

**BERM CONSTRUCTION NOTES:**

1. FILL MATERIAL USED FOR CONSTRUCTION OF THE POND BERMS SHALL BE CLAYEY SOIL FREE OF SAND, BRUSH, ROOTS OR OTHER PERISHABLE MATERIALS, AND OBTAINED FROM FORTON COUNTY, PA. THE FILL SHALL BE COMPACTED BY THE PA GAME COMMISSIONER THROUGH § 5, BELOW.
2. INITIAL CONSTRUCTION SHALL REQUIRE CLEARING AND GRUBBING OF THE BASE AREA, AND REMOVAL OF STANDING WATER AND OTHER UNSUITABLE BASE MATERIALS INCLUDING COARSE REFUSE, AS DEFINED BY THE ENGINEER.
3. ONCE THE BASE IS PREPARED FOR FILL PLACEMENT, THE INITIAL LIFT OF GRANULAR FILL SHALL BE PLACED AND SPREAD UNIFORM OVER THE ENTIRE BASE FOR EACH BERM. THE FILL SHALL BE PLACED IN LIFTS OF 6" TO 8" UNTIL THE ENTIRE BASE IS FULLY COMPACTED VIA MULTIPLE PASSES OF THE CONSTRUCTION EQUIPMENT.
4. ADDITIONAL LAYERS SHALL BE COMPOSED OF FILL MATERIAL AS DESCRIBED IN NOTE 1, ABOVE. THIS MATERIAL WILL BE PLACED IN HORIZONTAL LIFT HEIGHTS NOT EXCEEDING 8 INCHES, AND COMPACTED VIA SUCCESSIVE PASSES OF THE CONSTRUCTION EQUIPMENT UNTIL NO PUMPING IS NOTED.
5. FOR EACH LIFT, THE OPERATOR SHALL MAKE EVERY EFFORT TO ACHIEVE COMPACTATION OF THE ENTIRE SURFACE OF THE POND. THE POND OPERATOR SHALL REQUIRE COMPACTOR REQUIRE EQUIPMENT PASSES IN A DIRECTION PERPENDICULAR TO THE BERM CENTERLINE TO ASSURE ADEQUACY (ESPECIALLY IN THE UPPER SECTIONS OF THE EMBANKMENT WHERE THE FILL IS RELATIVELY NARROW).
6. THE FINAL SURFACES (INSIDE AND OUTSIDE SLOPES, AND TOP OF BERM) SHALL BE GRADED TO A SMOOTH, UNIFORM SLOPE AND COVERED WITH TOPSOIL MATERIAL SUITABLE FOR SUSTAINING VEGETATIVE GROWTH.
7. DURING FILL PLACEMENT, IF THE MATERIAL BECOMES SATURATED OR EXCESSIVELY WET, IT SHALL BE REMOVED AND REPLACED WITH DRY MATERIAL.

**GEOTEXTILE NOTES:**

1. GEOTEXTILES SHALL CONFORM TO THE REQUIREMENTS LISTED IN THE TABLE BELOW. TYPICAL GEOTEXTILES INCLUDE AMOCO 4508, EXXON TYPAR 3801, OR EQUIVALENT.
2. GEOTEXTILE SHALL BE PLACED ON A REASONABLY SMOOTH SURFACE FREE OF LOOSE ROCK AND CLODS, HOLES, DEPRESSIONS, PROJECTIONS, MUDDY CONDITIONS, AND STANDING OR FLOWING WATER.
3. THE GEOTEXTILE SHALL BE LOOSELY Laid IN SUCH A MANNER THAT IT WILL CONFORM TO SURFACE IRREGULARITIES WHEN MATERIAL IS PLACED OVER IT.
4. THE GEOTEXTILE SHALL BE JOINED BY MACHINE SEWING USING THREED, THE SEWING BEING MADE AT 12 INCH SPACING. SEWING SHALL BE MADE AT 12 INCH SPACING. STITCHED ROWS AT A SPACING OF APPROX 12 INCH USING APPROX 12 INCH STITCH. EACH ROW OF STITCHING SHALL BE LOCATED A MINIMUM OF 2 INCHES FROM THE GEOTEXTILE EDGE.

**REQUIREMENTS FOR NONWOVEN GEOTEXTILES:**

PROPERTY	TEST METHOD	REQUIREMENT
TENSILE STRENGTH	ASTM D 4832 (LBS)	200 LBS MIN.
BURSTING STRENGTH	ASTM D 3786 (PSI)	400 PSI MIN.
ELONGATION AT FAILURE	ASTM D 4832 (%)	>50%
PUNCTURE	ASTM D 4833 (LBS)	90 LBS MIN.
UV LIGHT	ASTM D 4355 (%)	70% MIN.
APPARENT OPENING SIZE	ASTM D 4751 (U.S. SEIVE)	#70 MAX.
PERMEABILITY	ASTM D 4491 (1/SEC)	0.170 MIN.

