## STORM WATER MANAGEMENT CONSTRUCTION SPECIFICATIONS

THESE SPECIFICATIONS ARE APPROPIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENTS, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOE OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUTOFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE \$\frac{1}{2}\text{200}\text{ Sieve.}\text{ Consideration GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE \$\frac{1}{2}\text{200}\text{ Sieve.}\text{ Consideration May be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer. Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent

B. PLACEMENT
AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTITIE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF THE HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

HE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/- 2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the engineer at the time of construction. All compaction is to be determined by AASHTO METHOD T-99 (STANDARD PROCTOR).

III. CUTOFF TRENCH (NOT APPLICABLE)

THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CORE (NOT APPLICABLE)

THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL A MINIMUM OF FOUR FEET. THE HEIGHT SHALL BE UP TO THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION, THE CORE SHALL BE PLACED CONCURRENTLY WITH THE OUTER SHELL OF THE

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF THE STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24° OR GREATER OVER THE STRUCTURE OR PIPE

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM—CM. MATERIAL SHALL BE PLACED SUCH THAT A MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE PLACED UNDER (BEDDING), OVER AND ON THE SIDE OF THE PIPE. IT ONLY NEEDS TO EXTEND UP TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKIFET OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF THE STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF THE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OR ANY PART OF A CONCRETE STRUCTURE OR PIPE UNLESS THERE IS A COMPACTED FILL OF 24" OF GREATER OVER THE STRUCTURE OR PIPE. BACKFILL MATERIAL OUTSIDE THE STRUCTURAL BACKFILL (FLOWABLE FILL) ZONE SHALL BE THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

PIPE CONDUITS

ALL PIPES SHALL BE CIRCULAR IN CROSS SECTION.

CORRUGATED METAL PIPE (NOT APPLICABLE)

MATERIALS

-(POLYMER COATED STEEL PIPE) - STEEL PIPES WITH POLYMERIC COATINGS SHALL HAVE A MINIMUM COATING THICKNESS OF 0.01 INCH (10 MIL) ON BOTH SIDES OF THE PIPE. THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASITO SPECIFICATIONS M-245 & M-246 WITH WATERTIGHT COUPLING BANDS OR

-(ALUMINUM COATED STEEL PIPE) - THIS PIPE AND ITS APPURTENANCES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M-274 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM COATED STEEL PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT.

-(ALUMINUM PIPE) — THIS PIPE AND ITS APPURTENANCES HALL CONFORM TO THE REQUIREMENTS OF AASHTO SPECIFICATION M—196 OR M—211 WITH WATERTIGHT COUPLING BANDS OR FLANGES. ALUMINUM PIPE, WHEN USED WITH FLOWABLE FILL OR WHEN SOIL AND/OR WATER CONDITIONS WARRANT THE NEED FOR INCREASED DURABILITY, SHALL BE FULLY BITUMINOUS COATED PER REQUIREMENTS OF AASHTO SPECIFICATION M-190 TYPE A. ANY ALUMINUM COATING DAMAGED OR OTHERWISE REMOVED SHALL BE REPLACED WITH COLD APPLIED BITUMINOUS COATING COMPOUND. ALUMINUM SURFACES THAT ARE TO BE IN CONTACT WITH CONCRETE SHALL BE PAINTED WITH ONE COAT OF ZINC CHROMATE PRIMER OR TWO COATS OF ASPHALT. HOT DIP GALVANIZED BOLTS MAY BE USED FOR CONNECTIONS. THE pH OF SURROUNDING SOILS

COUPLING BANDS, ANTI-SEEP COLLARS, END SECTIONS, ETC. MUST BE COMPOSED OF THE SAME MATERIAL AND COATINGS AS THE PIPE. METALS MUST BE INSULATED FROM DISSIMILAR MATERIALS WITH USE OF RUBBER OR PLASTIC INSULATING MATERIALS AT

CONNECTIONS — ALL CONNECTIONS WITH PIPES MUST BE COMPLETELY WATERTIGHT. THE DRAIN PIPE OR BARREL CONNECTION TO THE RISER SHALL BE WELDED ALL AROUND WHEN THE PIPE AND RISER ARE METAL. ANTI—SEEP COLLARS SHALL BE CONNECTED TO THE PIPE IN SUCH A MANNER AS TO BE COMPLETELY WATERTIGHT. DIMPLE BANDS ARE

