





**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 LEBANON COUNTY AND BERKS 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 GRANTEEES.
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. THEREFORE, THE PROPOSED GRADING FOR THE SITES, WHICH WAS DESIGNED FROM THE 1' CONTOUR INTERVAL SURVEY DATA, DOES NOT TIE INTO THE 2' CONTOUR INTERVAL LIDAR DATA.

**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, SODED, 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 SCARIFY 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.

**GEOWEB CONSTRUCTION SEQUENCE**

1. GRADE SURFACE TO SUBGRADE ELEVATIONS AS SOON AS PRACTICABLE FOLLOWING COMPLETION OF PIPE INSTALLATION. DO NOT COMPACT.
2. IF NEEDED, SCARIFY THE SOIL OR PROVIDE ADDITIONAL ROUGHENING SUCH AS DEEP RIPPING OR CHISEL RIPPING TO RESTORE THE AREA TO A MINIMAL COMPACTED STATE.
3. INSTALL GEOTEXTILE SEPARATION LAYER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
4. EXPAND GEOWEB TO REQUIRED DIMENSIONS AND ANCHOR EDGES WITH ATRA ANCHORS, IF NEEDED. JOIN ADJACENT SECTIONS WITH ATRA KEYS.
5. ANCHOR GEOWEB ON SLOPES GREATER THAN 5% WITH 24" ATRA ANCHORS PLACED ON A 3X8 CELL PATTERN.
6. MIX AND PLACE ENGINEERED INFILL MATERIAL (2/3 AASHTO #57 STONE AND 1/3 SCREENED TOPSOIL) INTO THE GEOWEB CELLS. INFILL MATERIAL SHALL BE FREE-FLOWING AND NOT FROZEN WHEN PLACED IN THE GEOWEB SECTIONS. LIMIT DROP HEIGHT TO 3 FEET TO AVOID DAMAGING OR DISPLACEMENT OF THE CELL WALL. SLIGHTLY OVERTILL THE CELLS AND LEVEL OFF MATERIAL ONCE SETTLEMENT IS NEGLIGIBLE. DO NOT COMPACT.
7. SEED AND MULCH FILLED SECTIONS IN ACCORDANCE WITH THE PERMANENT SEEDING SCHEDULE ONCE INFILL IS PLACED.
8. MAINTAIN EROSION AND SEDIMENTATION CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND A UNIFORM 70-PERCENT PERENNIAL VEGETATIVE COVER IS ESTABLISHED.

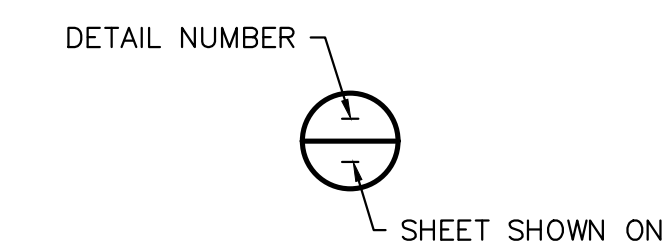
**SOIL AMENDMENT AND RESTORATION CONSTRUCTION SEQUENCE**

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.

**LEGEND**

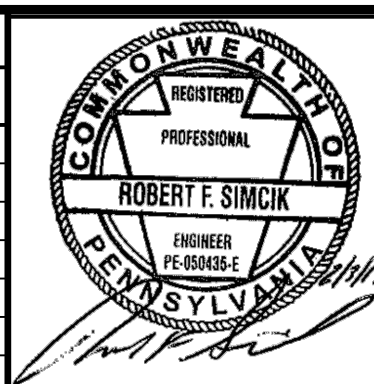
- 1.320 EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- EXISTING TREE LINE
- EXISTING FENCELINE
- EXISTING STREAM WITH FLOW DIRECTION
- OvH EXISTING ELECTRIC OVERHEAD
- UE EXISTING ELECTRIC UNDERGROUND
- EXISTING LIGHT POLE
- W EXISTING WATER LINE
- GAS EXISTING GAS LINE
- DOMN EXISTING DOMINION GAS LINE
- 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) SOIL TYPE/HYDROLOGY
- (C) (HYDROLOGY)
- LIMIT OF DISTURBANCE/AREA TO BE RESTORED
- WATER BAR
- TRENCH PLUGS
- AREA TO BE BORED
- 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/VEGETATED GEOWEB
- POST CONSTRUCTION WOODED AREA
- OIT-1 INFILTRATION TEST LOCATION
- PONDING AREA

