TO SCALE

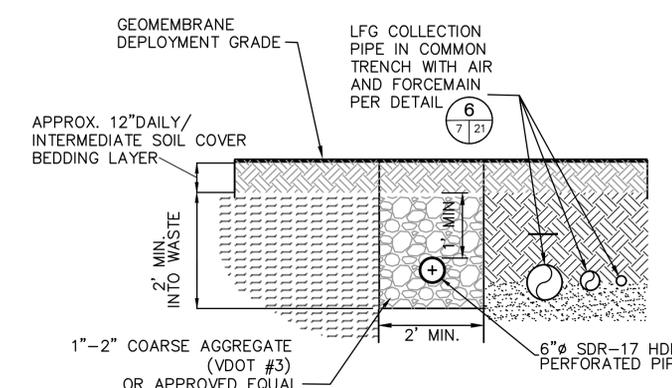


4 PERFORATED PIPE DETAIL
 NOT TO SCALE



NOTES:
 1. IF MINIMUM PIT DEPTH CANNOT BE REACHED, AN ALTERNATE DRAINAGE PIT LOCATION WILL BE SELECTED BY ENGINEER.

7 LFG DRAINAGE PIT WITH CROSS AND RISER
 NOT TO SCALE



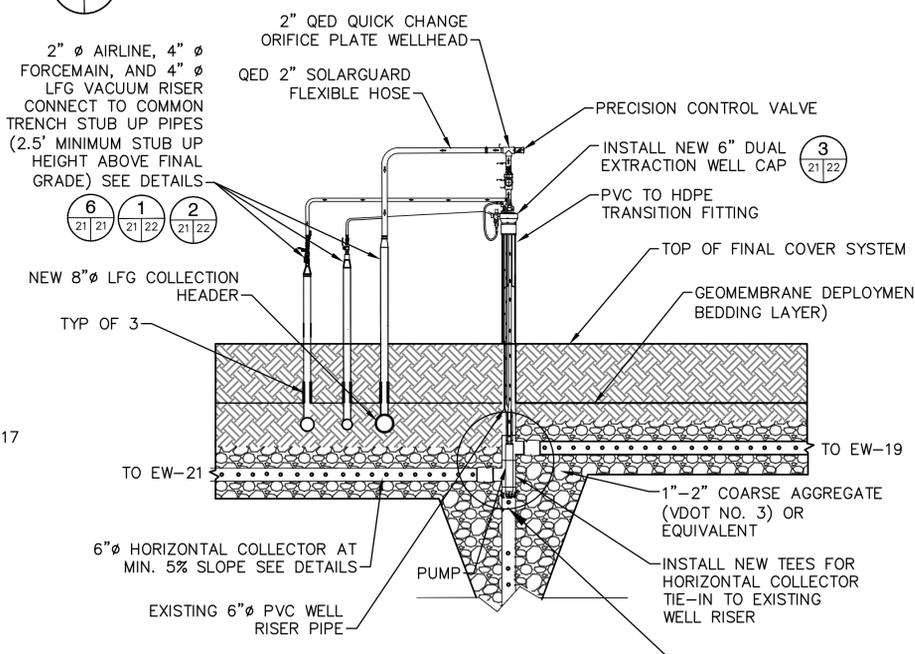
NOTE:
 1. MAINTAIN 5% MINIMUM SLOPE ON COLLECTOR

2 HORIZONTAL COLLECTOR SECTION
 NOT TO SCALE

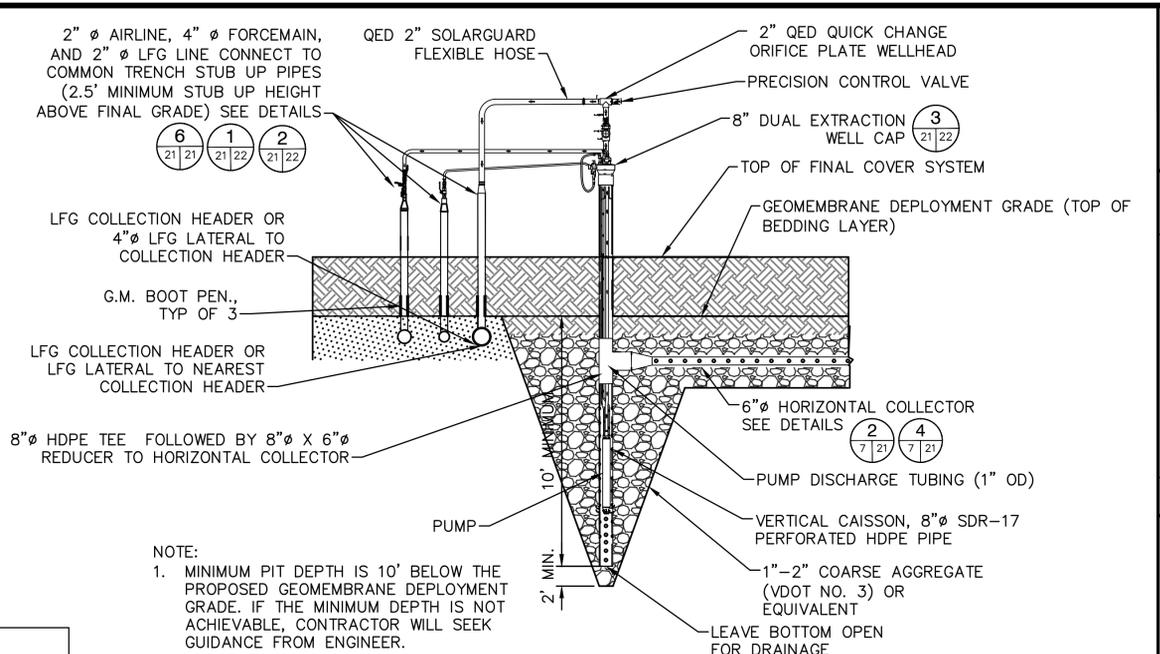
| ID | NORTHING | EASTING | V.C. DIAMETER (IN) | MIN. V.C. DEPTH (FT) | MAX. PUMP DEPTH (FT) |
|------|------------|-------------|--------------------|----------------------|----------------------|
| HC-4 | 3398897.93 | 10412747.05 | 8 | 10 | 8 |
| HC-5 | 3399041.94 | 10412793.83 | 8 | 10 | 8 |
| HC-6 | 3399142.91 | 10412911.62 | 8 | 10 | 8 |
| HC-7 | 3399043.70 | 10413262.99 | 8 | 10 | 8 |
| HC-8 | 3398902.34 | 10413232.56 | 8 | 10 | 8 |
| HC-9 | 3398672.22 | 10413461.70 | 8 | 10 | 8 |

- NOTES:
- CONTRACTOR SHALL SURVEY PROPOSED WELLHEAD LOCATIONS FOR ACTUAL GROUND ELEVATIONS BEFORE CONSTRUCTION.
 - CONTRACTOR SHALL SUBMIT SURVEY INFORMATION, INCLUDING NORTHING AND EASTING AND ACTUAL SURFACE ELEVATIONS, TO OWNER AND ENGINEER FOR POTENTIAL ADJUSTMENTS TO EXCAVATION DEPTHS. FOLLOWING REVIEW OF ADJUSTED WELL SCHEDULE, CONTRACTOR SHALL OBTAIN WRITTEN AUTHORIZATION FROM OWNER AND ENGINEER PRIOR TO EXCAVATION.
 - PNEUMATIC PUMPS SHALL BE PUMP ONE "ONE PUMP" PER ENGINEER'S DIRECTION
 - PUMPS TO BE INSTALLED IN PROPOSED HORIZONTAL COLLECTOR CAISSON WELLS. PUMP DEPTH VALUES PRESENTED ABOVE ARE ULTIMATE MAXIMUM DEPTHS FOR PURPOSE OF DEFINING LENGTHS OF HOSES AND PULL CABLE, AND ARE PRELIMINARY AND BASED ON WELL SCHEDULE FOR PROPOSED WELLS.
 - WELL DEPTH AND DEPTH TO BOTTOM OF PUMP MEASURED FROM GEOMEMBRANE DEPLOYMENT GRADE. INITIAL (AND FINAL) DEPTH TO PUMP BOTTOM IS VARIABLE BASED ON ACTUAL WELL DEPTH. THIS WILL BE DETERMINED PRIOR TO PUMP INSTALLATION.
 - V.C. = VERTICAL CAISSON