ALL CONNECTIONS SHALL USE A RUBBER OR NEOPRENE GASKET WHEN JOINING PIPE SECTIONS. THE END OF EACH PIPE SHALL BE RE—ROLLED AN ADEQUATE NUMBER OF CORRUGATIONS TO ACCOMMODATE THE BANDWIDTH. THE FOLLOWING TYPE CONNECTIONS ARE ACCEPTABLE FOR PIPES LESS THAN 24 INCHES IN DIAMETER: FLANGES ON BOTH ENDS OF PIPE WITH A CIRCULAR 3/8 INCH CLOSED CELL NEOPRENE GASKET, PRE-PUNCHED TO THE FLANGE BOLT CIRCLE, SANDWICHED BETWEEN ADJACENT FLANGES; A 12-INCH WIDE STANDARD LAP TYPE BAND WITH 12-INCH WIDE BY 3/8-INCH THICK CLOSED CELL CIRCULAR NEOPRENE GASKET; AND A 12-INCH WIDE HUGGER TYPE BAND WITH O—RING GASKETS HAVING A MINIMUM DIAMETER OF 1/2 INCH GREATER THAN THE CORRUGATION DEPTH. PIPES 24 INCHES IN DIAMETER AND LARGER SHALL BE CONNECTED BY A 24 INCH LONG ANNULAR CORRUGATED BAND USING A MINIMUM OF 4(FOUR) RODS AND LUGS, 2 ON EACH CONNECTING PIPE END. A 24-INCH NEOPRENE GASKET WILL BE INSTALLED WITH 12 INCHES OF THE END OF EACH PIPE. FLANGED JOINTS WITH 3/8 INCH CLOSED CELL GASKETS THE FULL WIDTH OF THE FLANGE IS ALSO ACCEPTABLE.

HELICALLY CORRUGATED PIPE SHALL HAVE EITHER CONTINUOUSLY WELDED SEAMS OR HAVE LOCK SEAMS WITH INTERNAL CAULKING OR A NEOPRENE BEAD.

BEDDING — THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH. WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE

B. REINFORCED CONCRETE PIPE (NOT APPLICABLE)

MATERIALS — REINFORCED CONCRETE PIPE SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS AND SHALL EQUAL OR EXCEED ASTM SPECIFICATION C-361.

2. BEDDING — ALL REINFORCED CONCRETE PIPE CONDUITS SHALL BE LAID IN A CONCRETE BEDDING/CRADLE FOR THEIR ENTIRE LENGTH. THIS BEDDING/CRADLE SHALL CONSIST OF HIGH SLUMP CONCRETE PLACED UNDER THE PIPE AND UP THE SIDES OF THE PIPE AT LEAST 50% OF ITS OUTSIDE DIAMETER WITH A MINIMUM THICKNESS OF 6 INCHES. WHERE A CONCRETE CRADLE IS NOT NEEDED FOR STRUCTURAL REASONS, FLOWABLE FILL MAY BE USED AS DESCRIBED IN THE "STRUCTURE BACKFILL" SECTION OF THIS STANDARD. GRAVEL BEDDING IS NOT PERMITTED.

3. LAYING PIPE — BELL AND SPIGOT PIPE SHALL BE PLACED WITH THE BELL END UPSTREAM. JOINTS SHALL BE MADE IN ACCORDANCE WITH RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL. AFTER THE JOINTS ARE SEALED FOR THE ENTIRE LINE, THE BEDDING SHALL BE PLACED SO THAT ALL SPACES UNDER THE PIPE ARE FILLED. CARE SHALL BE EXERCISED TO PREVENT ANY DEVIATION FROM THE ORIGINAL LINE AND GRADE OF THE PIPE. THE FIRST JOINT MUST BE LOCATED WITHIN 4 FEET FROM THE RISER.

