PENNSYLVANIA PIPELINE PROJECT

CONSTRUCTION SPREAD 4
BLOCK VALVE
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

NOVEMBER 2016

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PREPARED BY:

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PREPARED FOR:

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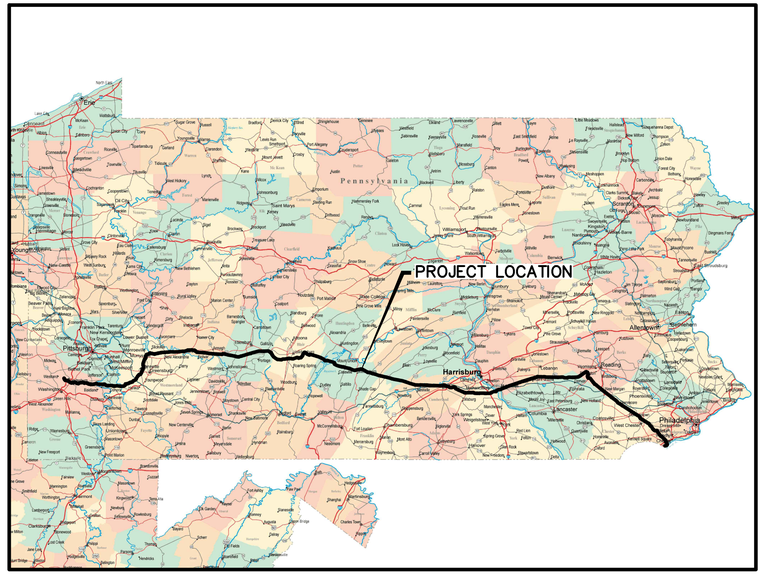

LOCATION MAP
PENNSYLVANIA PIPELINE PROJECT
HOUSTON, PENNSYLVANIA TO MARCUS HOOK, PENNSYLVANIA

R:_Marcellus Shale Projects\Sunoco\5958 – Penn Pipeline Project\PCSM Spread 4\5958PCS000.00.dwg PIT NICHOLE.NAJESKI 11/23/2016 6:49:22 AM

NOTES:

1. TOPOGRAPHIC MAPPING AND FEATURES AT BLOCK VALVE SITE WAS TAKEN BY FIELD SURVEY. TOPOGRAPHIC MAPPING AND FEATURES FOR DRAINAGE AREA COMPILED FROM WWW.PASDA.PSU.EDU.
2. THE PROJECT TAKES PLACE WITHIN CUMBERLAND COUNTY, YORK COUNTY, AND DAUPHIN COUNTY, PENNSYLVANIA.
3. TOWNSHIP BOUNDARIES TAKEN FROM WWW.PASDA.PSU.EDU.
4. 100-YEAR FEMA FLOODPLAINS FROM WWW.PASDA.PSU.EDU.
5. PIPELINE LOCATION AND RIGHT-OF-WAY FROM SUNOCO PIPELINE L.P.
6. THE RIGHTS-OF-WAYS AND EASEMENTS SHOWN ON THIS PLAN ARE THE RESPONSIBILITY OF SUNOCO PIPELINE L.P. TO SECURE WITH THE INDIVIDUAL PROPERTY OWNER. THE RIGHTS-OF-WAY AND EASEMENTS SHOWN ON THIS PERMIT DRAWING REPRESENT THE BEST AVAILABLE PROPERTY INFORMATION AS PROVIDED TO TETRA TECH, INC. BY SUNOCO PIPELINE L.P. THE RIGHTS-OF-WAY AND EASEMENTS SHALL BE VERIFIED AND LOCATED IN THE FIELD BY SUNOCO PIPELINE L.P.
7. PAST AND PRESENT LAND USE CONSISTS OF AGRICULTURAL, FORESTED AND RESIDENTIAL AREAS. POST CONSTRUCTION LAND USE WILL BE A MAINTAINED, VEGETATED RIGHT-OF-WAY.
8. DRAWINGS REPRESENT THE FINAL PLAN FOR CONSTRUCTION.
9. THE POST CONSTRUCTION STORMWATER MANAGEMENT PLAN, INSPECTION REPORTS, AND MONITORING REPORTS MUST BE AVAILABLE FOR REVIEW AND INSPECTION BY THE DEPARTMENT OR CONSERVATION DISTRICT.
10. THE LICENSED PROFESSIONAL OR DESIGNEE SHALL BE PRESENT ON SITE FOR THE CONSTRUCTION OF THE INFILTRATION BERMS AND TRENCHES.
11. A RECORDED INSTRUMENT WILL BE RECORDED AT THE RECORDER OF DEEDS TO PROVIDE FOR NECESSARY ACCESS FOR LONG TERM OPERATION AND MAINTENANCE FOR PCSM BMP'S. THE DEED WILL PROVIDE NOTICE THAT THE RESPONSIBILITY FOR THE LONG TERM OPERATION AND MAINTENANCE OF THE PCSM BMP's IS A COVENANT THAT RUNS WITH THE LAND AND IS BINDING AND ENFORCEABLE BY SUBSEQUENT GRANTEES.
12. AT BLOCK VALVE SITES, FIELD SURVEYS WERE CONDUCTED TO ACCURATELY REFLECT FIELD CONDITIONS TO FACILITATE THE DESIGN OF THE SITES. THESE SURVEYS WERE CONDUCTED IN THE IMMEDIATE VICINITY OF THE PAD AND ROAD TO BE DESIGNED. DUE TO THE NATURE OF POST CONSTRUCTION STORMWATER DESIGN CRITERIA, SURVEY COULD NOT BE CONDUCTED FOR THE ENTIRE DRAINAGE AREAS AT EACH LOCATION. IN THESE AREAS, LIDAR DATA WAS SUBSTITUTED.

SITE RESTORATION

FOLLOWING COMPLETION OF PIPELINE INSTALLATION AND TRENCH BACKFILLING, THE PIPELINE RIGHT OF WAY, ASSOCIATED WORKSPACES, AND TEMPORARY ACCESS ROADS SHALL BE RETURNED TO THE GENERAL GRADE PRESENT PRIOR TO PIPELINE INSTALLATION IN ORDER TO MAINTAIN PRECONSTRUCTION DRAINAGE PATTERNS. AFTER COMPLETION OF MAJOR CONSTRUCTION WORK, TOPSOIL THAT WAS STOCKPILED DURING CONSTRUCTION WILL BE PLACED ALONG THE ROW. GROUNDS DISTURBED BY ANY OF THE OPERATIONS NECESSARY TO COMPLETE THE WORK FOR THIS PROJECT ARE TO BE PERMANENTLY SEEDED, OR IF SPECIFIED, SODDED, UNLESS OCCUPIED BY STRUCTURES, PAVED OR DESIGNATED AS A PERMANENT ACCESS ROAD. DISTURBED AREAS, WHICH ARE AT FINAL GRADE, SHALL BE SEEDED AND MULCHED ONCE FINAL GRADES ARE ACHIEVED. THE PERMANENT SEED MIXTURE WILL RESTORE DISTURBED AREAS TO A MEADOW IN GOOD CONDITION OR BETTER. IF SEEDING CANNOT BE COMPLETED WITHIN A FOUR (4) DAY PERIOD DUE TO WEATHER CONDITIONS, THE DISTURBED AREA WILL BE MULCHED WITH STRAW AT THE RATE OF THREE (3) TONS PER ACRE. THIS STRAW WILL BE ANCHORED USING A METHOD OUTLINED ON DRAWING PCS-0.03.

SITE RESTORATION CONSTRUCTION SEQUENCE

A GENERALIZED CONSTRUCTION SEQUENCE IS PROVIDED BELOW. THE CONSTRUCTION SEQUENCE IS INTENDED TO PROVIDE A GENERAL COURSE OF ACTION TO CONFORM TO THE APPLICABLE REGULATORY AGENCY REQUIREMENTS FOR SITE RESTORATION AND POST-CONSTRUCTION STORMWATER MANAGEMENT OF THE SITE. NECESSARY STEPS FOR PROPER AND COMPLETE EXECUTION OF WORK PERTAINING TO THIS PLAN, WHETHER SPECIFICALLY MENTIONED OR NOT, ARE TO BE PERFORMED BY THE CONTRACTOR. THE CONTRACTOR WILL COMPLY WITH ALL REQUIREMENTS LISTED IN THIS SECTION. THE CONTRACTOR MAY BE REQUIRED TO ALTER CONTROLS BASED ON THE EFFECTIVENESS OF CONTROLS OR DIFFERING CONDITIONS ENCOUNTERED IN THE FIELD. THE APPROPRIATE COUNTY CONSERVATION DISTRICT AND DEP SHALL BE CONTACTED AND MUST APPROVE ANY DEVIATION TO THE AUTHORIZED PLANS.
A PRE-CONSTRUCTION MEETING IS REQUIRED PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY. THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (PADEP) OR APPLICABLE COUNTY CONSERVATION DISTRICT, CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, AND THE PLAN PREPARER MUST BE INVITED TO THIS MEETING AT LEAST 7 DAYS IN ADVANCE.

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. SURFACE ROUGHENING WILL BE UTILIZED TO ROUGH THE SOIL SURFACE WITH HORIZONTAL DEPRESSIONS FOR THE PURPOSE OF REDUCING RUNOFF VELOCITY, INCREASING INFILTRATION, AIDING THE ESTABLISHMENT OF VEGETATION, AND REDUCING EROSION. SURFACE ROUGHENING SHOULD BE APPLIED TO SLOPES 3H:1V OR STEEPER UNLESS A STABLE ROCK FACE IS PROVIDED OR IT CAN BE SHOWN THAT THERE IS NOT A POTENTIAL FOR SEDIMENT POLLUTION TO SURFACE WATERS. FOR ROUGHENED SURFACES WITHIN 50 FEET OF A SURFACE WATER, AND WHERE BLANKETING OF SEEDED AREAS IS PROPOSED AS THE MEANS TO ACHIEVING PERMANENT STABILIZATION, SPRAY-ON TYPE BLANKETS ARE RECOMMENDED. SURFACE ROUGHENING SHALL BE ACCOMPLISHED USING DOZERS AFFIXED WITH GROUSER TRACKED EQUIPMENT. DOZERS SHALL RUN UP AND DOWN THE SLOPES LEAVING HORIZONTAL GROOVES PERPENDICULAR TO THE SLOPE. DOZER BLADES SHALL BE RAISED AND NOT USED DURING SURFACE ROUGHENING. WHERE COMPACTION DOES OCCUR, CONTRACTOR SHALL SCARIFIY THE SOIL OR PROVIDE ADDITIONAL ROUGHENING SUCH AS DEEP RIPPING OR CHISEL RIPPING TO RESTORE THE AREA TO A MINIMAL COMPACTED STATE. IN AREAS OF PROPOSED INFILTRATION, SOILS SHALL BE AMENDED TO 2' BELOW GRADE. SEE SOIL AMENDMENT AND RESTORATION CONSTRUCTION SEQUENCE BELOW.
3. PLACE TOPSOIL FROM TOPSOIL STOCKPILES AS THE UPPER LAYER OF BACKFILL. TOPSOIL SHALL NOT BE PLACED WHEN THE SUBGRADE IS FROZEN OR WHEN IT IS EXCESSIVELY WET OR DRY AND SHALL NOT BE HANDLED WHEN IN A FROZEN OR MUDDY CONDITION.
4. REMOVE GRAVEL AND GEOTEXTILE FROM THE TEMPORARY ACCESS ROADS AND SCARIFY THE SOIL. REFER TO STEP 2 OF THIS SEQUENCE TO ADDRESS COMPACTION AT ACCESS ROADS. AFTER ADDRESSING COMPACTION CONCERNS, PLACE TOPSOIL THAT WAS STRIPPED PRIOR TO INSTALLATION OF THE ACCESS ROADS.
5. IMMEDIATELY SEED AND MULCH DISTURBED AREAS IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE ONCE FINAL GRADE IS ESTABLISHED AND TOPSOIL IS PLACED.
6. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER IS ESTABLISHED. REGRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE EROSION AND SEDIMENT CONTROLS.