5 LANDFILL GAS HORIZONTAL COLLECTOR WELLHEAD SCHEDULE
 NOT TO SCALE

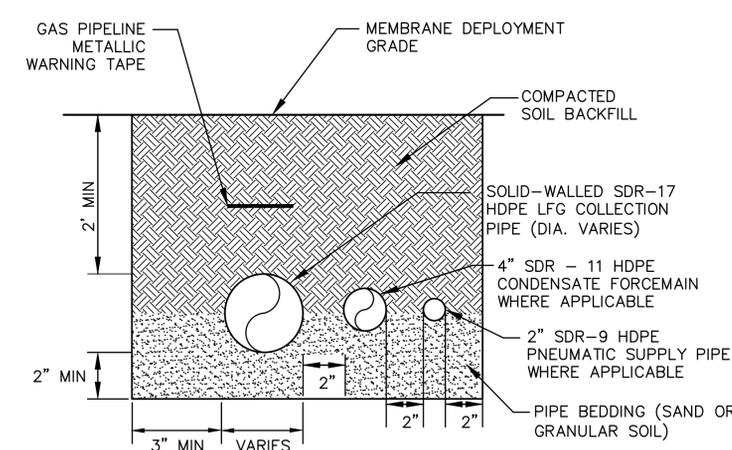


8 NEW HDPE HORIZONTAL COLLECTOR TIE-IN TO EXISTING EW-20
 NOT TO SCALE



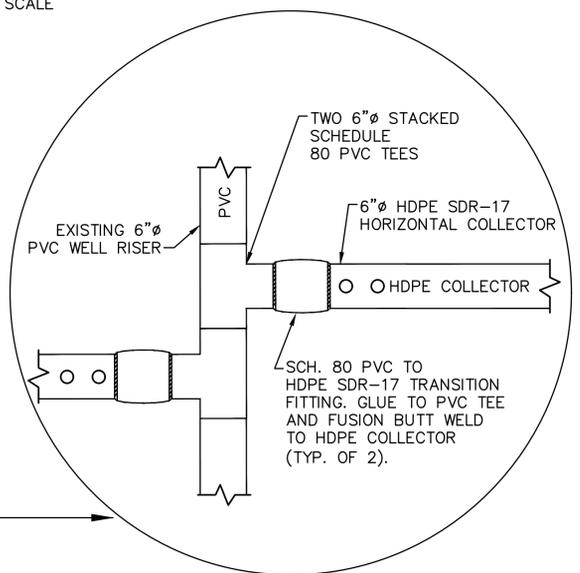
NOTE:
 1. MINIMUM PIT DEPTH IS 10' BELOW THE PROPOSED GEOMEMBRANE DEPLOYMENT GRADE. IF THE MINIMUM DEPTH IS NOT ACHIEVABLE, CONTRACTOR WILL SEEK GUIDANCE FROM ENGINEER.

3 HORIZONTAL COLLECTOR TERMINUS WITH NEW VERTICAL CAISSON WELL AND DRAINAGE PIT
 NOT TO SCALE



NOTE:
 1. FOR AIR AND FORCEMAIN IN COMMON TRENCH WITHOUT LFG COLLECTION PIPE, FOLLOW GUIDANCE IN THIS DETAIL. INCLUDE WARNING TAPE CENTERED OVER AIR AND FORCEMAIN.

6 BURIED LFG COLLECTION PIPE IN COMMON TRENCH WITH AIR AND FORCEMAIN DETAIL
 NOT TO SCALE



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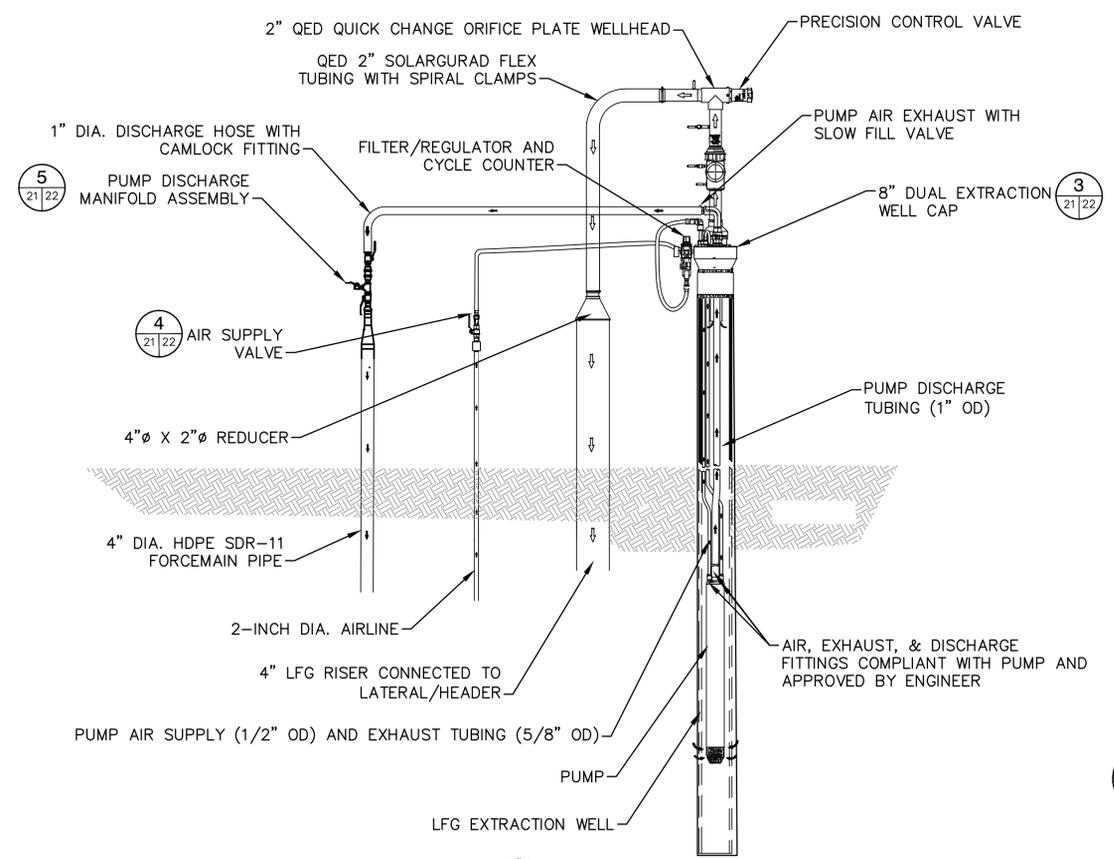
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| DATE | |
| REVISION | |
| NO. | |

SHEET TITLE: **DETAILS 4**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

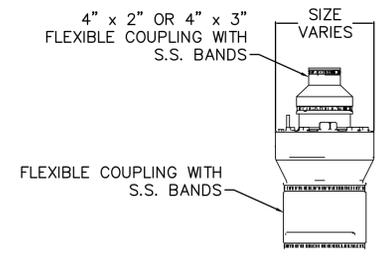
CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
 PH. (804) 378-7440 FAX. (804) 378-7433

CADD FILE: 02218208.05
 DATE: 8/18/2023
 SCALE: AS SHOWN
 DRAWING NO.