4. BACKFILLING SHALL CONFORM TO "STRUCTURE BACKFILL".

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE

C. PLASTIC PIPE (PVC, HDPE, ETC.):

MATERIALS - PVC PIPE SHALL BE PVC-1120 OR PVC-1220 CONFORMING TO ASTM D-1785 OR ASTM D-2241. CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) PIPE, COUPLINGS AND FITTINGS SHALL CONFORM TO FOLLOWING: 4"-10" INCH PIPE SHALL MEET THE REQUIREMENTS OF AASHTO M252 TYPE S, AND 12" THROUGH 24" INCH SHALL MEET THE REQUIREMENTS OF AASHTO M294 TYPE S.

JOINTS AND CONNECTIONS TO ANTI-SEEP COLLARS SHALL BE COMPLETELY WATERTIGHT.

BEDDING — THE PIPE SHALL BE FIRMLY AND UNIFORMLY BEDDED THROUGHOUT ITS ENTIRE LENGTH WHERE ROCK OR SOFT, SPONGY OR OTHER UNSTABLE SOIL IS ENCOUNTERED, ALL SUCH MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE EARTH COMPACTED TO PROVIDE ADEQUATE SUPPORT.

5. OTHER DETAILS (ANTI-SEEP COLLARS, VALVES, ETC.) SHALL BE AS SHOWN ON THE

VII. DRAINAGE DIAPHRAGMS (NOT APPLICABLE)

WHEN A DRAINAGE DIAPHRAGM IS USED, A REGISTERED PROFESSIONAL ENGINEER WILL SUPERVISE THE DESIGN AND CONSTRUCTION INSPECTION.

VIII. CONCRETE STRUCTURES (NOT APPLICABLE)

CONCRETE
CONCRETE SHALL MEET THE MINIMUM REQUIREMENTS OF MARYLAND DEPARTMENT OF
TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR
CONSTRUCTION AND MATERIALS, SECTION 902.10.03 MIX NO. 3.

REINFORCEMENT SHALL MEET THE MINIMUM REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 416 (REINFORCEMENT FOR CONCRETE STRUCTURES): SECTION 908 (REINFORCING STEEL - GRADE 60, WIRE ROPE AND WIRE FABRIC), AND SECTION 909.02 (STEEL FOR MISCELLANEOUS USE).

ROCK RIP RAP SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION, STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS. SECTION 311.
GEOTEXTILE SHALL BE PLACED UNDER ALL RIPRAP AND SHALL MEET THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION, STANDARD
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WARYLAND DEPARTMENT OF TRANSPORTATION OF TRA SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 921.09, CLASS 'SE' NON-WOVEN.

X. CARE OF WATER DURING CONSTRUCTION

ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT THE AREAS TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM THE VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM OF REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER TO SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

ALL BORROW AREAS SHALL BE GRADED TO PROVIDE DRAINAGE AND LEFT IN A SIGHTLY CONDITION.
ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS
SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING, MULCHING OR SODDING IN ACCORDANCE WITH
THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

SPECIFICATIONS — SOD SHALL BE "K-31" TALL FESCUE OR KENTUCKY BLUEGRASS/RED FESCUE MIXTURE OR APPROVED EQUAL. CLASS OF TURFGRASS SOD SHALL BE MARYLAND OR VIRGINIA STATE CERTIFIED OR APPROVED SOD.

SITE PREPARATION - WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 100 LBS./1000 SQ. FT. IN ALL SOILS 5-10-5 FERTILIZER OR APPROVED EQUAL SHALL BE APPLIED AT THE RATE OF 30 LBS/1000 SQ.FT. FERTILIZER SHALL BE UNIFORMLY APPLIED AND MIXED INTO THE TOP 3" OF SOIL WITH THE REQUIRED LIME. SLOW RELEASE NITROGEN, AT THE RATE OF 3.5 LBS/1000 SQ. FT., SHALL BE APPLIED TO THE PREPARED SOIL IMMEDIATELY PRIOR TO SOD INSTALLATION. THIS MATERIAL SHALL BE APPROXIMATELY ONE—THIRD IMMEDIATELY AVAILABLE AND TWO-THIRDS WATER INSOLUBLE NITROGEN. UREA FORMALDEHYDE (UF) AND