SOIL AMENDMENT AND RESTORATION CONSTRUCTION SEQUENCE

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. IN THE DESIGNATED SOIL AMENDMENT AREA, TILL THE GROUND AND MIX IN THE COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST) TO A DEPTH OF 24 INCHES.
3. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
4. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

POST CONSTRUCTION STORMWATER MANAGEMENT CONSTRUCTION SEQUENCE

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. INSTALL POST CONSTRUCTION BMPS AFTER COMPLETION OF PIPELINE CONSTRUCTION:

INFILTRATION BERM

1. INSTALL TEMPORARY SEDIMENT AND EROSION CONTROL BMPS AS PER THE PENNSYLVANIA EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL.
2. INSTALL ORANGE CONSTRUCTION FENCING AROUND THE PONDING AREA OF THE INFILTRATION BERM AS SHOWN ON THE PCSM PLAN DRAWINGS. COMPLETE SITE GRADING AND STABILIZE WITHIN THE LIMIT OF DISTURBANCE EXCEPT WHERE THE INFILTRATION BERM WILL BE CONSTRUCTED AND THE EXTENT OF THE PONDING AREA; MAKE EVERY EFFORT TO MINIMIZE BERM FOOTPRINT AND NECESSARY ZONE OF DISTURBANCE (INCLUDING BOTH REMOVAL OF EXISTING VEGETATION AND DISTURBANCE OF EMPTY SOIL) IN ORDER TO MAXIMIZE INFILTRATION. IF EQUIPMENT MUST TRAVEL THROUGH THE PONDING AREA, TIMBER MATTING SHALL BE PLACED TO MINIMIZE COMPACTION, AND EQUIPMENT TRAFFIC SHALL BE MINIMIZED.
3. LIGHTLY SCARIFY THE SOIL IN THE AREA OF THE PROPOSED BERM BEFORE DELIVERING SOIL TO SITE.
4. BRING IN FILL MATERIAL TO MAKE UP THE MAJOR PORTION OF THE BERM. SOIL SHOULD BE ADDED IN 8-INCH LIFTS AND COMPACTED AFTER EACH ADDITION ACCORDING TO DESIGN SPECIFICATIONS. THE SLOPE AND SHAPE OF THE BERM SHOULD BE GRADED OUT AS SOIL IS ADDED.
5. PROTECT THE SURFACE PONDING AREA AT THE BASE OF THE BERM FROM COMPACTION.
6. COMPLETE FINAL GRADING OF THE BERM AFTER THE TOP LAYER OF SOIL IS ADDED. TAMP SOIL DOWN LIGHTLY AND SMOOTH SIDES OF THE BERM. THE CREST AND BASE OF THE BERM SHOULD BE AT LEVEL GRADE.
7. PLANT BERM WITH TURF, MEADOW PLANTS, SHRUBS OR TREES, AS DESIRED.
8. MULCH PLANTED AND DISTURBED AREAS WITH COMPOST MULCH TO PREVENT EROSION WHILE PLANTS BECOME ESTABLISHED.

INFILTRATION TRENCH

1. INSTALL AND MAINTAIN PROPER EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION.
2. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE.
3. PROTECT INFILTRATION TRENCH AREA FROM COMPACTION PRIOR TO INSTALLATION. INSTALL ORANGE CONSTRUCTION FENCE AROUND THE TRENCH AND, IF APPLICABLE, THE PONDING AREA OF THE DOWNSLOPE BERM.
4. IF POSSIBLE, INSTALL INFILTRATION TRENCH DURING LATER PHASES OF SITE CONSTRUCTION TO PREVENT SEDIMENTATION AND/OR DAMAGE FROM CONSTRUCTION ACTIVITY. AFTER INSTALLATION, PREVENT SEDIMENT LADEN WATER FROM ENTERING INLETS AND PIPES. IF IT IS NOT POSSIBLE TO INSTALL THE INFILTRATION TRENCH DURING THE LATER PHASES OF CONSTRUCTION, PLACE COMPOST FILTER SOCK UPSLOPE OF THE TRENCH TO PREVENT SEDIMENT FROM REACHING AND CLOGGING THE TRENCH.
5. EXCAVATE INFILTRATION TRENCH BOTTOM TO A UNIFORM, LEVEL UNCOMPACTED SUBGRADE FREE FROM ROCKS AND DEBRIS. DO NOT COMPACT SUBGRADE. THE CONSTRUCTION EQUIPMENT SHALL REMAIN OUTSIDE OF THE INFILTRATION TRENCH WHILE EXCAVATING IT.
6. PLACE NONWOVEN GEOTEXTILE ALONG BOTTOM AND SIDES OF TRENCH. NONWOVEN GEOTEXTILE ROLLS SHOULD OVERLAP BY A MINIMUM OF 16 INCHES WITHIN THE TRENCH. FOLD BACK AND SECURE EXCESS GEOTEXTILE DURING STONE PLACEMENT.
7. INSTALL UPSTREAM AND DOWNSTREAM CONTROL STRUCTURES, CLEANOUTS, ETC.
8. PLACE UNIFORMLY GRADED, CLEAN-WASHED AGGREGATE IN 8-INCH LIFTS, LIGHTLY COMPACTING BETWEEN LIFTS. LIGHT COMPACTION SHALL ENSURE THE AGGREGATE WON'T SETTLE BELOW THE INTENDED TOP ELEVATION OF THE TRENCH. CARE SHALL BE TAKEN SO AS NOT TO COMPACT THE SUBGRADE.
9. INSTALL CONTINUOUSLY PERFORATED PIPE AS INDICATED ON PLANS. BACKFILL WITH UNIFORMLY GRADED, CLEAN-WASHED AGGREGATE IN 8-INCH LIFTS, LIGHTLY COMPACTING BETWEEN LIFTS. LIGHT COMPACTION SHALL ENSURE THE AGGREGATE WON'T SETTLE BELOW THE INTENDED TOP ELEVATION OF THE TRENCH. CARE SHALL BE TAKEN SO AS NOT TO COMPACT THE SUBGRADE.
10. FOLD AND SECURE NONWOVEN GEOTEXTILE OVER INFILTRATION TRENCH, WITH MINIMUM OVERLAP OF 16- INCHES.
11. PLACE 6-INCH LIFT OF APPROVED TOPSOIL OVER INFILTRATION TRENCH, AS INDICATED ON PLANS.
12. SEED AND STABILIZE TOPSOIL.
13. ANY SEDIMENT THAT ENTERS INLETS DURING CONSTRUCTION IS TO BE REMOVED WITHIN 24 HOURS.
14. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
15. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.
16. REMOVE EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE EROSION AND SEDIMENT CONTROLS.

SOIL AMENDMENT AND RESTORATION

1. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION.
2. IN THE DESIGNATED SOIL AMENDMENT AREA, TILL THE GROUND AND MIX IN THE COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST) TO A DEPTH OF 24 INCHES.
3. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
4. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

SLOW RELEASE TRENCH

1. INSTALL AND MAINTAIN PROPER EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION.
2. GRADE SURFACE TO FINISHED GRADE ELEVATIONS AS SOON AS PRACTICABLE.
3. IF POSSIBLE, INSTALL SLOW RELEASE TRENCH DURING LATER PHASES OF SITE CONSTRUCTION TO PREVENT SEDIMENTATION AND/OR DAMAGE FROM CONSTRUCTION ACTIVITY. AFTER INSTALLATION, PREVENT SEDIMENT LADEN WATER FROM ENTERING INLETS AND PIPES. IF IT IS NOT POSSIBLE TO INSTALL THE SLOW RELEASE TRENCH DURING THE LATER PHASES OF CONSTRUCTION, PLACE COMPOST FILTER SOCK UPSLOPE OF THE TRENCH TO PREVENT SEDIMENT FROM REACHING AND CLOGGING THE TRENCH.
4. EXCAVATE SLOW RELEASE TRENCH BOTTOM TO A UNIFORM, LEVEL SUBGRADE FREE FROM ROCKS AND DEBRIS.
5. INSTALL AN IMPERMEABLE LINER WITHIN THE SLOW RELEASE TRENCH. SECURE IMPERMEABLE LINER DURING STONE PLACEMENT WITH AN ANCHOR TRENCH.
6. INSTALL UPSTREAM AND DOWNSTREAM CONTROL STRUCTURES, CLEANOUTS, ETC.
7. PLACE UNIFORMLY GRADED, CLEAN-WASHED AGGREGATE IN 8-INCH LIFTS, LIGHTLY COMPACTING BETWEEN LIFTS. LIGHT COMPACTION SHALL ENSURE THE AGGREGATE WON'T SETTLE BELOW THE INTENDED TOP ELEVATION OF THE TRENCH.
8. INSTALL CONTINUOUSLY PERFORATED PIPE AND UNDERDRAIN OUTLET AS INDICATED ON PLANS. BACKFILL WITH UNIFORMLY GRADED, CLEAN-WASHED AGGREGATE IN 8-INCH LIFTS, LIGHTLY COMPACTING BETWEEN LIFTS. LIGHT COMPACTION SHALL ENSURE THE AGGREGATE WON'T SETTLE BELOW THE INTENDED TOP ELEVATION OF THE TRENCH.
9. PLACE 6-INCH LIFT OF APPROVED TOPSOIL OVER SLOW RELEASE TRENCH, AS INDICATED ON PLANS.
10. SEED AND STABILIZE TOPSOIL.
11. ANY SEDIMENT THAT ENTERS INLETS DURING CONSTRUCTION IS TO BE REMOVED WITHIN 24 HOURS.
12. IMMEDIATELY SEED AND MULCH DISTURBED AREAS ONCE FINAL GRADE IS ESTABLISHED IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE.
13. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70% PERENNIAL VEGETATIVE COVER IS ESTABLISHED.
14. REMOVE EROSION SEDIMENT CONTROL MEASURES UPON ESTABLISHMENT OF A UNIFORM 70% VEGETATIVE COVER OVER THE DISTURBED AREA. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE EROSION AND SEDIMENT CONTROLS.