**VFR SUBSTRATE MIX NOTES:**

1. VFR MIXTURE SHALL BE PLACED WITHOUT COMPACTATION ABOVE THE LIMESTONE. BASE. NO EQUIPMENT SHALL BE RUN OVER THE ORGANIC MATERIAL.
2. VFR MATERIAL SHALL BE PREPARED ON AN EXTERNAL PAD BEFORE PLACEMENT OVER 4" OF LOOSELY PLACED, SHOT-CHOPPED HAY.
3. NO MIXING SHALL BE PERMITTED WITHIN THE VFR CELL. MIXING SHOULD BE DONE TO PRODUCE A HOMOGENEOUS SUBSTRATE WITH MINIMUM SIZE SEGREGATION.
4. THE FINAL SUBSTRATE SURFACE SHALL BE LEVEL W/ NO POTHOLES, RIDGES, LUMPS OR SEGREGATION AND 1' +/- 6" BELOW THE NORMAL POOL LEVEL.

COMPONENTS	VOLUME
HAY (ALFALFA - TO BE SHREDDED BY SAW, OR SIMILAR)	30
HARDWOOD CHIPS/SHREDS (PREFERABLY AGED)	50
LIMESTONE (MIN 89% CARBONATE, AASHTO 10)	10
COW MANURE (W/ BEDDING HAY/STRAW/SAWDUST, NO PAPER)	10

5. ANY RAMPS USED DURING CONSTRUCTION MUST BE REMOVED BEFORE COMPLETION OF THE SUBSTRATE PLACEMENT.
6. THE 54" THICK VFR SUBSTRATE LAYER SHALL BE COMPOSED OF THE FOLLOWING COMPONENTS, BY VOLUME:

**LIMESTONE/SANDSTONE NOTES:**

1. LIMESTONE USED IN THE BASE OF THE VFR (18" THICK DRAINAGE ZONE) SHALL BE AASHTO #3.
2. LIMESTONE BLENDED W/ VFR SUBSTRATE MIX SHALL BE AASHTO #10
3. ALL LIMESTONE USED SHALL HAVE A MINIMUM CaCO3 CONTENT OF 89%
4. SANDSTONE USED AS RIPRAP @ ENTRANCE TO VFR AND BETWEEN SP1 AND SP2 SHALL BE R-6, AS PER PENNDOT 408 MANUAL.

**PIPING NOTES:**

1. ALL PIPES SHALL BE SCHEDULE 40 PVC.
2. PIPE SHALL BE STORED ON A RELATIVELY FLAT SURFACE.
3. PIPE SHALL BE LAD SO THAT THERE IS NO REVERSAL OF GRADES BETWEEN JOINTS.
4. VALVES SHALL BE THERMOPLASTIC OR DUCTILE IRON BALL OR GATE VALVES WITH STEEL EXTENSIONS AND LOCKING HANDLES AS NOTED. ALL VALVES SHALL BE APPROVED BY THE ENGINEER PRIOR TO PURCHASE.
5. STEEL EXTENSIONS SHALL CONSIST OF AN APPROPRIATE DIAMETER PVC CASING WITH A LOCKING COVER.
6. NECESSARY HOLES WILL BE CONSTRUCTED AS SHOWN ON THE PIPING DETAIL.
7. PIPES TO BE JOINED WILL BE CLEAN AND FREE FROM ANY BURRS.
8. CONTRACTOR SHALL USE PVC PRIMER PRIOR TO THE APPLICATION OF SOLVENT CEMENT.
9. THE PIPE SHALL BE FIRMLY AND UNFORMALLY PLACED ON A COMPACTED EARTH/FILL BEDDING OF ADEQUATE BEARING STRENGTH TO SUPPORT THE PIPE WITHOUT SIGNIFICANT SETTLEMENT.
10. EARTH/FILL MATERIALS USED FOR BEDDING SHALL BE FREE OF ROCKS OR STONES GREATER THAN 1 INCH DIAMETER AND EARTH CLODS GREATER THAN 2 INCH DIAMETER.
11. A DEEPENED GROOVE OF ADEQUATE LENGTH AND DEPTH SHALL BE EXCAVATED AT EACH JOINT OR FITTING LOCATION SO THAT THE PIPE IS UNFORMALLY SUPPORTED ALONG ITS ENTIRE LENGTH.

**PLANTING NOTES:**

1. ALL TREES SHALL BE REMOVED FROM THE BOTTOM OF ALL PONDS. ALL AREAS OF FILL PLACEMENT, AND FROM THE POND EMBANKMENT.
2. COW MANURE OR MUSHROOM MANURE COMPOST SHALL BE USED IN SP2 AND THE WETLAND AREA.
3. BERMS AND THE SURROUNDING AREA SHALL BE MULCHED AND SEEDED WITH A MIXTURE OF 50% LIME PERENNIAL Ryegrass AND 50% ANNUAL Ryegrass AT A RATE OF 10 POUNDS PER ACRE.
4. WITHIN SP2, THE WETLAND AREA SHALL BE PLANTED WITH HARVESTED WETLANDS PLANTS FROM THE SITE AREA AND THE ADJACENT PA STATE GAMELANDS.

POND NAME	DESCRIPTION	TOP OF DIKE		NORMAL POOL		POND BOTTOM		POND VOLUME TO NORMAL POOL
		ELEV (ft)	AREA (SF)	ELEV (ft)	AREA (SF)	ELEV (ft)	AREA (SF)	
MDP	Mine Discharge Pond	1089		1087		1078		VARIABLES
VFR	Vertical Flow Reactor	1087		1085		1069		
SP #1	Settling Pond #1	1075		1073		1073		
SP #2	Settling Pond #2	1075		1073		1072		