SOD INSTALLATION — THE FIRST ROW OF SOD SHALL BE LAID IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACE PARALLEL TO AND TIGHTLY WEDGED AGAINST EACH OTHER. LATERAL JOINTS SHALL BE STAGGERED TO PROMOTE MORE UNIFORM GROWTH AND STRENGTH. ENSURE THAT SOD IS NOT STRETCHED OR OVERLAPPED AND THAT ALL JOINTS ARE BUTTED TIGHT IN ORDER TO PREVENT VOIDS WHICH WOULD CAUSE AIR DRYING OF THE ROOTS. ON SLOPING AREAS WHERE EROSION MAY BE A PROBLEM, SOD SHALL BE LAID WITH LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERED JOINTS. SECURE THE SOD BY TAMPING AND PEGGING OR OTHER APPEAR SHALL BE POLLED OR SODDING IS COMPLETED IN ANY ONE SECTION, THE ENTIRE AREA SHALL BE ROLLED OR TAMPED TO ENSURE SOLID CONTACT OF ROOTS WITH THE SOIL SURFACE. SOD SHALL BE WATERED IMMEDIATELY AFTER ROLLING OR TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOLID SURFACE BELOW THE SOD ARE THOROUGHLY WET. THE OPERATION OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD SHALL BE COMPLETED WITHIN FIGHT HOURS. WITHIN EIGHT HOURS.

PERMANENT SEEDING ALL DISTURBED AREAS SHALL BE STABILIZED AS FOLLOWS:

SEEDBED PREPARATION — LOOSEN UPPER 3 INCHES OF SOIL BY RAKING, DICING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

SOIL AMENDMENTS - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS./1000) SQ. FT.), 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ. FT.) AND 400 LBS. PER ACRE OF 30-0-0 UREAFORM FERTILIZER (9.2 LBS./100 SQ. FT.). HARROW OR DISC LIME AND FERTILIZER INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS PER ACRE (9.2 LBS./1000 SQ. FT.) OF 30-0-0 UREAFORM FERTILIZER AND 500 LBS. PER ACRE (11.5 LBS./1000 SQ.FT.) OF 10-10-10 FERTILIZER.

SEEDING — FOR THE PERIOD MARCH 1 THROUGH APRIL 30 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 15 LBS. PER ACRE INOCULATED CROWNVETCH. FOR THE PERIOD MAY 1 THROUGH JULY 31 SEED WITH 60 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 2 LBS. PER ACRE INOCULATED WEEPING LOVEGRASS. FOR THE PERIOD OF AUGUST 1 THROUGH OCTOBER 15 SEED WITH 40 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND 20 LBS. PER ACRE INOCULATED INTERSTATE SERICA LESPEDEZA. DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY: OPTION (1) - 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) — USE SOD. OPTION (3) — SEED WITH 60 LBS. PER ACRE KENTUCKY 31 HARD FESCUE AND MULCH WITH 2 TONS PER ACRE WELL ANCHORED STRAW. FOR THE PERIOD OF MAY 1 THROUGH FEBRUARY 28, INOCULATED CROWNVETCH SHALL BE APPLIED DURING THE SUBSEQUENT PERIOD OF MARCH 1 THROUGH APRIL 30 AT THE RATE OF 15 LBS. PER ACRE.

MULCHING — APPLY 1.5 TO 2 TONS PER ACRE OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING 218 GALLONS PER ACRE OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPE 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE FOR ANCHORING.

MAINTENANCE — INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDING.

C. TEMPORARY SEEDING

SEEDBED PREPARATION — LOOSEN UPPER 3 INCHES OF SOIL BY DICING, RAKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING.

SOIL AMENDMENTS — APPLY 600 LBS. PER ACRE OF 10—10—10 FERTILIZER. WHERE SOIL IS ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE APPLIED AT THE RATE OF 2 TONS PER ACRE (92 LBS./1000 SQ.FT.).