LEGEND

- 1320 — EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING TREE LINE
- x x x — EXISTING FENCELINE
- EXISTING STREAM WITH FLOW DIRECTION
- OVH — EXISTING ELECTRIC OVERHEAD
- UE — EXISTING ELECTRIC UNDERGROUND
- EXISTING LIGHT POLE
- W — EXISTING WATER LINE
- GAS — EXISTING GAS LINE
- DOMN — EXISTING DOMINION GAS LINE
- SAN — EXISTING SANITARY SEWER LINE
- EXISTING BUILDING
- PROPERTY LINE
- COUNTY BOUNDARY
- TOWNSHIP BOUNDARY
- 100-YEAR FLOODWAY
- 100-YEAR FEMA FLOODWAY
- 100-YEAR FEMA FLOODPLAIN
- ORANGE CONSTRUCTION FENCE
- EXISTING PEM WETLAND
- EXISTING PFO WETLAND
- EXISTING PSS WETLAND
- G — PROPOSED PIPE LOCATION
- PROPOSED RIGHT-OF-WAY
- RIPARIAN FOREST BUFFER
- SOIL BOUNDARY
- ErB (TYPE) / (C) (HYDROLOGY) — SOIL TYPE/HYDROLOGY
- LIMIT OF DISTURBANCE/AREA TO BE RESTORED
- WATER BAR
- TRENCH PLUGS
- AREA TO BE BORED / G — CONVENTIONAL BORE
- UNDERDRAIN
- OVERALL DRAINAGE AREA
- POST CONSTRUCTION DETAINED DRAINAGE AREA
- POST CONSTRUCTION DETAINED TIME OF CONCENTRATION
- POST CONSTRUCTION UN-DETAINED TIME OF CONCENTRATION
- PRE CONSTRUCTION TIME OF CONCENTRATION
- PRE CONSTRUCTION IMPERVIOUS AREA
- PRE CONSTRUCTION MEADOW AREA
- PRE CONSTRUCTION FORESTED AREA
- POST CONSTRUCTION GRAVEL AREA
- POST CONSTRUCTION MEADOW AREA
- POST CONSTRUCTION WOODED AREA
- OIT-1 — INFILTRATION TEST LOCATION
- PONDING AREA

DETAIL INDICATOR

DETAIL NUMBER

SHEET SHOWN ON

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REVISIONS

NO.	BY	DATE	REMARKS

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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
GENERAL NOTES & LEGEND

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

PCS-0.01
SHEET 0.01 OF 17

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LONG TERM INSPECTIONS AND MAINTENANCE FOR SITE RESTORATION AND PCSM CONTROLS:

LONG-TERM MAINTENANCE OF THE PIPELINE ROW WILL INCLUDE PERIODIC VISUAL INSPECTIONS FOR SUFFICIENT VEGETATIVE GROWTH AND COVER. INSUFFICIENT VEGETATIVE COVER IS DEFINED AS ANY AREA NOT ACHIEVING A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER. BARE SPOTS AND AREAS WITH INSUFFICIENT VEGETATIVE COVER WILL BE RESEEDED AND MULCHED WITHIN 24 HOURS OF DISCOVERY. THE RIGHT OF WAY WILL BE INSPECTED FOR SIGNS OF EROSION, ESPECIALLY ON STEEP SLOPES. CORRECTIVE MEASURES WILL BE TAKEN, AS NEEDED. IF THERE IS EVIDENCE OF TRENCH SETTLING, THE AREA WILL BE REGRADED TO MAINTAIN PRE-CONSTRUCTION DRAINAGE PATTERNS, MULCHED, AND SEEDED. A WRITTEN REPORT IS REQUIRED FOR EACH INSPECTION AND FOR EACH REPAIR OR MAINTENANCE ACTIVITY, AND THE REPORT SHOULD SPECIFY HOW TO ACCESS THE SITE. SPLP IS RESPONSIBLE FOR MAINTAINING THE ROW UNDER THE PROVISIONS OF THIS PERMIT.

PERMANENT PROPOSED ACCESS ROADS AND VALVE PADS WILL BE CONSTRUCTED AS PART OF THE PROJECT. THESE ACCESS ROADS WILL REMAIN AS A PERMANENT GRAVEL DRIVE AFTER CONSTRUCTION IS COMPLETE. THE ACCESS ROADS WILL BE INSPECTED PERIODICALLY, AND AGGREGATE WILL BE APPLIED TO THE PERMANENT ACCESS ROADS AS NEEDED TO MAINTAIN AN ADEQUATE THICKNESS.

INSPECTION AND MAINTENANCE PROCEDURES FOR PERMANENT POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES AND STORMWATER CONVEYANCE BMPS ARE SUMMARIZED BELOW. IF ANY POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES ARE CONSTRUCTED PRIOR TO STABILIZATION OF UPSLOPE CONTRIBUTORY DRAINAGE AREAS, INSPECTIONS SHALL OCCUR WEEKLY AND AFTER RUNOFF EVENTS UNTIL THE SURROUNDING AREA ACHIEVES STABILIZATION. SPECIFY WHERE WE HAVE TO DO POST-CONSTRUCTION INFILTRATION TESTING.

INFILTRATION BERM

- THE INFILTRATION BERM SHALL BE INSPECTED AT LEAST 4 TIMES PER YEAR TO ENSURE IT IS INFILTRATING PROPERLY AND NOT CLOGGED WITH SEDIMENT.
- MONITOR DRAWDOWN TIME AFTER THE FIRST MAJOR STORM EVENT. THE BERM SHALL DEWATER WITHIN A MAXIMUM OF 72 HOURS. IF THE BERM IS NOT INFILTRATING WITHIN THE SPECIFIED TIMEFRAME, AMEND THE SOILS WITHIN THE PONDING AREA OF THE BERM (SEE SOIL AMENDMENT DETAIL IN PLANS).
- VEGETATION OVER THE BERM SHALL BE MAINTAINED AS NECESSARY, WHICH MAY REQUIRE ANNUAL MULCHING. ROUTINELY REMOVE ACCUMULATED DEBRIS AND INVASIVE PLANTS AS NEEDED.
- INSPECT FOR SIGNS OF FLOW CHANNELIZATION AND RESTORE LEVEL GRADIENT IMMEDIATELY AFTER ANY DEFICIENCIES ARE OBSERVED.

INFILTRATION TRENCH

- CATCH BASINS AND INLETS FOR THE INFILTRATION TRENCH SHOULD BE INSPECTED AND CLEANED, AS NECESSARY, AT LEAST 4 TIMES PER YEAR.
- THE VEGETATION ALONG THE SURFACE OF THE INFILTRATION TRENCH SHOULD BE MAINTAINED IN GOOD CONDITION, AND ANY BARE SPOTS REVEGETATED AS SOON AS POSSIBLE.
- VEHICLES SHOULD NOT BE PARKED OR DRIVEN ON A VEGETATED INFILTRATION TRENCH, AND CARE SHOULD BE TAKEN TO AVOID EXCESSIVE COMPACTION BY MOWERS.

SOIL AMENDMENT AND RESTORATION

- THE SOIL RESTORATION PROCESS MAY NEED TO BE REPEATED OVER TIME, DUE TO COMPACTION BY USE AND/OR SETTLING.
- SOIL AMENDMENT AREAS SHALL BE INSPECTED AT LEAST 4 TIMES PER YEAR FOR SIGNS OF COMPACTION. TO REMEDY COMPACTION, TILL THE SOIL TO A DEPTH OF 24 INCHES AND MIX IN COMPOST AT A RATIO OF 2:1 (SOIL: COMPOST).

SLOW RELEASE TRENCH

- INLETS AND OUTLETS FOR THE SLOW RELEASE TRENCH SHOULD BE INSPECTED AND CLEANED, AS NECESSARY, AT LEAST 4 TIMES PER YEAR.
- THE VEGETATION ALONG THE SURFACE OF THE SLOW RELEASE TRENCH SHOULD BE MAINTAINED IN GOOD CONDITION, AND ANY BARE SPOTS REVEGETATED AS SOON AS POSSIBLE.
- VEHICLES SHOULD NOT BE PARKED OR DRIVEN ON A SLOW RELEASE TRENCH.

DIVERSION BERM

- INSPECTIONS TO BE DONE ANNUALLY AND WITHIN 48 HOURS AFTER EVERY MAJOR STORM EVENT (> 1 INCH RAINFALL DEPTH).
- MAINTAIN TURF GRASS AND OTHER VEGETATION BY MOWING AND RE-MULCHING.
- ROUTINELY REMOVE ACCUMULATED TRASH AND DEBRIS.
- REMOVE INVASIVE PLANTS AS NEEDED.
- INSPECT FOR SIGNS OF FLOW CHANNELIZATION; RESTORE LEVEL GRADIENT IMMEDIATELY AFTER DEFICIENCIES ARE OBSERVED.

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NO.	BY	DATE	REMARKS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — ROBERT F. SIMCIK — PE 059435-E

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN NOTES

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

PCS-0.02
SHEET 0.02 OF 17

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TEMPORARY SEEDING

TEMPORARY GRASS COVER SHALL BE ESTABLISHED IN THE FOLLOWING AREAS:

1. WHERE SOIL STOCKPILES ARE TO BE EXPOSED FOR A PERIOD GREATER THAN FOUR (4) DAYS, THE STOCKPILE SHALL BE SEEDED.
2. WHERE VEGETATIVE FILTERS MUST BE ESTABLISHED BELOW FILTER BAGS, A MINIMUM DISTANCE OF 10 FT SHALL BE SEEDED DOWN SLOPE OF THE TRAP OUTLET.

TEMPORARY COVER

SEED MIXTURE FOR TEMPORARY COVER SHALL CONSIST OF 100% ANNUAL RYEGRASS. SEED SHALL BE APPLIED AT THE RATE OF 40 LB/ACRE OR AS RECOMMENDED BY A LOCAL RECOGNIZED SEED SUPPLIER APPROVED BY THE OWNER'S REPRESENTATIVE. PRIOR TO SEEDING, APPLY 1 TON OF AGRICULTURAL GRADE LIMESTONE PER ACRE PLUS 10–10–10 FERTILIZER AT THE RATE OF 500 LB. PER ACRE AND WORK INTO SOIL.