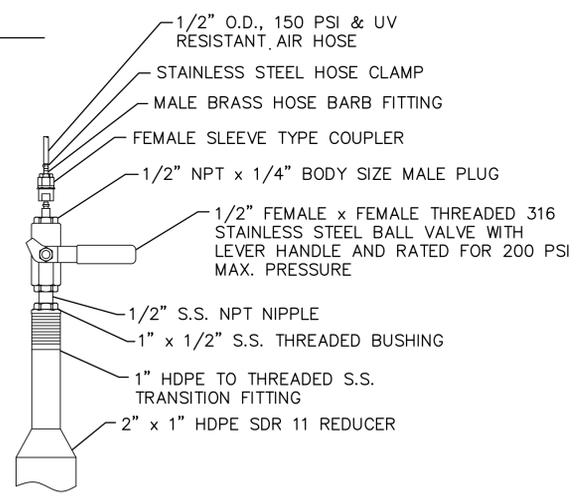


1 LFG WELL WITH PUMP DETAIL
 NOT TO SCALE

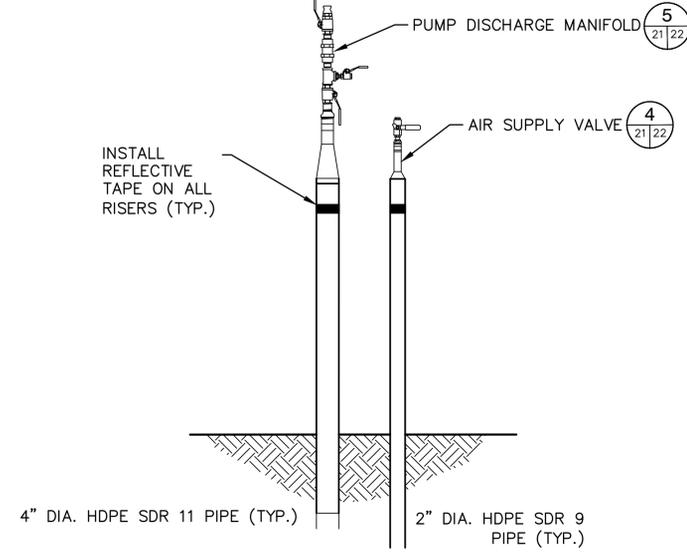


NOTES:
 1. INSTALL PROPER WELL HEAD SIZE ACCORDING TO WELL SCHEDULE

3 DUAL EXTRACTION WELL CAP
 NOT TO SCALE

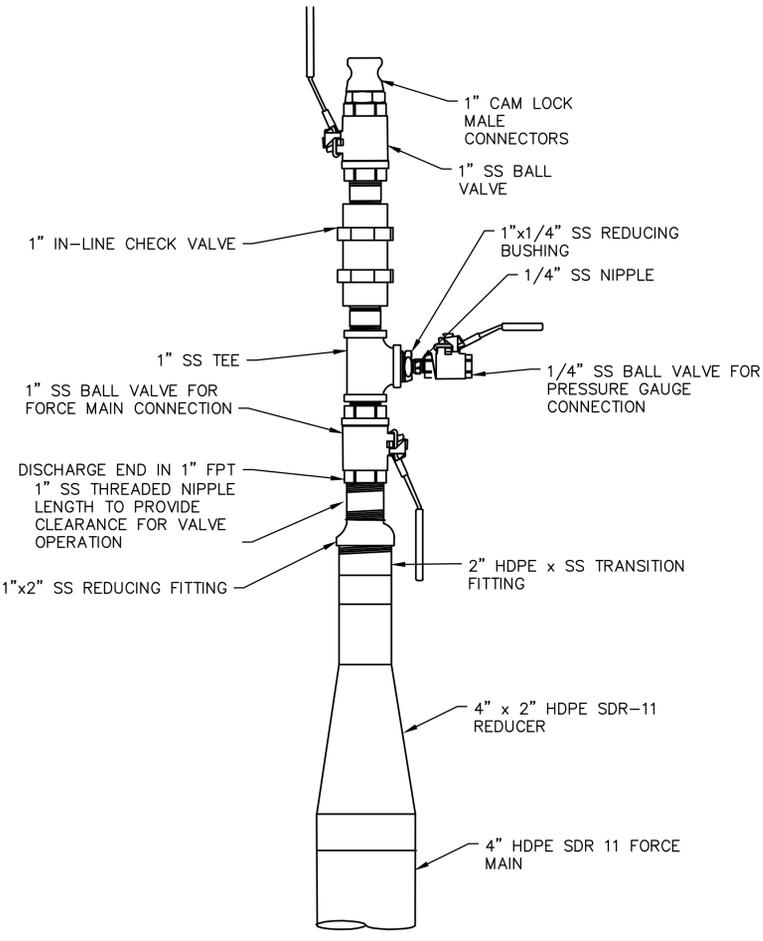


4 AIR SUPPLY VALVE DETAIL
 NOT TO SCALE

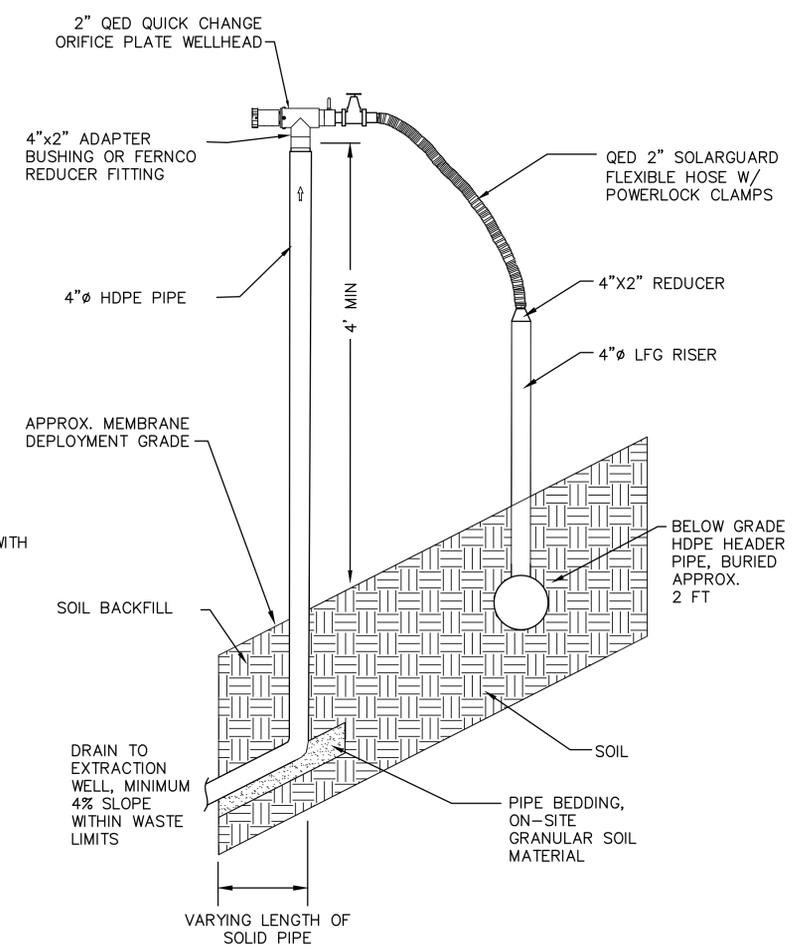


NOTES:
 1. ALL 2" AND 4" PIPE AND FITTINGS SHALL BE BUTT WELDED.
 2. WHERE NEW AIRLINE AND FORCE MAIN PIPING IS INSTALLED TO AN EXISTING WELL WITH PUMP, THE OLD AIRLINE AND FORCE MAIN PIPING IS TO BE ABANDONED AND NEW PIPING CONNECTED TO THE DUAL EXTRACTION WELL.

2 STUB-UP FOR ABOVE GRADE AIR AND FORCEMAIN PIPING DETAIL
 NOT TO SCALE



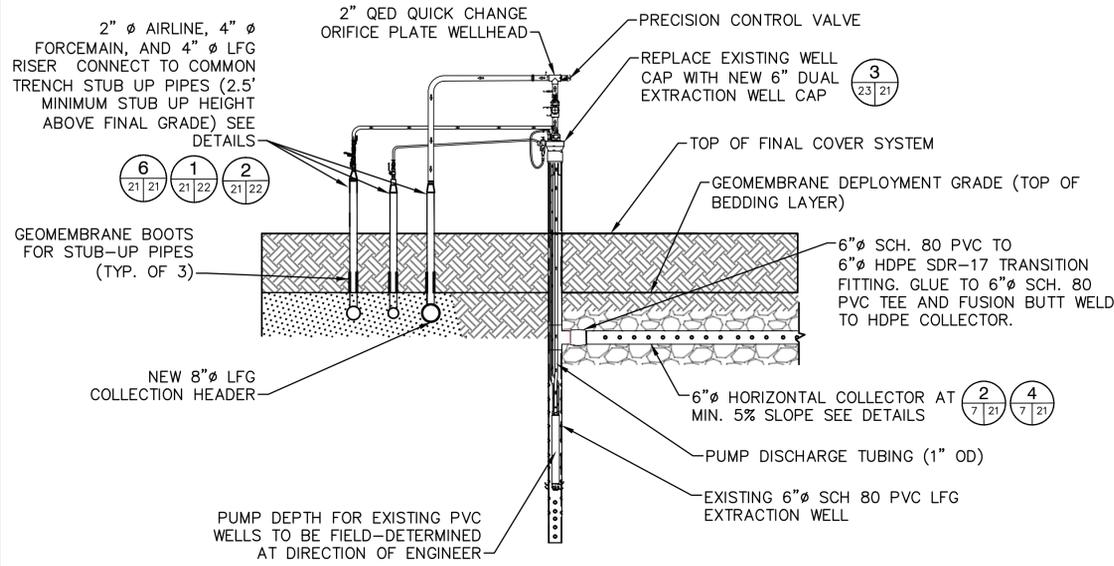
5 PUMP DISCHARGE MANIFOLD DETAIL
 NOT TO SCALE



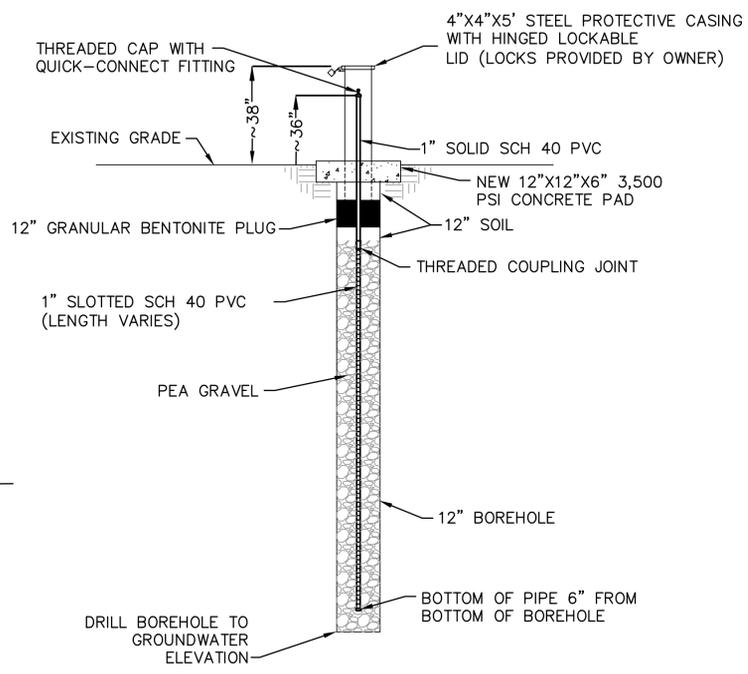
6 REMOTE WELLHEAD
 NOT TO SCALE

GENERAL NOTES:
 1. PNEUMATIC PUMPS SHALL BE PUMP ONE "ONE PUMP" OR EQUIVALENT PER ENGINEER'S DIRECTION
 2. PUMPS TO BE INSTALLED IN PROPOSED WELLS. PUMP DEPTH VALUES PRESENTED ABOVE ARE ULTIMATE MAXIMUM DEPTHS FOR PURPOSE OF DEFINING LENGTHS OF HOSES AND PULL CABLE, AND ARE PRELIMINARY AND BASED ON WELL SCHEDULE FOR PROPOSED WELLS.
 3. WELL DEPTH AND DEPTH TO BOTTOM OF PUMP MEASURED FROM TOP OF CASING.
 4. 2.5' MINIMUM STUB UP HEIGHT ABOVE FINAL GRADE FOR AIR LINE, FORCEMAIN, AND LFG LINE.