SEEDING - FOR PERIODS MARCH 1 THROUGH APRIL 30, AND FROM AUGUST 15 THROUGH NOVEMBER 15, SEED WITH 2.5 BUSHELS PER ACRE ANNUAL RYE. FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS. PER ACRES OF WEEPING LOVEGRASS. FOR THE PERIOD NOVEMBER 16 THROUGH FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE

4. MULCHING — SAME AS PERMANENT SEEDING. XII. EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.

XIII. OPERATION AND MAINTENANCE

AN OPERATION AND MAINTENANCE PLAN IN ACCORDANCE WITH LOCAL OR STATE REGULATIONS WILL BE PREPARED FOR ALL PONDS. AS A MINIMUM, THE DAM INSPECTION CHECKLIST LOCATED IN APPENDIX A SHALL BE INCLUDED AS PART OF THE OPERATION AND MAINTENANCE PLAN AND PERFORMED AT LEAST ANNUALLY. WRITTEN RECORDS OF MAINTENANCE AND MAJOR REPAIRS NEEDS TO BE RETAINED IN A FILE. THE ISSUANCE OF A MAINTENANCE AND REPAIR PERMIT FOR ANY REPAIRS OR MAINTENANCE THAT INVOLVES THE MODIFICATION OF THE DAM OR SPILLWAY FROM ITS ORIGINAL DESIGN AND SPECIFICATION IS REQUIRED. A PERMIT IS ALSO REQUIRED FOR ANY REPAIRS OR RECONSTRUCTION THAT INCLUDE A SUBSTANTIAL PORTION OF THE STRUCTURE. ALL INDICATED REPAIRS ARE TO BE MADE AS SOON AS PRACTICAL.

XIV. FENCING (NOT APPLICABLE)

FENCING SHALL BE 42" HIGH CHAIN FENCE CONSTRUCTED IN ACCORDANCE WITH THE LATEST MARYLAND STATE HIGHWAY ADMINISTRATION STANDARD DETAILS 690.02 AND 690.03. THE SPECIFICATIONS FOR A 6'-0" FENCE SHALL BE USED, SUBSTITUTING 42" FABRIC AND 6'-8" LINE POSTS. GATE SHALL BE CONSTRUCTED IN ACCORDANCE WITH STATE HIGHWAY ADMINISTRATION STANDARD DETAIL 692.01 WITH 42" FABRIC. FABRIC FOR FENCE AND GATE SHALL CONFORM TO ASSHTO DESIGNATION M181.74. DARK VINYL COATING IS REQUIRED FOR THE FENCE POSTS AND WIRE FABRIC IN ACCORDANCE WITH THE LANDSCAPE MANUAL ADOPTED BY RESOLUTION 56-90, OCTOBER 1

XV. FILTER CLOTH (NOT APPLICABLE)

1. FILTER CLOTH TO BE MIRAFI 140N OR APPROVED EQUAL.

XVI. GABIONS (NOT APPLICABLE)

GABIONS TO BE PVC COATED. CLASS IV. SECTION H.24, MARYLAND STANDARD SPECIFICATIONS AND DETAILS FOR SOIL EROSION AND SEDIMENT CONTROL.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 5 WORKING DAYS PRIOR TO STARTING ANY WORK SHOWN ON THESE PLANS SO THAT STORMWATER MANAGEMENT POND MAY BE INSPECTED XVIII. REFERENCES

UNLESS OTHERWISE NOTED, ALL CONSTRUCTION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH:

BALTIMORE COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION MATERIALS, DECEMBER 2007, ERRATA & ADDENDA.

NATURAL RESOURCES CONSERVATION SERVICES OF MARYLAND STANDARDS AND SPECIFICATIONS, POND, CODE 378, JANUARY 2000.

MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION, JULY 2008, STANDARD SPECIFICATION FOR CONSTRUCTION AND MATERIAL.

SEQUENCE OF CONSTRUCTION

NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, (410-887-3226) AT LEAST 48 HOURS PRIOR TO START OF WORK TO ESTABLISH A PRE-CONSTRUCTION MEETING DATE. NOTIFY THE ENGINEER IN CHARGE (410-821-1690) AT LEAST 5 DAYS PRIOR TO COMMENCING CONSTRUCTION.

AFTER THE PRE-CONSTRUCTION MEETING AND WITH THE APPROVAL OF BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL AND THE SEDIMENT CONTROL INSPECTOR, CLEAR AND GRUB AS NECESSARY FOR INSTALLATION/REPAIR OF THE SEDIMENT CONTROL MEASURES AND DEVICES INCLUDING INLET PROTECTION TO EXISTING INLETS.

NOTIFY BALTIMORE COUNTY DEPARTMENT OF PERMITS, APPROVALS AND INSPECTIONS, SEDIMENT CONTROL, UPON COMPLETION OF ABOVE INSTALLATION.