MULCHING

THE PURPOSE OF MULCH IS TO REDUCE RUNOFF AND EROSION, PREVENT SURFACE COMPACTION OR CRUSTING, CONSERVE MOISTURE, AID IN ESTABLISHING PLANT COVER, AND CONTROL WEEDS. MULCH SHALL BE APPLIED ON ANY AREA SUBJECT TO EROSION, OR WHICH HAS UNFAVORABLE CONDITIONS FOR PLANT ESTABLISHMENT AND GROWTH. THE PRACTICE MAY BE USED ALONE OR IN CONJUNCTION WITH OTHER STRUCTURAL AND VEGETATIVE CONSERVATION PRACTICES, SUCH AS WATERWAYS, PONDS, SEDIMENTATION TRAPS OR CRITICAL AREA PLANTING. ON SEDIMENT PRODUCING AREAS WHERE THE PERIOD OF EXPOSURE IS LESS THAN TWO (2) MONTHS, MULCH MATERIALS SHALL BE APPLIED ACCORDING TO THE FOLLOWING GUIDELINES:

1. STRAW MULCH SHALL BE APPLIED AT THE RATE OF THREE TONS PER ACRE. CHEMICALLY TREATED OR SALTED STRAW IS NOT ACCEPTABLE AS MULCH.
2. STRAW MULCH SHALL BE ANCHORED IMMEDIATELY AFTER APPLICATION BY AT LEAST ONE OF THE FOLLOWING METHODS.
   - A. "CRIMPED" INTO THE SOIL USING TRACTOR DRAWN EQUIPMENT (STRAIGHT BLADED COULTER OR SIMILAR). THIS METHOD IS LIMITED TO SLOPES NO STEEPER THAN 3:1. MACHINERY SHOULD BE OPERATED ON THE CONTOUR. (CRIMPING OF HAY OR STRAW BY RUNNING IT OVER WITH TRACKED MACHINERY IS NOT RECOMMENDED)
   - B. ASPHALT, EITHER EMULSIFIED OR CUT–BACK, CONTAINING NO SOLVENTS OR OTHER DILUTING AGENTS TOXIC TO PLANT OR ANIMAL LIFE, UNIFORMLY APPLIED AT THE RATE OF 31 GALLONS PER 1000 FT2.
   - C. SYNTHETIC BINDERS (CHEMICAL BINDERS) MAY BE USED AS RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH PROVIDED SUFFICIENT DOCUMENTATION IS PROVIDED TO SHOW THAT IT IS NON–TOXIC TO NATIVE PLANT AND ANIMAL SPECIES.
   - D. LIGHTWEIGHT PLASTIC, FIBER, OR PAPER NETS MAY BE STAPLED OVER THE MULCH ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

MULCHED AREAS SHALL BE CHECKED PERIODICALLY AND AFTER EACH RUNOFF EVENT (E.G. RAIN, SNOWMELT, ETC) FOR DAMAGE UNTIL THE DESIRED PURPOSE OF THE MULCHING IS ACHIEVED. DAMAGED PORTIONS OF THE MULCH OR TIE–DOWN MATERIAL SHALL BE REPAIRED UPON DISCOVERY.

REVEGETATION

LIMING RATES

MINIMUM 6 TONS PER ACRE AT 100% EFFECTIVE NEUTRALIZING VALUE (% ENV), UNLESS THE SOIL TEST DETERMINES THAT A LESSER AMOUNT IS NEEDED. TO DETERMINE THE ACTUAL AMOUNT OF REGULAR LIME TO APPLY, DIVIDE THE AMOUNT CALLED FOR BY THE SOIL TEST BY THE % ENV FOR THE PRODUCT USED. FOR EXAMPLE, IF 6 TONS PER ACRE IS NEEDED AND THE ENV FOR THE LIME USED IS 88%, DIVIDE 6 BY 0.88 RESULTING IN 6.8 TONS NEEDING TO BE APPLIED.
FOR DOLOMITIC LIME, WHICH HAS A SIGNIFICANT AMOUNT OF MAGNESIUM IN IT, DIVIDE THE AMOUNT CALLED FOR BY THE SOIL TEST BY THE % CALCIUM CARBONATE EQUIVALENT (% CCE) LISTED FOR THE PRODUCT INSTEAD OF THE % ENV. THE % CCE MAY BE ABOVE 100% WHICH ACCOUNTS FOR THE FACT THAT MAGNESIUM HAS A GREATER EFFECT PER POUND THAN THE CALCIUM IN REGULAR LIME. WORK IN LIME AND FERTILIZER TO A DEPTH OF 4 INCHES USING SUITABLE EQUIPMENT.
NOTE: WHEN A SOIL TEST REQUIRES MORE THAN 8,000 POUNDS OF LIME PER ACRE, THE LIME MUST BE MIXED INTO THE TOP 6 INCHES OF SOIL.

FERTILIZATION RATES

APPLY 10–20–20 AT 600 POUNDS/ACRE, IF TOP DRESSED OR 1,000 POUNDS/AC, IF INCORPORATED, UNLESS THE SOIL TEST DETERMINES THAT THE RATE CAN BE LESS THAN THESE MINIMUMS.

SOIL AMENDMENT APPLICATION RATE EQUIVALENTS

SOIL AMENDMENT	PER ACRE	PER 1,000 SQ. FT.	PER 1,000 SQ. YDS.	NOTES
PERMANENT SEEDING APPLICATION RATE				
AGRICULTURAL LIME	6 TONS	240 LBS.	240 LBS.	OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS
10–20–20 FERTILIZER	1,000 LBS.	25 LBS.	210 LBS.	OR AS PER SOIL TEST; MAY NOT BE REQUIRED IN AGRICULTURAL FIELDS

RECOMMENDED SEED MIXTURES

MIXTURE NO.	SPECIES	SEEDING RATES – PLS(1) MOST SITES	SEEDING RATES – PLS(1) ADVERSE SITES
1 (2)	SPRING OATS (SPRING), OR 64 96	64	96
	ANNUAL RYEGRASS (SPRING OR FALL), OR	10	15
	WINTER WHEAT (FALL), OR	90	120
	WINTER RYE (FALL)	56	112
2 (3)	TALL FESCUE, OR 75	60	75
	FINE FESCUE, OR 40	35	40
	KENTUCKY BLUEGRASS, PLUS 25 30	25	30
	REDTOP(4), OR	3	3
	PERENNIAL RYEGRASS	15	20
3	BIRDSFOOT TREFOIL, PLUS 6 10	6	10
	TALL FESCUE	30	35
4	BIRDSFOOT TREFOIL, PLUS	6	10
	REED CANARYGRASS	10	15
5 (5)	CROWNVETCH, PLUS	10	15
	TALL FESCUE, OR	20	25
	PERENNIAL RYEGRASS	20	25
6 (5,6)	CROWNVETCH, PLUS	10	15
	ANNUAL RYEGRASS	20	25
7 (5)	BIRDSFOOT TREFOIL, PLUS	20	30
	CROWNVETCH, PLUS	20	30
	TALL FESCUE	20	25
8	FLATPEA, PLUS	20	30
	TALL FESCUE, OR	20	30
	PERENNIAL RYEGRASS	20	25
9 (7)	SERECIA LESPEDEZA, PLUS	10	20
	TALL FESCUE, PLUS	20	25
	REDTOP(4)	3	3
10	TALL FESCUE, PLUS	40	60
	FINE FESCUE	10	15
11	DEERTONGUE, PLUS	15	20
	BIRDSFOOT TREFOIL	6	10
12(8)	SWITCHGRASS, OR	15	20
	BIG BLUESTEM, PLUS	15	20
	BIRDSFOOT TREFOIL	6	10
13	ORCHARDGRASS, OR	20	30
	SMOOTH BROMEGRASS, PLUS	25	35
	BIRDSFOOT TREFOIL	6	10

NOTES:

1. PURE LIVE SEED (PLS) IS THE PRODUCT OF THE PERCENTAGE OF PURE SEED TIMES PERCENTAGE GERMINATION DIVIDED BY 100. FOR EXAMPLE, TO SECURE THE ACTUAL PLANTING RATE FOR SWITCHGRASS, DIVIDE 12 POUNDS PLS SHOWN ON THE SEED TAG. THUS, IF THE PLS CONTENT OF A GIVEN SEED LOT IS 35 PERCENT, DIVIDE 12 PLS BY 0.35 TO OBTAIN 34.3 POUNDS OF SEED REQUIRED TO PLANT ONE–ACRE. ALL MIXTURES IN THIS TABLE ARE SHOWN IN TERMS OF PLS.
2. IF HIGH–QUALITY SEED IS USED, FOR MOST SITES SEED SPRING OATS AT A RATE OF TWO BUSHELS PER ACRE, WINTER WHEAT AT 11.5 BUSHELS PER ACRE, AND WINTER RYE AT ONE BUSHEL PER ACRE. IF GERMINATION IS BELOW 90 PERCENT, INCREASE THESE SUGGESTED SEEDING RATES BY 0.5 BUSHEL PER ACRE.
3. THIS MIXTURE IS SUITABLE FOR FREQUENT MOWING. DO NOT CUT SHORTER THAN 4 INCHES.
4. KEEP SEEDING RATE TO THAT RECOMMENDED IN TABLE. THESE SPECIES HAVE MANY SEEDS PER POUND AND ARE VERY COMPETITIVE. TO SEED SMALL QUANTITIES OF SMALL SEEDS SUCH AS WEEPING LOVEGRASS AND REDTOP, DILUTE WITH DRY SAWDUST, SAND, RICE HULLS, BUCKWHEAT HULLS, ETC.
5. USE FOR HIGHWAY SLOPES AND SIMILAR SITES WHERE THE DESIRED SPECIES AFTER ESTABLISHMENT IS BIG BLUESTEM.
6. USE ONLY IN EXTREME SOUTHEASTERN OR EXTREME SOUTHWESTERN PA. SERECIA LESPEDEZA IS NOT WELL ADAPTED TO MOST OF PA.
7. DO NOT MOW SHORTER THAN 9 TO 10 INCHES.
8. NOTE NOT APPLICABLE BECAUSE CROWNVETCH IS NOT PROPOSED.
9. IF LIMING, FERTILIZATION, AND PREPARATION OF SEEDBED ARE PROPERLY DONE AND IF CARE IS TAKEN TO DRILL AND COVER THE SEED (OR MULCH APPLIED), THE RATE FOR "MOST SITES" SHOULD SUFFICE. HOWEVER, ON ERODED OR COARSE AND POORLY PREPARED SEEDBEDS, PARTICULARLY IF THE SOIL IS VERY ACIDIC OR INFERTILE, THE RATE FOR "ADVERSE SITES" SHOULD BE USED.