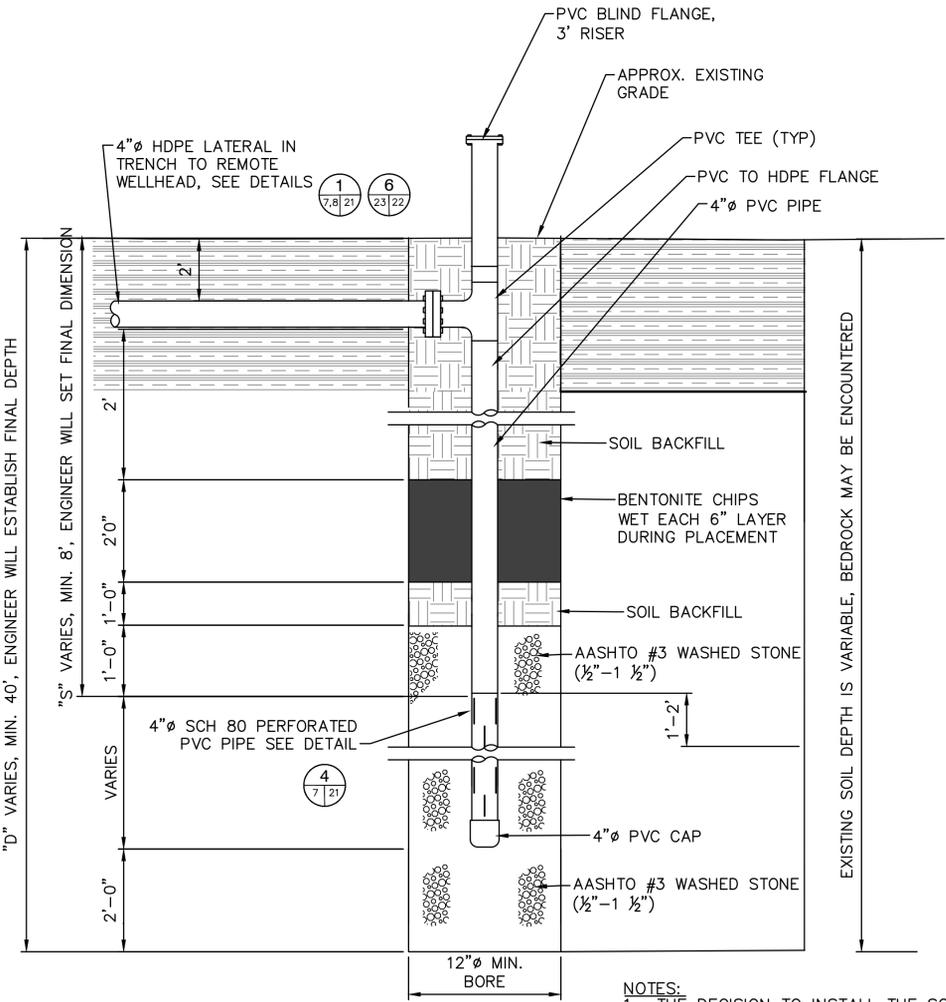
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1 HORIZONTAL COLLECTOR TERMINUS WITH EXISTING PVC WELL NOT TO SCALE

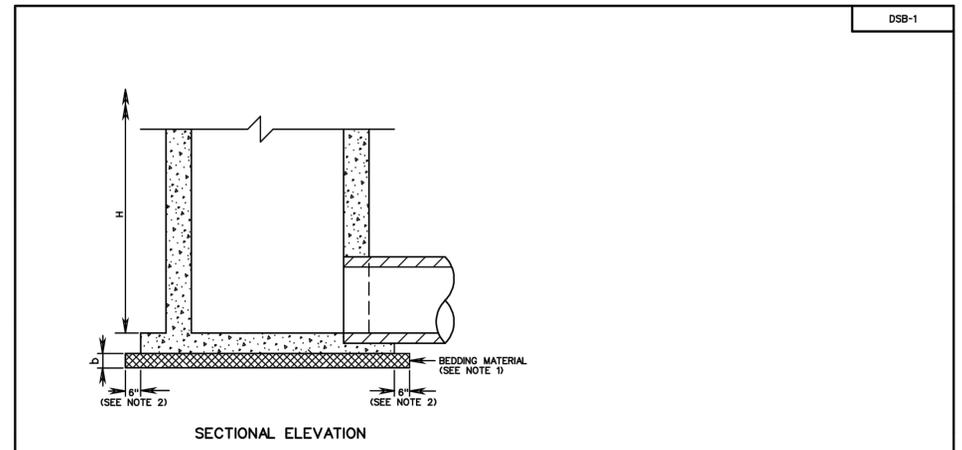


2 NOT TO SCALE



3 REMOTE SOIL EXTRACTION WELL DETAIL N.T.S.

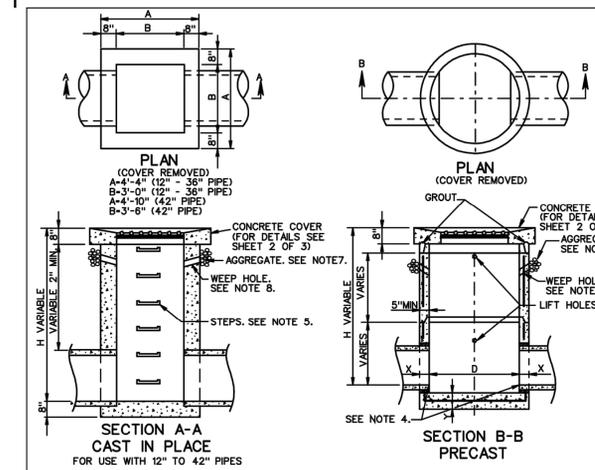
- NOTES:
- THE DECISION TO INSTALL THE SOIL GAS EXTRACTION WELLS IS PENDING PER FURTHER INVESTIGATION BY SCS.
 - INSTALL (1) MARKER POST AT EACH REMOTE WELL ADJACENT TO ACCESS BOX.
 - USE LARGEST DIAMETER BOREHOLE AVAILABLE FOR AIR ROTARY DRILL METHOD



BEDDING THICKNESS TABLE

| FOUNDATION TYPE | BEDDING THICKNESS (D) |
|-----------------|--|
| NORMAL EARTH | 4" FOR H < 10' 6" FOR H > 10' |
| ROCK | 1" PER FOOT OF H, MAX. 8" |
| SOFT & YIELDING | AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER |

- NOTES
- DEPTH OF INLET (H) TO BE SHOWN ON PLANS.
 - THE "H" DIMENSION SHOWN ON THE STANDARDS AND SPECIFIED ON THE PLANS WILL BE MEASURED FROM THE INVERT OF THE OUTFALL PIPE TO THE TOP OF THE STRUCTURE. PLAN "H" DIMENSIONS ARE APPROXIMATE ONLY FOR ESTIMATING PURPOSES AND THE ACTUAL DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FROM FIELD CONDITIONS. MAXIMUM DEPTH (H) TO BE 12'-8".
 - WHEN SPECIFIED ON THE PLANS THE INVERT IS TO BE SHAPED IN ACCORDANCE WITH STANDARD ST-1. THE COST OF FURNISHING AND PLACING ALL MATERIALS INCIDENTAL TO THE SHAPING IS TO BE INCLUDED IN THE BID PRICE FOR THE STRUCTURE.
 - IN THE EVENT THE INVERT OF THE OUTFALL PIPE IS HIGHER THAN THE BOTTOM OF THE STRUCTURE, THE INVERT OF THE STRUCTURE SHALL BE SHAPED WITH GROUT MORTAR TO PREVENT STANDING OR PONDING OF WATER IN THE STRUCTURE. THE COST OF FURNISHING AND PLACING ALL MATERIALS INCIDENTAL TO THE SHAPING IS TO BE INCLUDED IN THE BID PRICE FOR THE STRUCTURE.
 - STEPS ARE TO BE PROVIDED WHEN H IS 4'-0" OR GREATER. SEE DETAILS. SEE STANDARD ST-1.
 - REINFORCED CONCRETE FOOTING MAY BE PRECAST OR CAST-IN-PLACE. TWO LIFTING HOOPS OF FABRICATORS DESIGN TO BE PROVIDED IN PRECAST FOOTING.
 - 4" DEPTH AGGREGATE #68, #78, OR #8 X 6" WIDTH.
 - 3" DIAMETER WEEP HOLE WITH 1/2" PLASTIC HARDWARE CLOTH 1/2" MESH OR GALVANIZED STEEL WIRE. MINIMUM WIRE DIAMETER 0.03" NUMBER 4 MESH HARDWARE CLOTH ANCHORED FIRMLY TO THE OUTSIDE OF THE STRUCTURE.
 - THE TYPE OF INLET (PRECAST OR CAST IN PLACE), DETAILED HEREON, TO BE CONSTRUCTED, WILL BE AT THE OPTION OF THE CONTRACTOR.
 - FOR DETAILS OF CONCRETE COVER, COLLAR AND GRATE, AND THE METHOD OF PLACING APPROACH GUTTER SEE SHEET 2 OF 3.
 - CAST-IN PLACE CONCRETE IS TO BE CLASS A3 (3000 PSI). PRECAST CONCRETE IS TO BE 4000 PSI.
 - CONCRETE QUANTITIES SHOWN ARE FOR INDICATED DEPTH (H) WITHOUT PIPES. THE AMOUNT DISPLACED BY PIPES MUST BE DEDUCTED TO OBTAIN TRUE QUANTITIES. FOR INLETS OF DIFFERENT DEPTHS ADD OR SUBTRACT THE APPROPRIATE CUBIC YARDS OF CONCRETE FOR EACH FOOT OF DEPTH.
 - PAVED DITCHES ARE TO BE TRANSITIONED TO MEET INLET GUTTER AS SHOWN IN STANDARD PG-2A.
 - PROVIDE SAFETY SLABS WHEN SPECIFIED ON THE PLANS.