CLEAR AND GRUB ENTIRE SITE WITHIN LIMITS OF DISTURBANCE AND COMPLETE

INSTALL STORM DRAIN UTILITIES AND BEGIN CONSTRUCTION OF STORMWATER MANAGEMENT FACILITY. CONTRACTOR SHALL NOTIFY ENGINEER AND STORMWATER MANAGEMENT MANUFACTURER PRIOR TO ORDERING MATERIALS OR INSTALLATION CONTRACTOR SHALL ENSURE THAT EITHER THE ENGINEER ON RECORD OR THE MANUFACTURER'S REPRESENTATIVE IS AVAILABLE TO BE ON-SITE DURING SEPARATE STAGES OF INSTALLATION OF THE STORMWATER MANAGEMENT FACILITY. CONTRACTOR SHALL INSTALL INLET BLOCKING FOR NEW STORMWATER MANAGEMENT STRUCTURES AS NECESSARY.

INSTALL NEW CURB AND BEGIN PAVING OF PROPOSED PARKING LOT AND SIDEWALK.

FOR WORK THAT REQUIRES DAILY STABILIZATION. CONTRACTOR SHALL LIMIT DISTURBANCE TO THAT AREA WHICH CAN BE STABILIZED AT THE END OF EACH WORKING DAY. IF THE DISTURBED AREA CANNOT BE STABILIZED AT THE END OF THE WORKING DAY, CONTRACTOR SHALL INSTALL SILT FENCE ON THE DOWNSLOPE SIDE.

A. FOR AREAS TO BE PAVED, INCLUDING SIDEWALKS, STABLIZATION SHALL BE STONE SUB-BASE.

B. FOR THOSE AREAS TO BE VEGETATIVELY STABILIZED, STABILIZATION SHALL BE AS FOLLOWS: FOR PROPOSED SWALES/CHANNELS, USE PERMANENT SEED &

EROSION CONTROL MATTING. FOR ALL OTHER AREAS, USE PERMANENT SEED & MULCH. UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE UTILITY

BRING TO FINAL GRADES. PERMANENTLY STABILIZE THOSE AREAS DISTURBED BY THIS PROCESS. PROPOSED SLOPES SHALL BE STABILIZED WITH PERMANENT SEED AND SOIL STABILIZATION MATTING.

COMPLETE REMAINING PAVING OPERATIONS.

INSTALL LANDSCAPING PER APPROVED LANDSCAPE PLAN.

11. INSTALL LANDSCAPING FOR STORMWATER MANAGEMENT PER APPROVED STORMWATER MANAGEMENT PLAN.

12. UPON STABILIZATION OF SITE WITH ESTABLISHED VEGETATION AND WITH PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, REMOVE ALL REMAINING SEDIMENT CONTROL MEASURES AND STABILIZE THOSE AREAS DISTURBED BY THIS

AS-BUILT SURVEY AND STUDY TO BE COMPLETED WITHIN 30 DAYS OF THE COMPLETION OF FACILITIES CONVERSION AND SUBMITTED TO BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY (DEPS).

OWNER / DEVELOPER

THE AGAPE CHRISTIAN CHURCH INC.

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME

AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NUMBER 46853, EXPIRATION DATE: 06-11-2023

100 E. TIMONIUM ROAD TIMONIUM, MARYLAND 21093

CONTACT: CHIMA UGAH

PHONE: (410) 252-4255 EMAIL: CHIMAUGAH@GMAIL.COM

MAINTENANCE RESPONSIBILITY

THE STORMWATER MANAGEMENT FACILITIES SHOWN ON THESE PLANS ARE PRIVATE AND SHALL BE MAINTAINED BY THE OWNER(S).

**ENGINEER'S CERTIFICATION** 

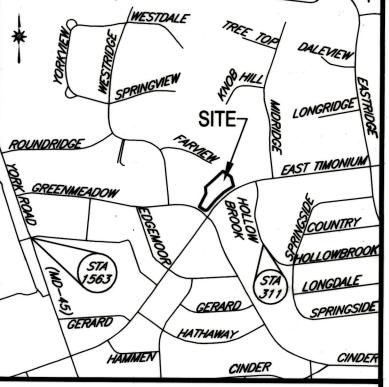
HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE BALTIMORE COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY AND THE BALTIMORE SOIL CONSERVATION DISTRICT.