PENN DOT FORMULA B

SEEDING RATE	3 LBS PER 1,000 SQ FT			
SPECIES	% BY WT.	PURITY %	MIN. % GERMINATION	MAX. % WEED SEED
KENTUCKY BLUEGRASS	50	98	80	0.20
PERENNIAL RYE	20	98	90	0.15
RED FESCUE	30	98	85	0.15

SITE CONDITIONS	NURSE CROP	SEED MIXTURE (SELECT ONE MIXTURE)
SLOPES AND BANKS (NOT MOWED)		
WELL–DRAINED	1 PLUS	3, 5, 8, OR 12 (1)
VARIABLE DRAINAGE	1 PLUS	3 OR 7
SLOPES AND BANKS (MOWED)		
WELL–DRAINED	1 PLUS	2 OR 10
SLOPES AND BANKS (GRAZED/HAY)		
WELL–DRAINED	1 PLUS	2,3, OR 13
GULLIES AND ERODED AREAS	1 PLUS	3, 5, 7, OR 12 (1)
EROSION CONTROL FACILITIES (BMPS)		
SOD WATERWAYS, SPILLWAYS, FREQUENT WATER FLOW AREAS	1 PLUS	2, 3, OR 4
DRAINAGE DITCHES		
SHALLOW, LESS THAN THREE FEET DEEP	1 PLUS	2, 3, OR 4
DEEP, NOT MOWED	1 PLUS	5 OR 7
POND BANKS, DIKES, LEVEES, DAMS, DIVERSION CHANNELS, AND OCCASIONAL WATER FLOW AREAS		
MOWED AREAS	1 PLUS	2 OR 3
NON–MOWED AREAS	1 PLUS	5 OR 7
FOR HAY OR SILAGE ON DIVERSION CHANNELS AND OCCASIONAL WATER FLOW AREAS	1 PLUS	3 OR 13
HIGHWAYS (2)		
NON–MOWED AREAS	1 PLUS	
WELL–DRAINED	1 PLUS	5, 7, 8, 9, OR 10
VARIABLE DRAINED	1 PLUS	3 OR 7
POORLY DRAINED	1 PLUS	3 OR 9
AREAS MOWED SEVERAL TIMES PER YEAR	1 PLUS	2, 3, OR 10
UTILITY ROW		
WELL–DRAINED	1 PLUS	5, 8, OR 12 (1)
VARIABLE DRAINED	1 PLUS	3 OR 7
WELL–DRAINED AREAS FOR GRAZING/HAY	1 PLUS	2, 3, OR 13
EFFLUENT DISPOSAL AREAS	1 PLUS	3 OR 4
SANITARY LANDFILLS	1 PLUS	3, 5, 7, 11 (1), OR 12 (1)
SURFACE MINES		
SPOILS, MINE WASTES, FLY ASH, SLAG, SETTLING BASIN RESIDUES AND OTHER SEVERELY DISTURBED AREAS (LIME TO SOIL TEST)	1 PLUS	3, 4, 5, 7, 8, 9, 11 (1) OR 12(1)
SEVERELY DISTURBED AREAS FOR GRAZING/HAY	1 PLUS	3 OR 13

NOTES:

1. FOR SEED MIXTURES 11 AND 12, ONLY USE SPRING OATS OR WEEPING LOVEGRASS (INCLUDED IN MIX) AS NURSE CROP.
2. CONTACT THE PennDOT DISTRICT ROADSIDE SPECIALIST FOR SPECIFIC SUGGESTIONS ON TREATMENT TECHNIQUES AND MANAGEMENT PRACTICES.

MULCH APPLICATION RATES

MULCH TABLE	APPLICATION RATE (MINIMUM) PER ACRE	PER 1,000 SQ. FT.	PER 1,000 SQ. YDS.	NOTES
STRAW	3 TONS	140 LBS.	1,240 LBS.	EITHER WHEAT OR OAT STRAW, FREE OF WEEDS, NOT CHOPPED OR FINELY BROKEN
HAY	3 TONS	140 LBS.	1,240 LBS.	TIMOTHY, MIXED CLOVER AND TIMOTHY OR OTHER NATIVE FORAGE GRASSES
WOODCHIPS	4 TO 6 TONS	185 TO 275 LBS.	1,650 TO 2,500 LBS.	MAY PREVENT GERMINATION OF GRASSES AND LEGUMES
HYDROMULCH	1 TON	47 LBS.	415 LS.	SEE LIMITATIONS ABOVE

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REVISIONS

NO.	BY	DATE	REMARKS

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER ROBERT F. SIMCIK PE-039435-E

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1–20" & 1–16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN
SEEDING SPECIFICATIONS

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

PCS–0.03
SHEET 0.03 OF 17

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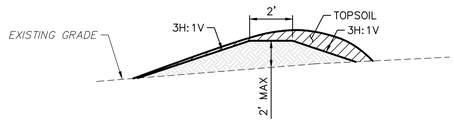
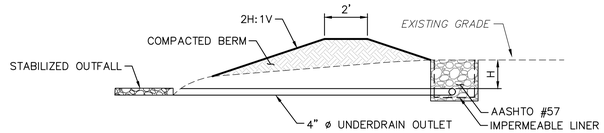


NOTES:

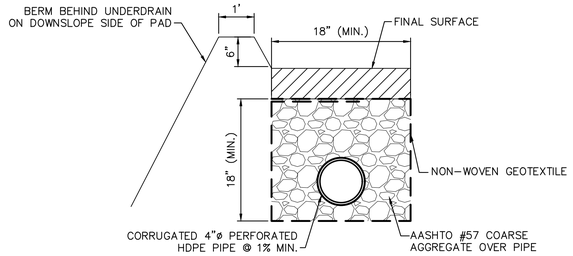
1. FILL WITH TOPSOIL TO ACHIEVE DESIRED SHAPE.

INFILTRATION BERM DETAIL (1 / 0.04)
NOT TO SCALE



SITE NAME	SHEET NUMBER	TRENCH WIDTH (FT)	PIPE DIAMETER (IN)	FILTER MEDIA THICKNESS (FT) (H)	FILTER MEDIA TYPE	BERM HEIGHT (FT)
CREEK ROAD	PCS-4.02	3	4	2	FINE SAND	2
WOLF BRIDGE ROAD	PCS-4.04	3	4	2	FINE SAND	1

SLOW RELEASE TRENCH DETAIL (2 / 0.04)
NOT TO SCALE



UNDERDRAIN DETAIL (3 / 0.04)
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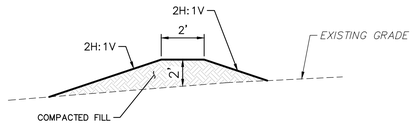

DIVERSION BERM DETAIL (4 / 0.04)
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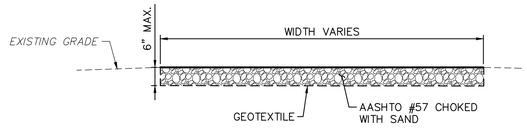

TYPICAL AGGREGATE SURFACE DETAIL
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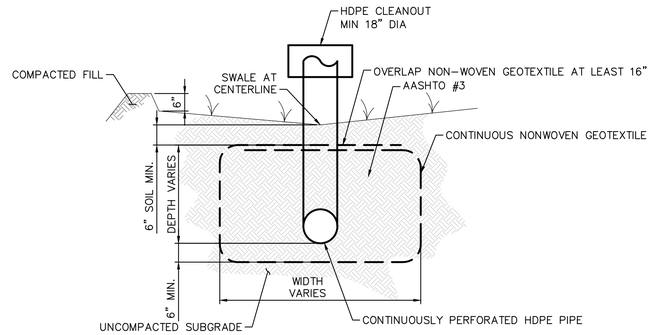
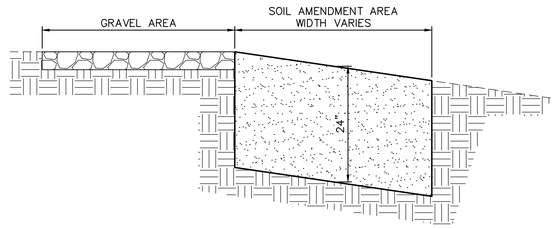


NOTES:

1. NON-WOVEN GEOTEXTILE SHALL CONSIST OF NEEDLED NONWOVEN POLYPROPYLENE FIBERS AND MEET THE FOLLOWING PROPERTIES:
   a. GRAB TENSILE STRENGTH (ASTM-D4632)
   b. MULLEN BURST STRENGTH (ASTM-D3786)
   c. FLOW RATE (ASTM-D4491)
   d. UV RESISTANCE AFTER 500 HOURS (ASTM-D4355) 70%
   e. HEAT-SET OR HEAT-CALENDARED FIBERS ARE NOT PERMITTED ACCEPTABLE TYPES INCLUDE MIRAFI 140N, AMOCO 4547, AND GEOTEX 451.

INFILTRATION TRENCH DETAILS						
SITE NAME	SHEET NUMBER	TRENCH WIDTH (FT)	TRENCH DEPTH (FT)	TRENCH LENGTH (FT)	PIPE DIAMETER (IN)	BERM HEIGHT (FT)
WEST TRINDLE ROAD (1)	PCS-4.06	3	3	66	12	N/A
WEST TRINDLE ROAD (2)	PCS-4.06	3	3	52	12	0.5

INFILTRATION TRENCH DETAIL (6 / 0.04)
NOT TO SCALE



NOTES:

1. SOIL AMENDMENT MEDIAN SHOULD CONSIST OF SOIL AND COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST).
2. SOIL AMENDMENT SHOULD NOT BE USED ON SLOPES GREATER THAN 30%.
3. COMPOST CAN BE SUBSTITUTED WITH MULCH, MANURE, SAND.
4. NO VEHICULAR TRAFFIC WILL BE PERMITTED TO DRIVE IN THE SOIL AMENDMENT AREA TO MINIMIZE THE POSSIBILITY OF COMPACTION
5. ALL CONSTRUCTION SHOULD BE COMPLETED AND STABILIZED BEFORE BEGINNING SOIL RESTORATION.
6. SOIL AMENDMENT TO BE INSTALLED BY TILING.

SOIL AMENDMENT DETAIL (7 / 0.04)
NOT TO SCALE

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REVISIONS

NO.	BY	DATE	REMARKS

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — ROBERT F. SIMCIK — ENGINEER — PE-030436-E

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN DETAILS

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

PCS-0.04
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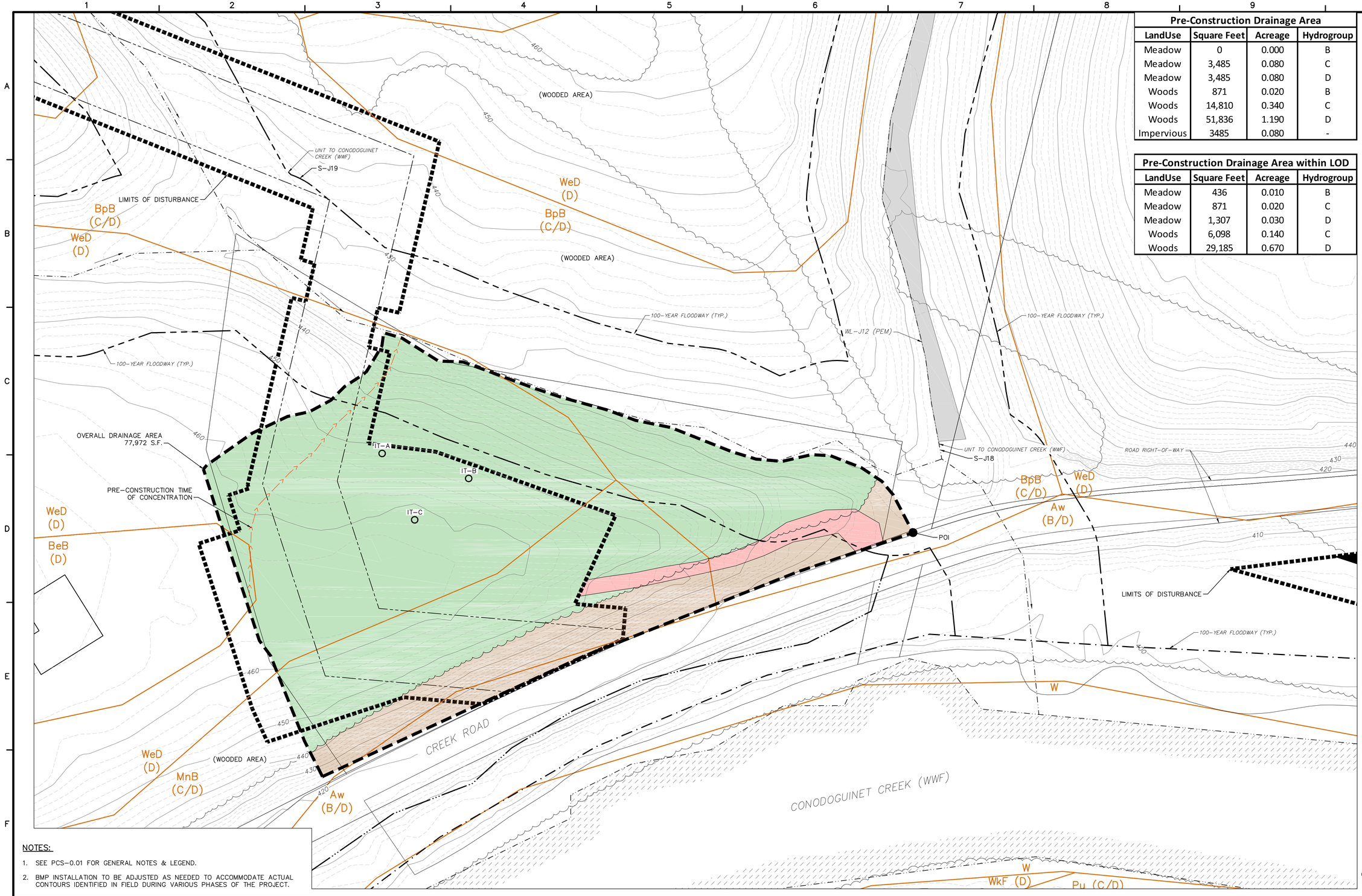
Pre-Construction Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	0	0.000	B
Meadow	3,485	0.080	C
Meadow	3,485	0.080	D
Woods	871	0.020	B
Woods	14,810	0.340	C
Woods	51,836	1.190	D
Impervious	3485	0.080	-