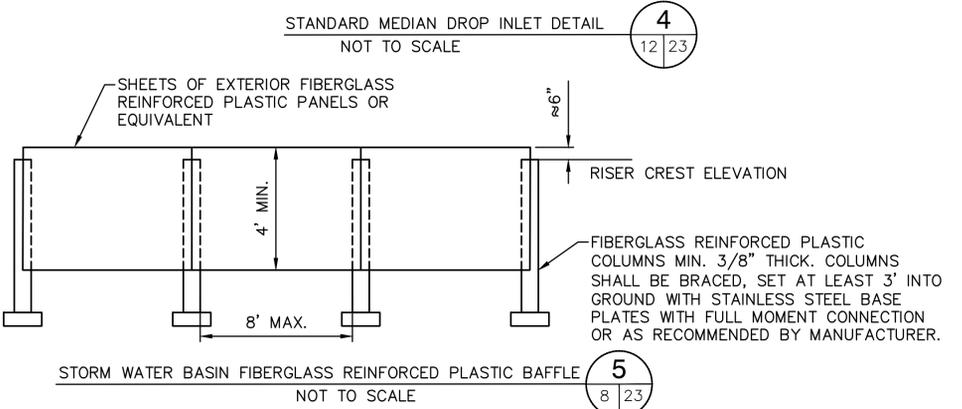
RECOMMENDED MINIMUM HEIGHT CHART

| PIPE SIZE | H DIMENSION |
|-----------|-------------|
| 12" | 2'-6" |
| 15" | 2'-9 1/4" |
| 18" | 3'-0 1/2" |
| 21" | 3'-3 3/4" |
| 24" | 3'-7" |
| 27" | 3'-10 1/4" |
| 30" | 4'-1 1/2" |
| 33" | 4'-4 3/4" |
| 36" | 4'-8" |
| 42" | 5'-2 1/2" |

CONCRETE CUBIC YARDS: .947 1.045 1.143 1.339 1.535 1.731 1.927

INCREMENT PER FOOT OF ADDITIONAL DEPTH (H) 1/4" = 0.362 CU. YDS. (12" - 36" PIPE)
1/2" = 0.410 CU. YDS. (42" PIPE)

STANDARD MEDIAN DROP INLET 12" TO 42" PIPE VIRGINIA DEPARTMENT OF TRANSPORTATION



| NO. | DATE | REVISION |
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PROJECT TITLE
SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS

SHEET TITLE
DETAILS 5

CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
2655 VALLEY DRIVE
BRISTOL, VA 24201

CLIENT
SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK., MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

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23 of 26



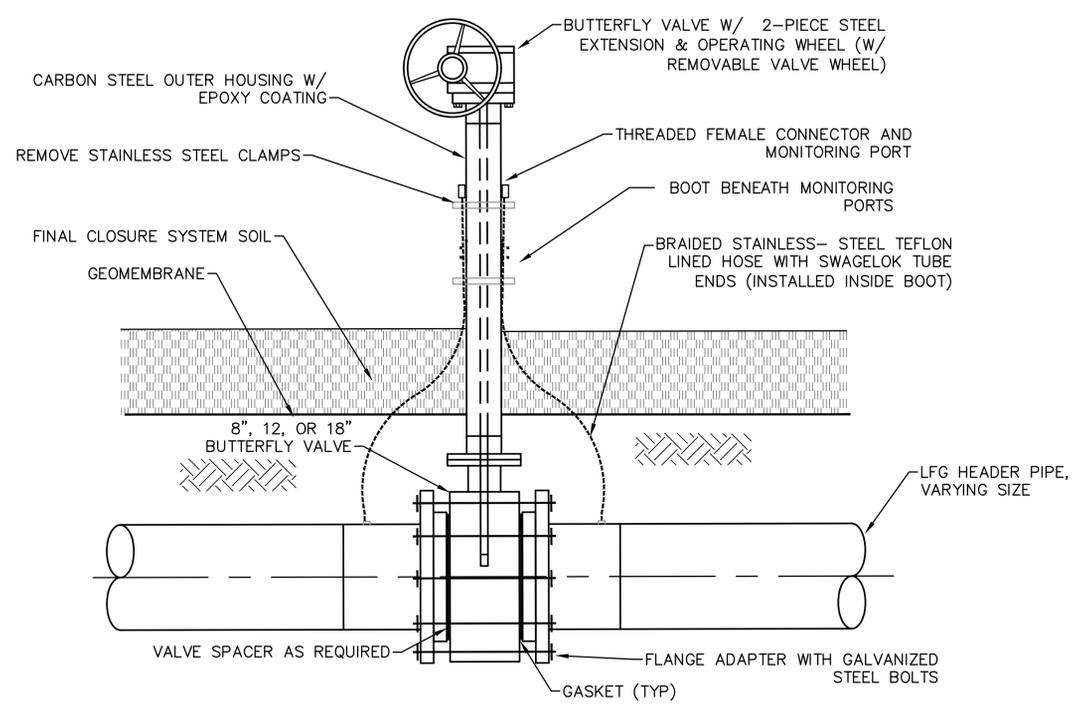
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| NO. | |

SHEET TITLE: **DETAILS 6**
 PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

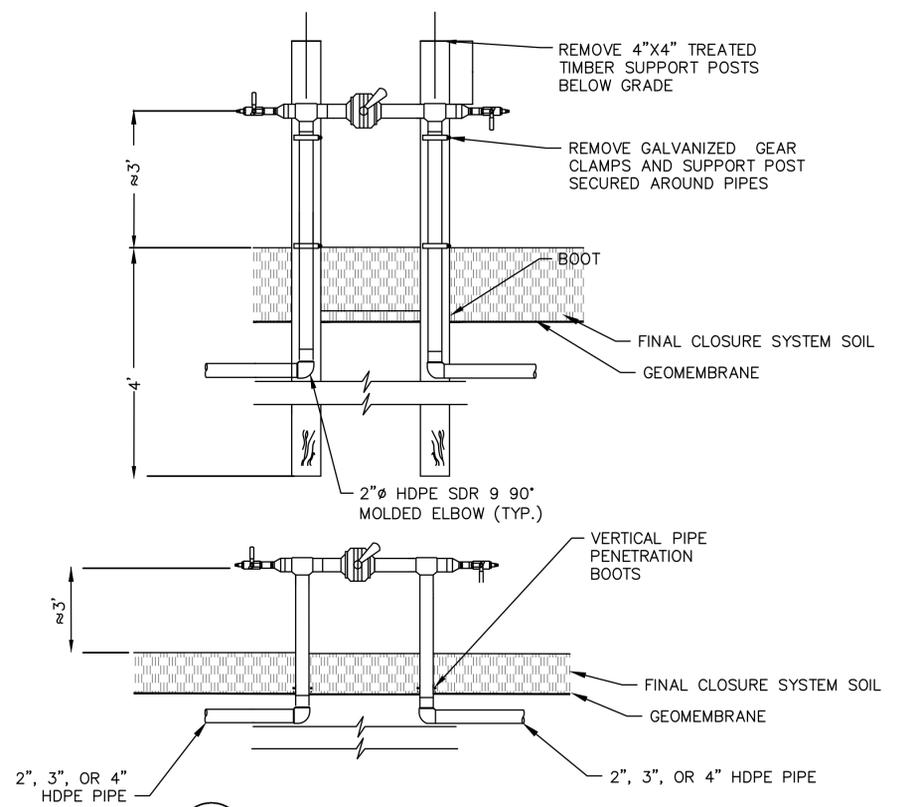
CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
 2655 VALLEY DRIVE
 BRISTOL, VA 24201

SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS, INC.
 16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
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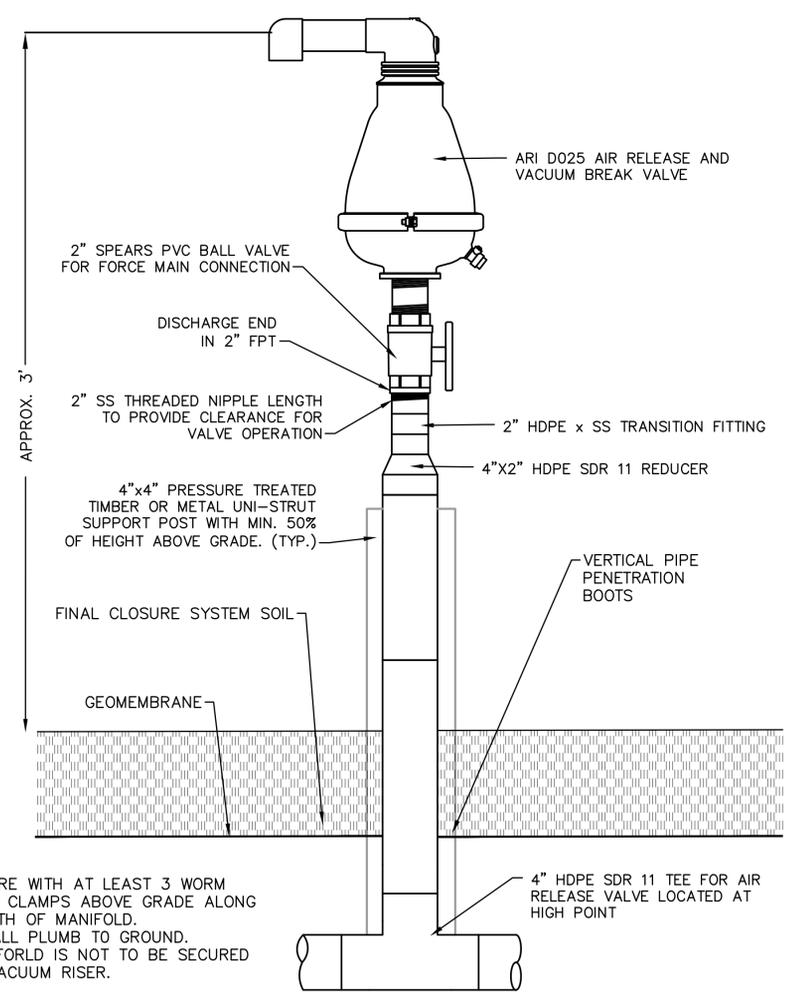
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 DATE: 8/18/2023
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 DRAWING NO.



1 BELOW GRADE LFG HEADER ISOLATION VALVE DETAIL
 7/24 NOT TO SCALE



2 AIRLINE/FORCEMAIN ISOLATION VALVE BOOT DETAIL
 7/24 NOT TO SCALE



3 FORCE MAIN AIR RELEASE VALVE DETAIL
 7/24 NOT TO SCALE

2016 ROAD & BRIDGE STANDARDS

NOTES:

- CONCRETE TO BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH.
- IF PIPE IS TO BE SKEWED THE OPENING WILL BE ADJUSTED TO ACCOMMODATE ANGLES UP TO 45°.
- REINFORCING STEEL IN ACCORDANCE WITH ASTM A-615 (REINFORCING BARS).
- PIPE OPENINGS IN PRECAST DRAINAGE UNITS SHALL NOT EXCEED 4 INCHES AT ANY GIVEN POINT BETWEEN THE PIPE AND THE PRECAST UNIT.
- DIMENSIONS SHOWN ARE MINIMUM. ACTUAL MEASUREMENTS MAY VARY WITH MANUFACTURER'S TOLERANCE.
- IN NO CASE SHALL TOP OF ENDWALL PROJECT ABOVE FILL SLOPE, DITCH SLOPE, OR SHOULDER.
- HEADWALL TO BE BEVELED IN ALL AREAS EXCEPT WHERE A CONFLICT WITH INVERT OR WINGWALL OCCUR.
- BEVEL EDGE IS REQUIRED ON THE HEADWALL AT THE INLET END OF THE CULVERT. HEADWALL AT OUTLET END MAY BE EITHER SQUARE EDGE OR BEVELED.
- 3/4" CHAMFER MAY BE PROVIDED ON ALL EDGES AT MANUFACTURER'S OPTION.

| ENDWALL FOR CIRCULAR PIPE | | | | | | | ENDWALL FOR ELLIPTICAL PIPE | | | | | | | | |
|---------------------------|---------|-----------|-----------|------------|------------|------------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DIAMETER OF PIPE CULVERT | | | | | | | SIZE OF ELLIPTICAL PIPE CULVERT (SPAN x RISE) | | | | | | | | |
| D | 12" | 15" | 18" | 21" OR 24" | 27" OR 30" | 33" OR 36" | S x D | 23" x 14" | 30" x 19" | 34" x 22" | 38" x 24" | 42" x 27" | 45" x 28" | 49" x 32" | 53" x 34" |
| H | 2'-0" | 2'-3" | 2'-6" | 3'-2" | 3'-10" | 4'-4" | L | 1'-10" | 2'-4" | 2'-7" | 2'-9" | 3'-1" | 3'-3" | 3'-6" | 3'-8" |
| L | 4'-0" | 5'-0" | 6'-0" | 8'-0" | 10'-0" | 12'-0" | l | 5'-5" | 7'-2" | 8'-6" | 9'-2" | 10'-2" | 10'-11" | 12'-1" | 12'-11" |
| a | 0'-1/4" | 0'-1/4" | 0'-2" | 0'-2 1/2" | 0'-3 1/4" | 0'-3 3/4" | g | 0'-2 1/2" | 0'-3 1/4" | 0'-3 1/2" | 0'-4" | 0'-4 1/2" | 0'-4 3/4" | 0'-5" | 0'-5 1/2" |
| b | 0'-1" | 0'-1 1/4" | 0'-1 1/2" | 0'-2" | 0'-2 1/2" | 0'-3" | b | 0'-2" | 0'-2 1/2" | 0'-2 3/4" | 0'-3" | 0'-3 1/2" | 0'-3 3/4" | 0'-4" | 0'-4 1/2" |

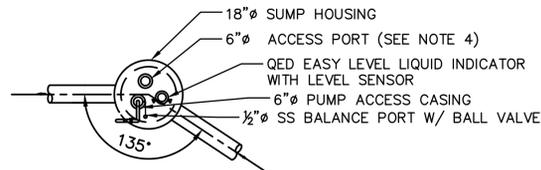
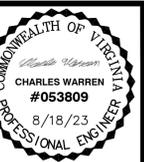
VDOT
 ROAD AND BRIDGE STANDARDS
 SHEET 1 OF 1 REVISION DATE 101.02

PRECAST ENDWALL FOR PIPE CULVERTS
 12" - 36" CIRCULAR AND 23" x 14" - 53" x 34" ELLIPTICAL PIPES
 VIRGINIA DEPARTMENT OF TRANSPORTATION
 2016 ROAD & BRIDGE STANDARDS