46853 SIGNATURE P.E. NO. 10-6-2021 MARK A. VELLA-CAMILLERI PRINT NAME

## LANDOWNER'S / DEVELOPER'S CERTIFICATION

I/WE HEREBY CERTIFY THAT ALL WORK SHOWN ON THESE CONSTRUCTION DRAWINGS WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/WE ALSO UNDERSTAND THAT IT IS MY/OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED, INCLUDING THE SUBMITTAL OF "AS-BUILT" PLANS WITHIN THIRTY (30) DAYS OF COMPLETION, BY A MARYLAND

GISTERED PROFESSIONAL ENGINEER. 10-11-2021 Shim God i SIGNATURE OF OWNER/DEVELOPER DATE CHIMA UGAH PRINTED NAME



VICINITY MAP SCALE: 1" = 1000'

**BENCHMARKS** 

COORDINATES, BEARINGS AND ELEVATIONS SHOWN HEREON ARE BASED ON THE BALTIMORE COUNTY SURVEY CONTROL SYSTEM AND WERE BASED ON THE FOLLOWING STATIONS: NAD83 (2011) - NAVD88

1563 N: 647,962.78 E: 1,417,344.14 ELEV.411.82' DESCRIPTION: CAPPED REBAR N: 647,510.86 E: 1,419,834.57 ELEV.364.54' DESCRIPTION: CAPPED PIPE

SHEET INDEX

DESCRIPTION

1 OF 9 NOTES

2 OF 9 EXISTING CONDITIONS / SITE AND RESOURCE MAPPING 3 OF 9 SITE FINGERPRINTING AND DEVELOPMENT LAYOUT

4 OF 9 EROSION AND SEDIMENT CONTROL OVERLAY PLAN

DRAINAGE AREA MAPS FOR QUANTITY MANAGEMENT AND ENVIRONMENTAL SITE DESIGN

6 OF 9 ENVIRONMENTAL SITE DESIGN PLAN & PROFILE

ENVIRONMENTAL SITE DESIGN MANUFACTURER SPECIFICATIONS, NOTES & DETAILS 1

8 OF 9 ENVIRONMENTAL SITE DESIGN MANUFACTURER SPECIFICATIONS, NOTES & DETAILS 2

9 OF 9 ENVIRONMENTAL SITE DESIGN MANUFACTURER SPECIFICATIONS, NOTES & DETAILS 3

BILL 25-10

PAI #: 08-0014 DISTURBED AREA:

GRADING PERMIT #: N/A

**SWM PERMIT #: B981223** 

DESIGN AND DRAWINGS ARE BASED ON MARYLAND COORDINATE SYSTEM (MCS). HORIZONTAL - NAD 83/(2011), VERTICAL - NAVD 88.

19,950 SF OR 0.458 AC±

POSITION SHEET: 54 NW 2 COUNCILMANIC DISTRICT: **ELECTION DISTRICT:** 

SWM APPROVED UNDER

APPROVED:

STORMWATER MANAGEMENT DIVISION BALTO, CO. DEPT, OF **ENVIRONMENTAL PROTECTION** 

AND SUSTAINABILITY

SHEET NO.:

1 OF 9

19213

BALTIMORE COUNTY SOIL CONSERVATION DISTRICT APPROVED FOR STORMWATER MANAGEMENT DISTRICT OFFICIAL DATE

CHNICAL REVIEW FOR THE DISTRICT: BALTO. CO. DEPT. OF ENVIRONMENTAL PROTECTION AND SUSTAINABILITY:

## Richardson Engineering, LLC

7 Deneison Street Timonium, Maryland 21093 Phone: 410-560-1502 Fax: 443-901-1208 MARKORICHARDSONENGINEERING.NET

> FINAL STORMWATER MANAGEMENT NOTES

100 E TIMONIUM ROAD

TIMONIUM, MARYLAND 21093

BALTIMORE COUNTY MARYLAND 8TH ELECTION DISTRICT 3RD COUNCILMANIC DISTRICT DRAWN BY: CHECKED BY: SCALE: AS SHOWN JOB NO .:

10-6-2021

10-6-2021