Pre-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	436	0.010	B
Meadow	871	0.020	C
Meadow	1,307	0.030	D
Woods	6,098	0.140	C
Woods	29,185	0.670	D



NOTES:

1. SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
2. BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.

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SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

CREEK ROAD
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
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CHECKED BY:	RS

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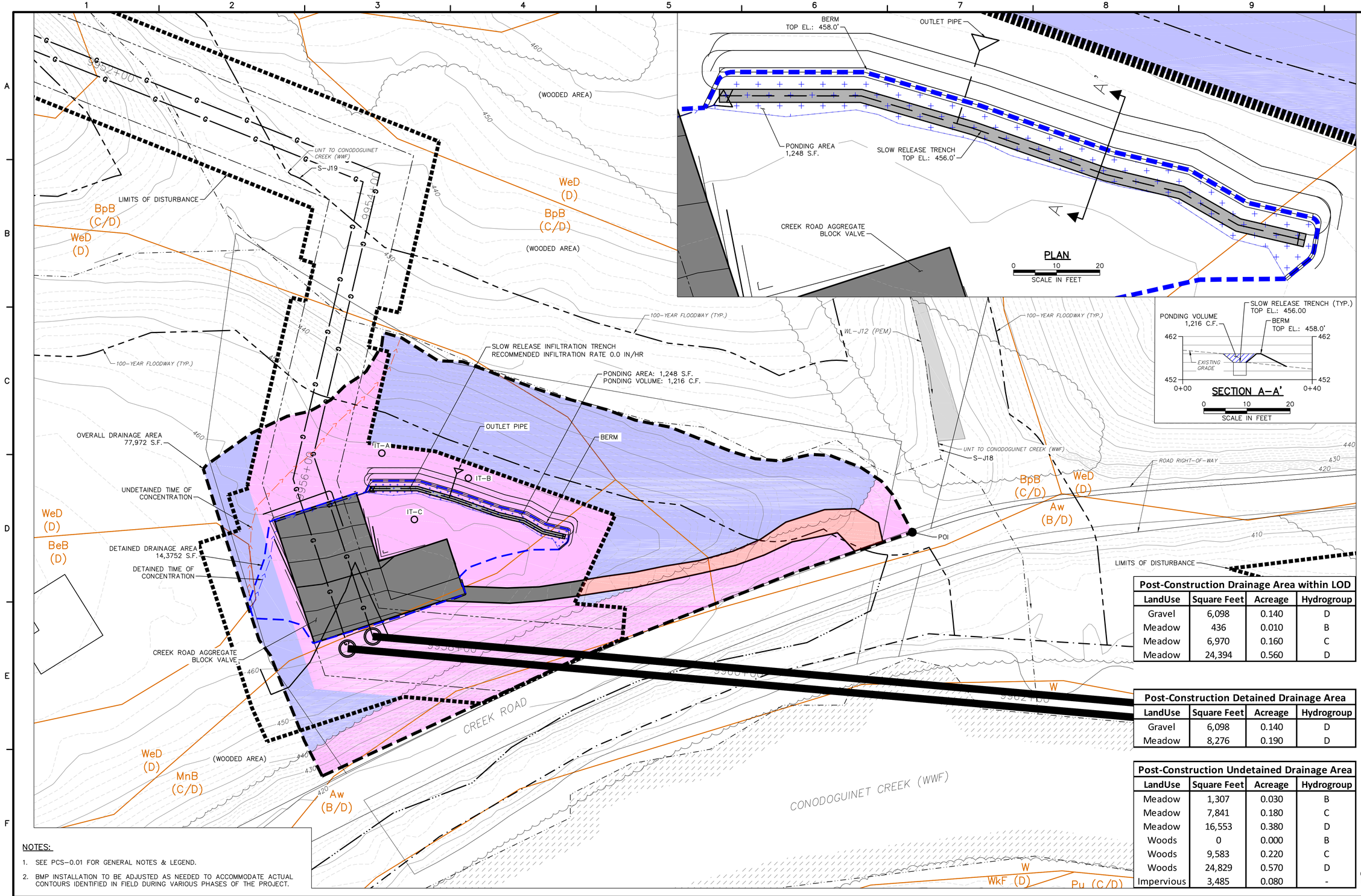
SHEET 4.01 OF 17



Post-Construction Drainage Area within LOD

LandUse	Square Feet	Acreage	Hydrogroup
Gravel	6,098	0.140	D
Meadow	436	0.010	B
Meadow	6,970	0.160	C
Meadow	24,394	0.560	D

Post-Construction Detained Drainage Area

LandUse	Square Feet	Acreage	Hydrogroup
Gravel	6,098	0.140	D
Meadow	8,276	0.190	D

Post-Construction Undetained Drainage Area

LandUse	Square Feet	Acreage	Hydrogroup
Meadow	1,307	0.030	B
Meadow	7,841	0.180	C
Meadow	16,553	0.380	D
Woods	0	0.000	B
Woods	9,583	0.220	C
Woods	24,829	0.570	D
Impervious	3,485	0.080	-

0 30 60
SCALE IN FEET

NOTES:

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REVISIONS

NO.	BY	DATE	REMARKS

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

CREEK ROAD
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE: 11/23/16
PROJECT NO.: 112IC05958
DESIGNED BY: KG
DRAWN BY: BH
CHECKED BY: RS

PCS-4.02
SHEET 4.02 OF 17

Pre-Construction Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	34,848	0.800	B
Meadow	436	0.010	D
Woods	4,792	0.110	B
Woods	436	0.010	D

Pre-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	25,265	0.580	B
Meadow	0	0.000	D
Woods	0	0.000	B
Woods	0	0.000	D

N

MnB (C/D)
ROAD RIGHT-OF-WAY
Ub
POI
BeC (B)
WeD (D)
BeB (B)
(WOODED AREA)
440
PRE-CONSTRUCTION TIME OF CONCENTRATION
OVERALL DRAINAGE AREA 40,511 S.F.
LIMITS OF DISTURBANCE
IT-01
IT-02
IT-03
IT-04
IT-A
(WELL VEGETATED AREA)
BpB (C/D)
WOLF BRIDGE ROAD
450
448
WL-K41 (PEM)
430
420

NOTES:

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0 30 60
SCALE IN FEET

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REVISIONS			
NO.	BY	DATE	REMARKS

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

WOLF BRIDGE ROAD
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

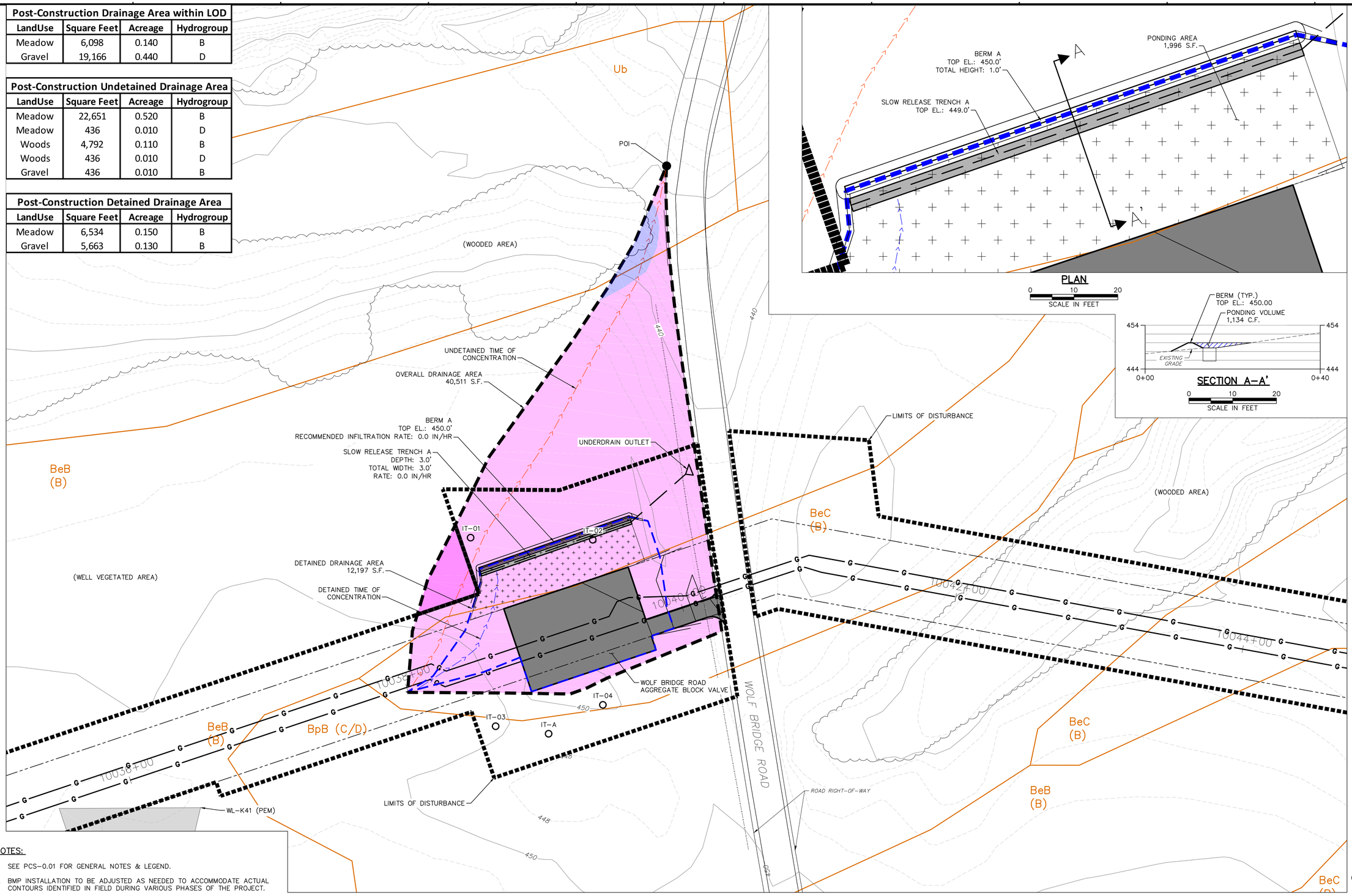
DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS-4.03
SHEET 4.03 OF 17