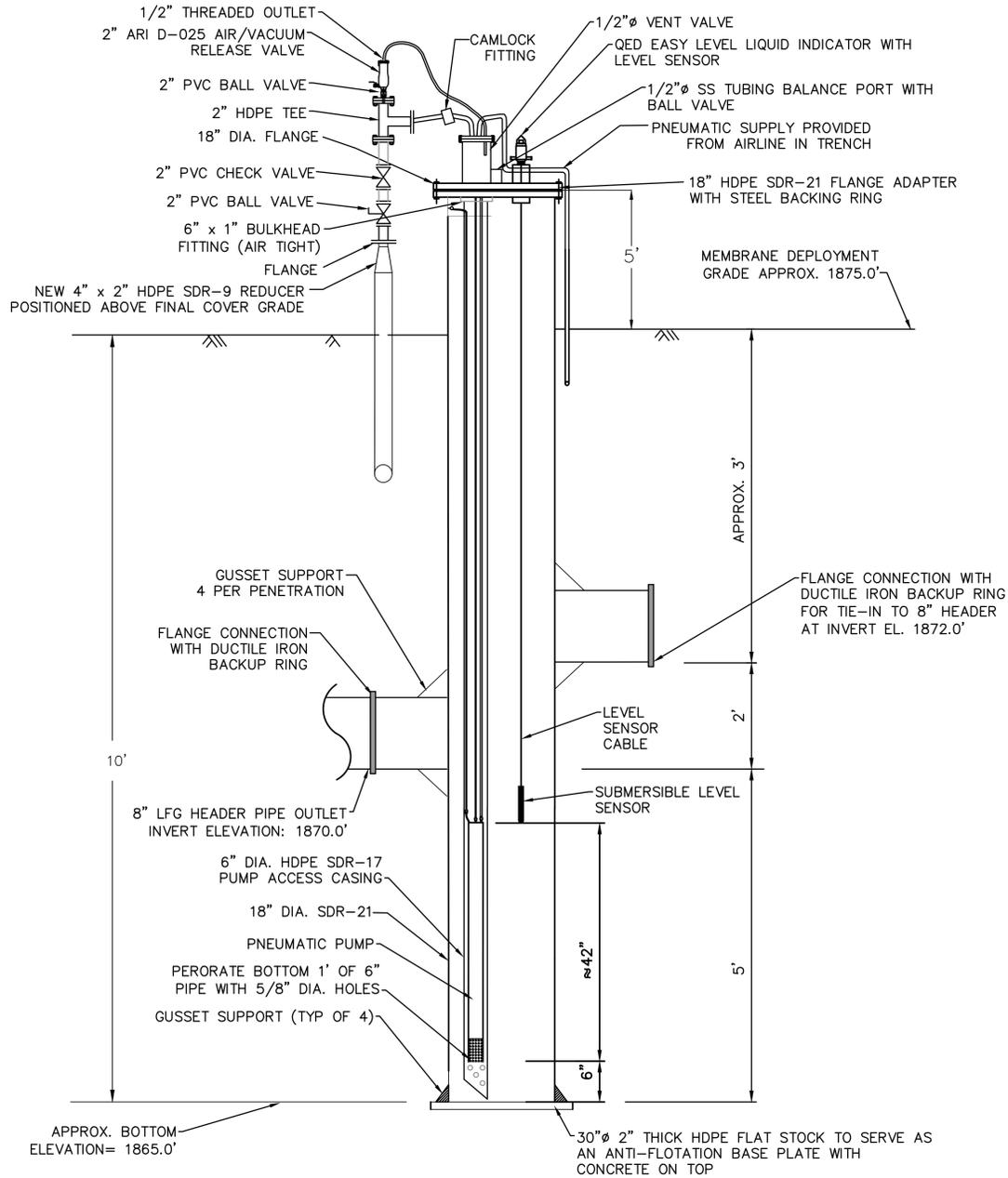
SPECIFICATION REFERENCE: 105 302

4 VDOT PRECAST CULVERT ENDWALL DETAIL
 12/24 NOT TO SCALE

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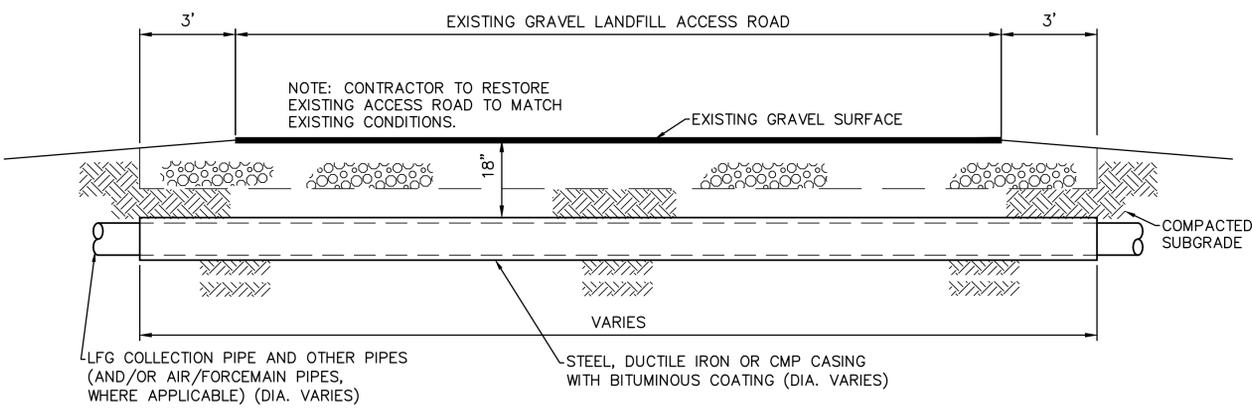


PLAN VIEW

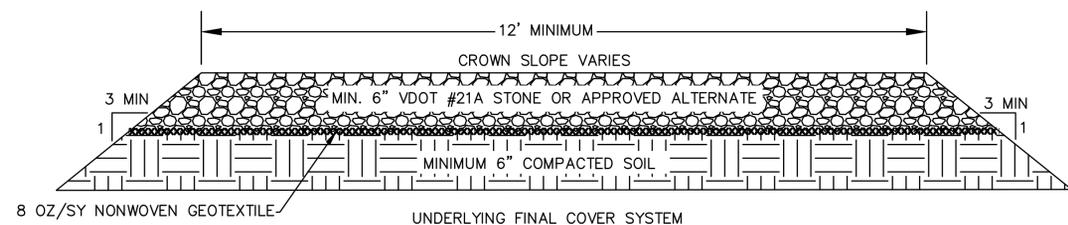


1 CONDENSATE SUMP (CS-1) DETAIL
7/25 NOT TO SCALE

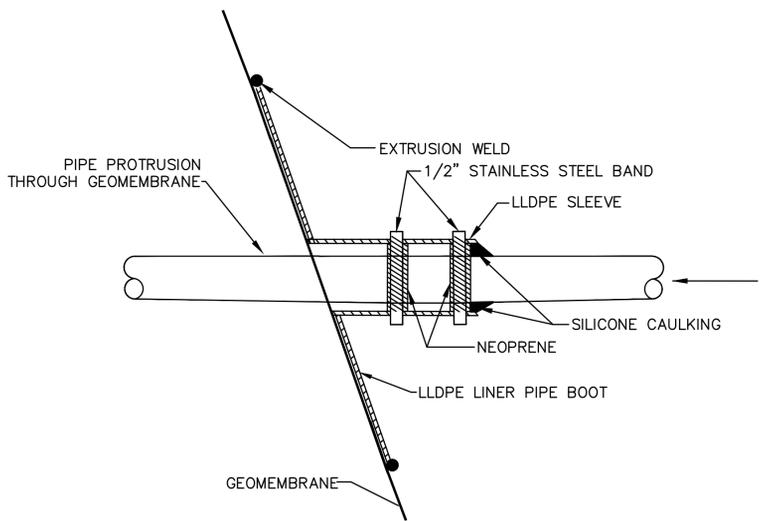
- NOTES:
1. LFG HEADER PIPE INLET AND OUTLET ORIENTED AT 135 DEGREES.
 2. SUPPLY INSULATION ON ALL ABOVEGRADE PUMP DISCHARGE HOSE AND EXPOSED FORCEMAIN PIPING.
 3. CONTRACTOR SHALL PLACE 1-FOOT THICK LAYER OF CONCRETE ONTO TOP OF ANTI-FLOTATION BASE PLATE TO COUNTERACT BUOYANCY POTENTIAL.
 4. SUMP LID SHALL INCLUDE A SECOND 6" ACCESS PORT INTO SUMP VESSEL.



2 ROAD CROSSING DETAIL
7/25 NOT TO SCALE



3 ACCESS ROAD DETAIL
7/25 NOT TO SCALE



4 PIPE BOOT THROUGH GEOMEMBRANE
7/25 NOT TO SCALE

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SHEET TITLE: **DETAILS 7**
PROJECT TITLE: **SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS**