Post-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	6,098	0.140	B
Gravel	19,166	0.440	D

Post-Construction Undetained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	22,651	0.520	B
Meadow	436	0.010	D
Woods	4,792	0.110	B
Woods	436	0.010	D
Gravel	436	0.010	B

Post-Construction Detained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	6,534	0.150	B
Gravel	5,663	0.130	B



NOTES:

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0 30 60
SCALE IN FEET

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REVISIONS			
NO.	BY	DATE	REMARKS

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

WOLF BRIDGE ROAD
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS-4.04

SHEET 4.04 OF 17

Pre-Construction Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	133,294	3.060	B
Woods	6,970	0.160	B

Pre-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	58,370	1.340	B
Woods	1,307	0.030	B

NOTES:

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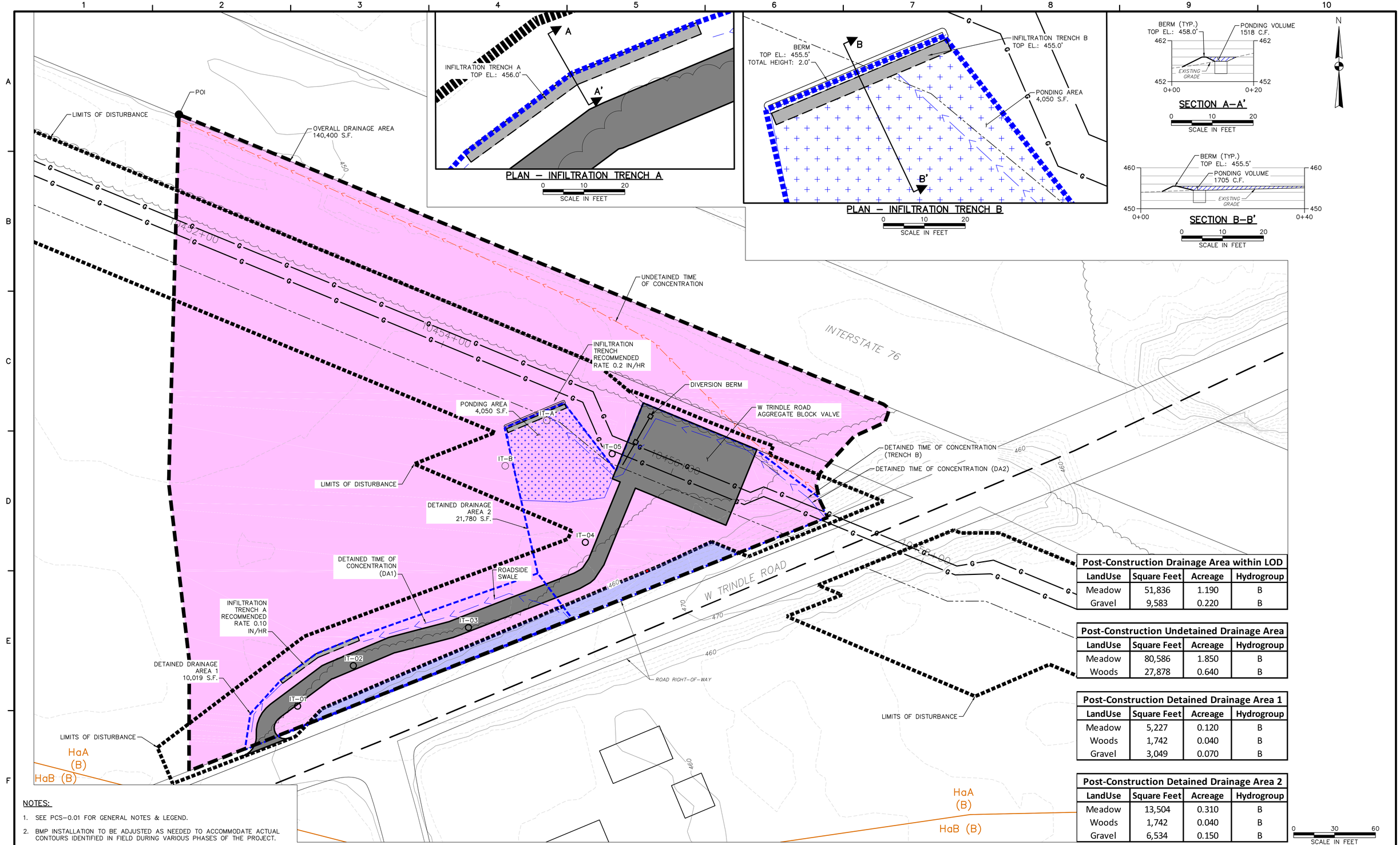
PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

W TRINDLE ROAD
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE: 11/23/16
PROJECT NO.: 112IC05958
DESIGNED BY: KG
DRAWN BY: BH
CHECKED BY: RS

PCS-4.05
SHEET 4.05 OF 17



Post-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	51,836	1.190	B
Gravel	9,583	0.220	B

Post-Construction Undetained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	80,586	1.850	B
Woods	27,878	0.640	B

Post-Construction Detained Drainage Area 1			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	5,227	0.120	B
Woods	1,742	0.040	B
Gravel	3,049	0.070	B

Post-Construction Detained Drainage Area 2			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	13,504	0.310	B
Woods	1,742	0.040	B
Gravel	6,534	0.150	B

NOTES:

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PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1–20" & 1–16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

W TRINDLE ROAD
POST–CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE: 11/23/16
PROJECT NO.: 112IC05958
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DRAWN BY: BH
CHECKED BY: RS

PCS–4.06
SHEET 4.06 OF 17

POI

OVERALL DRAINAGE AREA
160,736 S.F.

UNDETAINED TIME OF
CONCENTRATION

ROAD RIGHT-OF-WAY

EXISTING RAILROAD ACCESS

IT-02

IT-01

IT-A

IT-B

LIMITS OF
DISTURBANCE

(WELL VEGETATED AREA)

(WOODED AREA)

LIMITS OF DISTURBANCE

EdB
(B)

DuA
(B)

GAS

450

N

Pre-Construction Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	160,736	3.690	B
Woods	0	0.000	B

Pre-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	37,462	0.860	B
Woods	0	0.000	B

0 30 60
SCALE IN FEET

NOTES:

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REVISIONS

NO.	BY	DATE	REMARKS

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

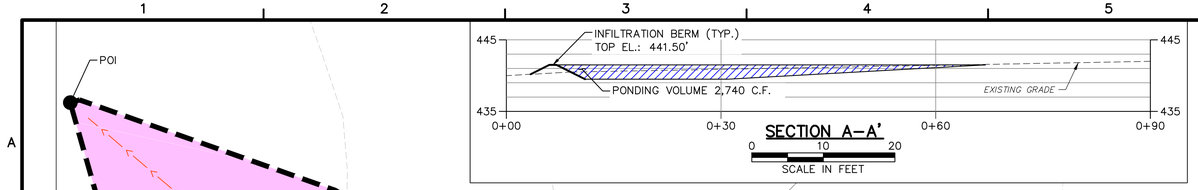
PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

ARCONA ROAD
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS-4.07
SHEET 4.07 OF 17



Post-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	29,185	0.670	B
Gravel	8,276	0.190	B

Post-Construction Undetained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	101,059	2.320	B
Gravel	436	0.010	B

Post-Construction Detained Drainage Area 1			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	51,401	1.180	B
Woods	0	0.000	B
Gravel	7,841	0.180	B

NOTES:

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REVISIONS

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SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1–20" & 1–16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

ARCONA ROAD
POST–CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS–4.08
SHEET 4.08 OF 17

(WELL VEGETATED AREA)

(WOODED AREA)

100-YEAR FLOODWAY (TYP.)

WL-I21 (PEM)

S-I25

UNT TO MARSH RUN

IT-B

IT-A

11050+00

11052+00

11054+00

11056+00

LIMITS OF DISTURBANCE (TYP.)

OLD YORK ROAD
AGGREGATE BLOCK VALVE

S-I26

WL-I20 (PEM)

S-I25

UNT TO MARSH RUN

ROAD RIGHT-OF-WAY

100-YEAR FLOODWAY (TYP.)

OLD YORK ROAD

LgC
(B)

WbB
(C/D)

LhB
(C/D)

BrC
(B)

LgC
(B)

630

640

650

660

670

680

690

700

NOTES:

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0 30 60
SCALE IN FEET

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REVISIONS

NO.	BY	DATE	REMARKS

SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

OLD YORK ROAD
STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS-4.09
SHEET 4.09 OF 17

Pre-Construction Drainage Area 2			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	32,670	0.750	A
Impervious	436	0.010	A

Pre-Construction Drainage Area 2 within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	14,810	0.340	A
Woods	0	0.000	A

Pre-Construction Drainage Area 1			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	43,560	1.000	A
Woods	871	0.020	A

Pre-Construction Drainage Area 1 within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	16,117	0.370	A
Woods	0	0.000	A

NOTES:

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0 30 60
SCALE IN FEET

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SUNOCO PIPELINE L.P.
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

N UNION STREET
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE: 11/23/16
PROJECT NO.: 112IC05958
DESIGNED BY: KG
DRAWN BY: BH
CHECKED BY: RS

PCS-4.10
SHEET 4.10 OF 17

Post-Construction Drainage Area 1 within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	13,068	0.300	A
Gravel	3,049	0.070	A

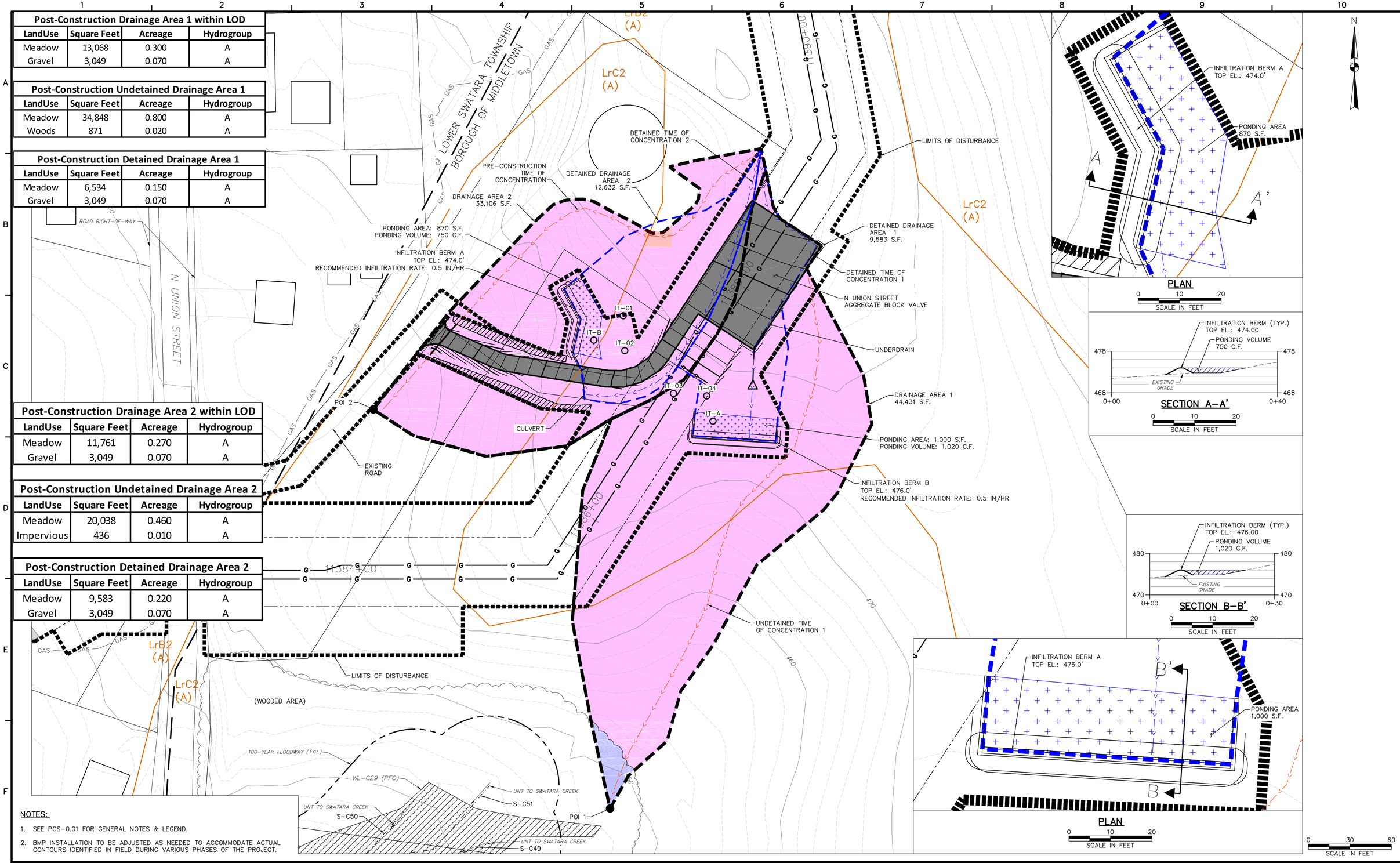
Post-Construction Undetained Drainage Area 1			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	34,848	0.800	A
Woods	871	0.020	A

Post-Construction Detained Drainage Area 1			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	6,534	0.150	A
Gravel	3,049	0.070	A

Post-Construction Drainage Area 2 within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	11,761	0.270	A
Gravel	3,049	0.070	A

Post-Construction Undetained Drainage Area 2			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	20,038	0.460	A
Impervious	436	0.010	A

Post-Construction Detained Drainage Area 2			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	9,583	0.220	A
Gravel	3,049	0.070	A



PLAN

0 10 20

SCALE IN FEET

SECTION A–A'

0 10 20

SCALE IN FEET

SECTION B–B'

0 10 20

SCALE IN FEET

PLAN

0 10 20

SCALE IN FEET

0 30 60

SCALE IN FEET

NOTES:

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REVISIONS

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SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1–20" & 1–16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

N UNION STREET
POST–CONSTRUCTION STORMWATER MANAGEMENT PLAN

DATE:	11/23/16
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DESIGNED BY:	KG
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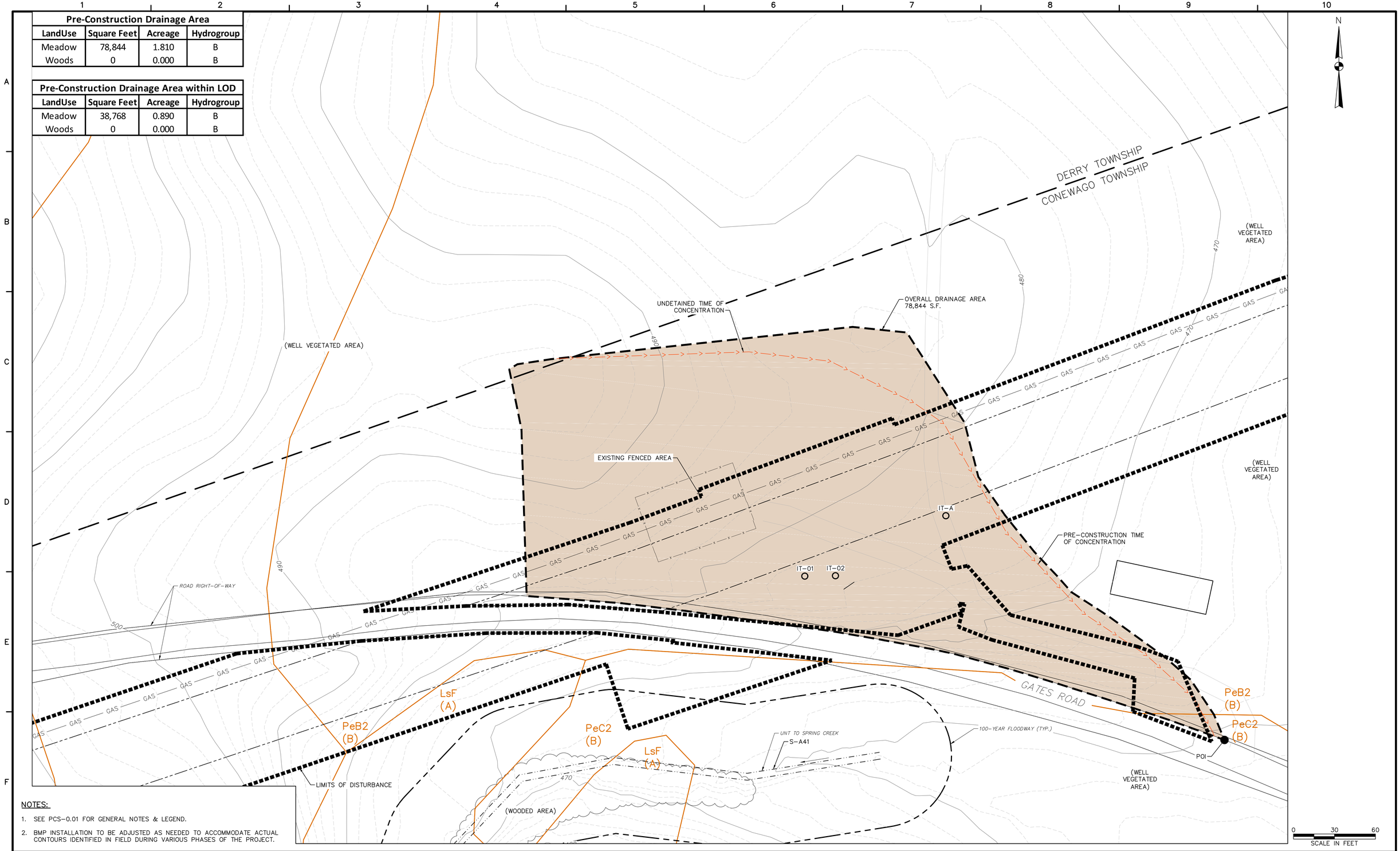
PCS–4.11

SHEET 4.11 OF 17

Pre-Construction Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	78,844	1.810	B
Woods	0	0.000	B

Pre-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	38,768	0.890	B
Woods	0	0.000	B



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REVISIONS

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SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT
CONSTRUCTION SPREAD 4

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

GATES ROAD
PRE-CONSTRUCTION STORMWATER MANAGEMENT PLAN

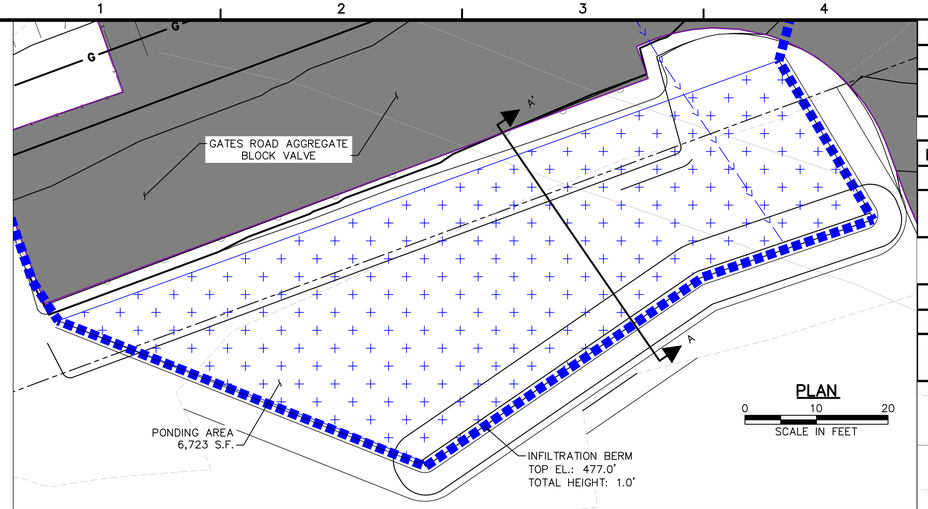
DATE:	11/23/16
PROJECT NO.:	112IC05958
DESIGNED BY:	KG
DRAWN BY:	BH
CHECKED BY:	RS

PCS-4.12
SHEET 4.12 OF 17

Post-Construction Drainage Area within LOD			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	33,106	0.760	B
Gravel	5,663	0.130	B

Post-Construction Undetained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	57,499	1.320	B
Gravel	0	0.000	B

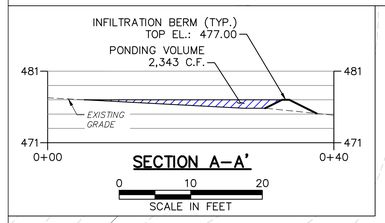
Post-Construction Detained Drainage Area			
LandUse	Square Feet	Acreage	Hydrogroup
Meadow	16,553	0.380	B
Gravel	4,792	0.110	B



PLAN

0 10 20

SCALE IN FEET



SECTION A–A'

0 10 20

SCALE IN FEET

0 30 60

SCALE IN FEET

NOTES:

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1–20" & 1–16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES

GATES ROAD
POST–CONSTRUCTION STORMWATER MANAGEMENT PLAN

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PCS–4.13

SHEET 4.13 OF 17