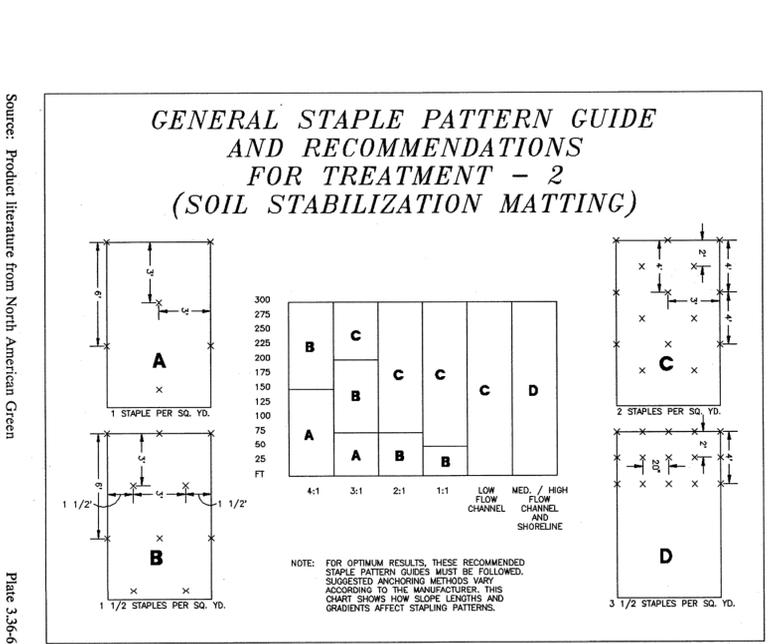
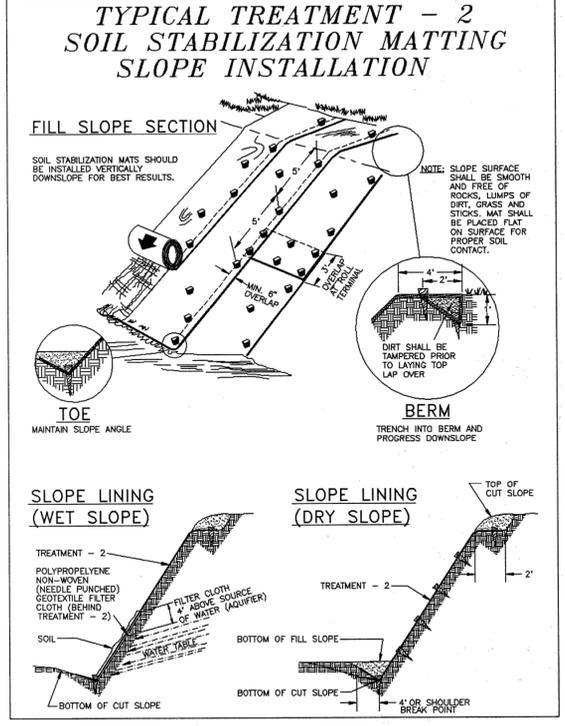
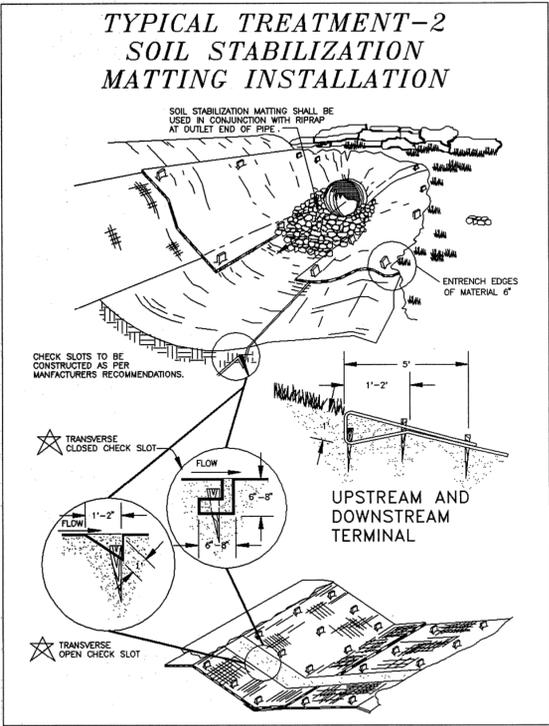
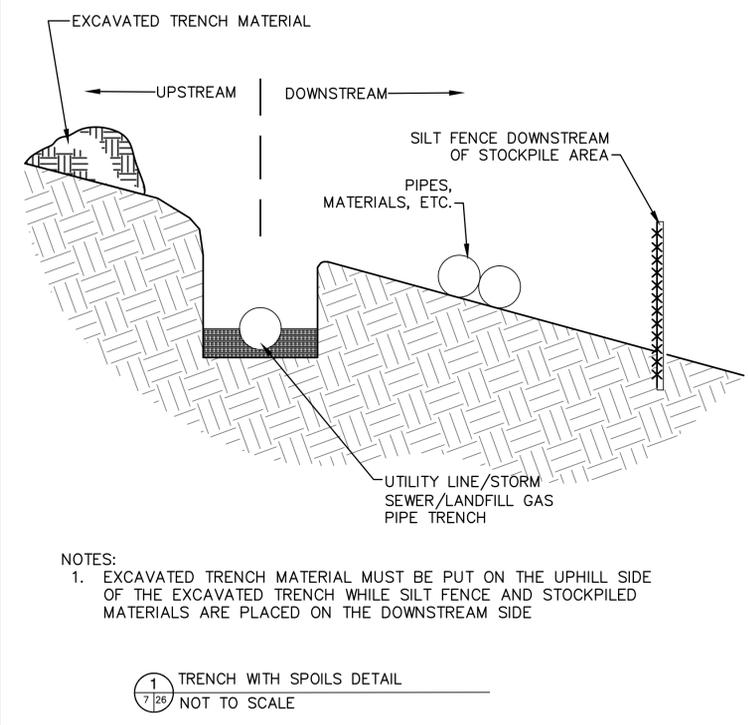
CLIENT: **CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY**
2655 VALLEY DRIVE
BRISTOL, VA 24201

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
16521 MIDLOTHIAN TPK - MIDLOTHIAN, VA 23113
PH. (804) 378-7440 FAX. (804) 378-7433

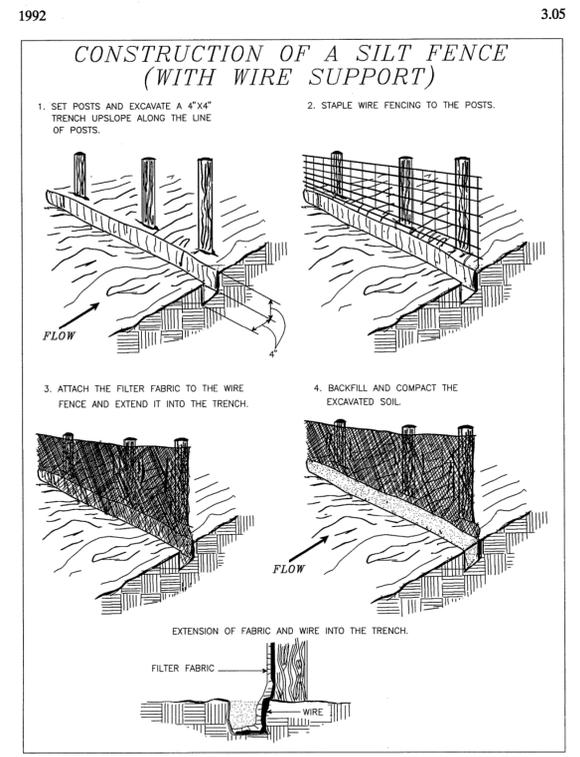
PROJ. NO. 20208.05
DATE: 8/18/2023
APP. BY: C/JW
CHK. BY: C/JW
TRW

CADD FILE: 02218208.05
DATE: 8/18/2023
SCALE: AS SHOWN
DRAWING NO.

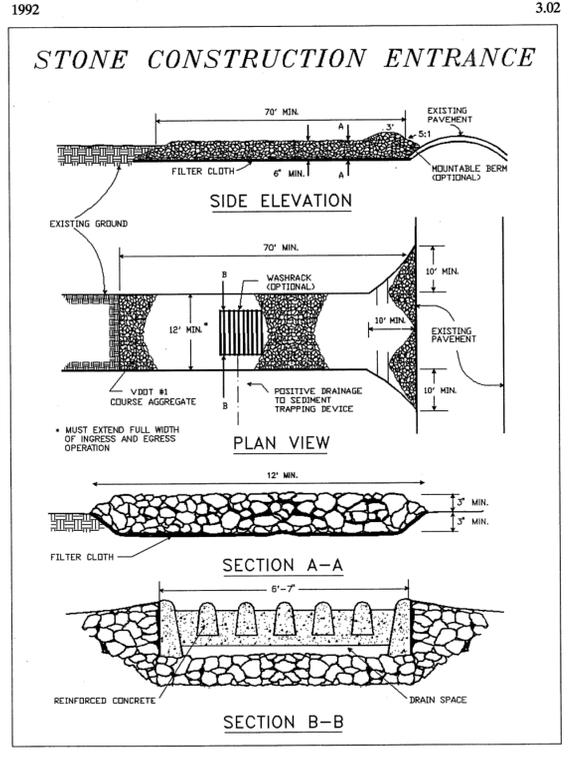
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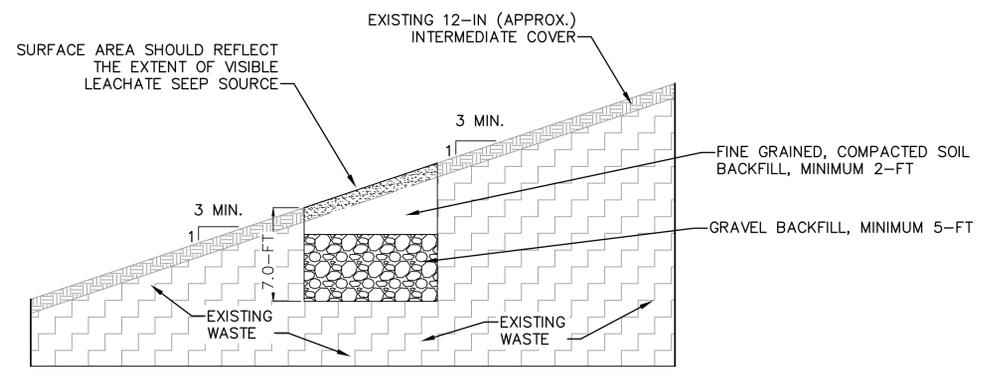
2
8/26 SOIL STABILIZATION MATTING INSTALLATION
NOT TO SCALE



3
8/26 CONSTRUCTION OF A SILT FENCE
NOT TO SCALE



4
8/26 STONE CONSTRUCTION ENTRANCE
NOT TO SCALE



NOTES:
1. IF A LEACHATE SEEP IS ENCOUNTERED DURING EARTHWORK WITHIN THE LANDFILL LIMITS, CONTRACTOR WILL EXCAVATE EXISTING INTERMEDIATE COVER AND UNDERLYING WASTE TO A TOTAL DEPTH OF APPROXIMATELY 7.0-FT OR AS NEEDED TO ENABLE DRAINAGE. CONTRACTOR SHALL BACKFILL WITH 5'-FT GRAVEL AND AT LEAST 2'-FT OF FILL SOIL, AS SHOWN. THE TRENCH WIDTH SHALL BE APPROXIMATELY 24-36 IN, OR AS WIDE AS THE EXCAVATOR BUCKET.

5
7/26 LEACHATE SEEP MANAGEMENT
NOT TO SCALE

| | |
|---------------|---|
| DATE | |
| REVISION | |
| NO. | |
| SHEET TITLE | DETAILS 8 |
| PROJECT TITLE | SWP #498 FINAL COVER SYSTEM CONSTRUCTION DRAWINGS |

CITY OF BRISTOL INTEGRATED SOLID WASTE MANAGEMENT FACILITY
2655 VALLEY DRIVE
BRISTOL, VA 24201

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PROJ. NO. 20218208.05
DATE: 8/18/2023
SCALE: AS SHOWN
DRAWING NO. 26 of 26

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