**DETAIL INDICATOR**



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SUNOCO PIPELINE L.P.  
SINKING SPRING, PENNSYLVANIA  
**PENNSYLVANIA PIPELINE PROJECT  
CONSTRUCTION SPREAD 5**

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
**POST CONSTRUCTION STORMWATER MANAGEMENT PLAN  
GENERAL NOTES & LEGEND**

|                           |            |
|---------------------------|------------|
| DATE:                     | 2/3/17     |
| PROJECT NO.:              | 112IC05958 |
| DESIGNED BY:              | JB         |
| DRAWN BY:                 | BH         |
| CHECKED BY:               | RS         |
| COPYRIGHT TETRA TECH INC. |            |
| <b>PCS-0.01</b>           |            |
| SHEET 0.01 OF 10          |            |

**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.

**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).

**GEOWEB MAINTENANCE**

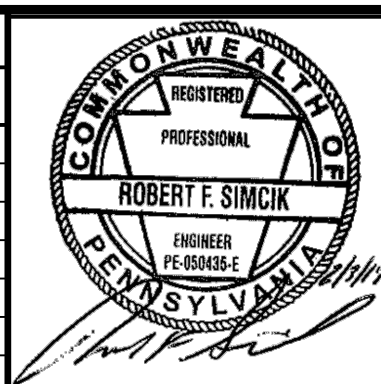
IN AREAS WHERE VEGETATED GEOWEB IS INSTALLED, IN ADDITION TO INSPECTING THE VEGETATION COVERAGE, THE GEOWEB WILL BE INSPECTED FOR SIGNS OF DAMAGE AFFECTING GEOWEB PERFORMANCE, E.G., DISPLACED CELLS OR SIGNIFICANTLY TORN CELLS. IF THE INFILL TOPSOIL/AGGREGATE MIX SETTLES OVER TIME AND EXPOSES THE GEOWEB, IT WILL BE FILLED WITH THE SAME INFILL MIXTURE AND RE-SEEDDED. NOTE THAT WITH AGE, IT IS NOT UNUSUAL THAT THE TOP OF THE GEOWEB SECTIONS MAY BECOME EXPOSED AND TRAMPLED WITH USE. THIS DOES NOT AFFECT THE PERFORMANCE OF THE CELLULAR CONFINEMENT. IF GEOWEB BECOMES TORN, IT WILL BE REPAIRED. IF THE GEOWEB BECOMES EXPOSED, IT WILL BE FILLED WITH THE SAME INFILL MIXTURE AND RE-SEEDDED.

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NOTES**

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**TEMPORARY SEEDING**

TEMPORARY GRASS COVER SHALL BE ESTABLISHED IN THE FOLLOWING AREAS:

- WHERE SOIL STOCKPILES ARE TO BE EXPOSED FOR A PERIOD GREATER THAN FOUR (4) DAYS, THE STOCKPILE SHALL BE SEEDED.
- 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:

- STRAW MULCH SHALL BE APPLIED AT THE RATE OF THREE TONS PER ACRE. CHEMICALLY TREATED OR SALTED STRAW IS NOT ACCEPTABLE AS MULCH.
- STRAW MULCH SHALL BE ANCHORED IMMEDIATELY AFTER APPLICATION BY AT LEAST ONE OF THE FOLLOWING METHODS.
  - "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)
  - 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 FT<sup>2</sup>.
  - 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.
  - 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 NEEDED 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   |
|---|------------|-------------------|--------------------|---|
| <b>PERMANENT SEEDING APPLICATION RATE</b> |            |                   |                    |   |
| 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              | 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             |
| 3           | PERENNIAL RYEGRASS                   | 15                      | 20            |
|             | BIRDSFOOT TREFOIL, PLUS 6 10         | 6                       | 10            |
| 4           | TALL FESCUE                          | 30                      | 35            |
|             | BIRDSFOOT TREFOIL, PLUS              | 6                       | 10            |
| 5 (5)       | REED CANARYGRASS                     | 10                      | 15            |
|             | CROWNVEATCH, PLUS                    | 10                      | 15            |
| 6 (5,6)     | TALL FESCUE, OR                      | 20                      | 25            |
|             | PERENNIAL RYEGRASS                   | 20                      | 25            |
|             | CROWNVEATCH, PLUS                    | 10                      | 15            |
| 7 (5)       | ANNUAL RYEGRASS                      | 20                      | 25            |
|             | BIRDSFOOT TREFOIL, PLUS              | 20                      | 30            |
|             | CROWNVEATCH, PLUS                    | 20                      | 30            |
| 8           | TALL FESCUE                          | 20                      | 25            |
|             | FLATPEA, PLUS                        | 20                      | 30            |
|             | TALL FESCUE, OR                      | 20                      | 30            |
| 9 (7)       | PERENNIAL RYEGRASS                   | 20                      | 25            |
|             | SERECIA LESPEDEZA, PLUS              | 10                      | 20            |
|             | TALL FESCUE, PLUS                    | 20                      | 25            |
| 10          | REDTOP(4)                            | 3                       | 3             |
|             | TALL FESCUE, PLUS                    | 40                      | 60            |
| 11          | FINE FESCUE                          | 10                      | 15            |
|             | DEERTONGUE, PLUS                     | 15                      | 20            |
| 12(8)       | BIRDSFOOT TREFOIL                    | 6                       | 10            |
|             | SWITCHGRASS, OR                      | 15                      | 20            |
|             | BIG BLUESTEM, PLUS                   | 15                      | 20            |
| 13          | BIRDSFOOT TREFOIL                    | 6                       | 10            |
|             | ORCHARDGRASS, OR                     | 20                      | 30            |
|             | SMOOTH BROMEGRASS, PLUS              | 25                      | 35            |
|             | BIRDSFOOT TREFOIL                    | 6                       | 10            |

**NOTES:**

- 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 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.
- 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.
- THIS MIXTURE IS SUITABLE FOR FREQUENT MOWING. DO NOT CUT SHORTER THAN 4 INCHES.
- 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.
- USE FOR HIGHWAY SLOPES AND SIMILAR SITES WHERE THE DESIRED SPECIES AFTER ESTABLISHMENT IS BIG BLUESTEM.
- USE ONLY IN EXTREME SOUTHEASTERN OR EXTREME SOUTHWESTERN PA. SERECIA LESPEDEZA IS NOT WELL ADAPTED TO MOST OF PA.
- DO NOT MOW SHORTER THAN 9 TO 10 INCHES.
- NOTE NOT APPLICABLE BECAUSE CROWNVEATCH IS NOT PROPOSED.
- 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 DRAINAGE  | 1 PLUS     | 3 OR 7                            |
| POORLY DRAINAGE  | 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 DRAINAGE  | 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:**

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

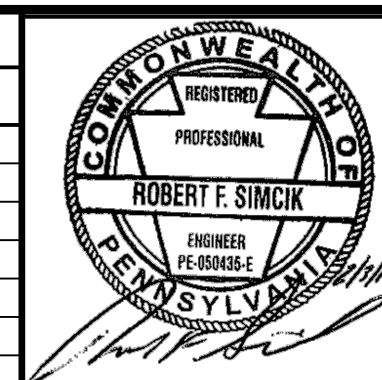
**MULCH APPLICATION RATES**

| MULCH TABLE | APPLICATION RATE (MINIMUM) |                   |                     | NOTES  |
|-------------|----------------------------|-------------------|---------------------|--|
|             | PER ACRE                   | PER 1,000 SQ. FT. | PER 1,000 SQ. YDS.  |  |
| 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 LBS.            | SEE LIMITATIONS ABOVE  |



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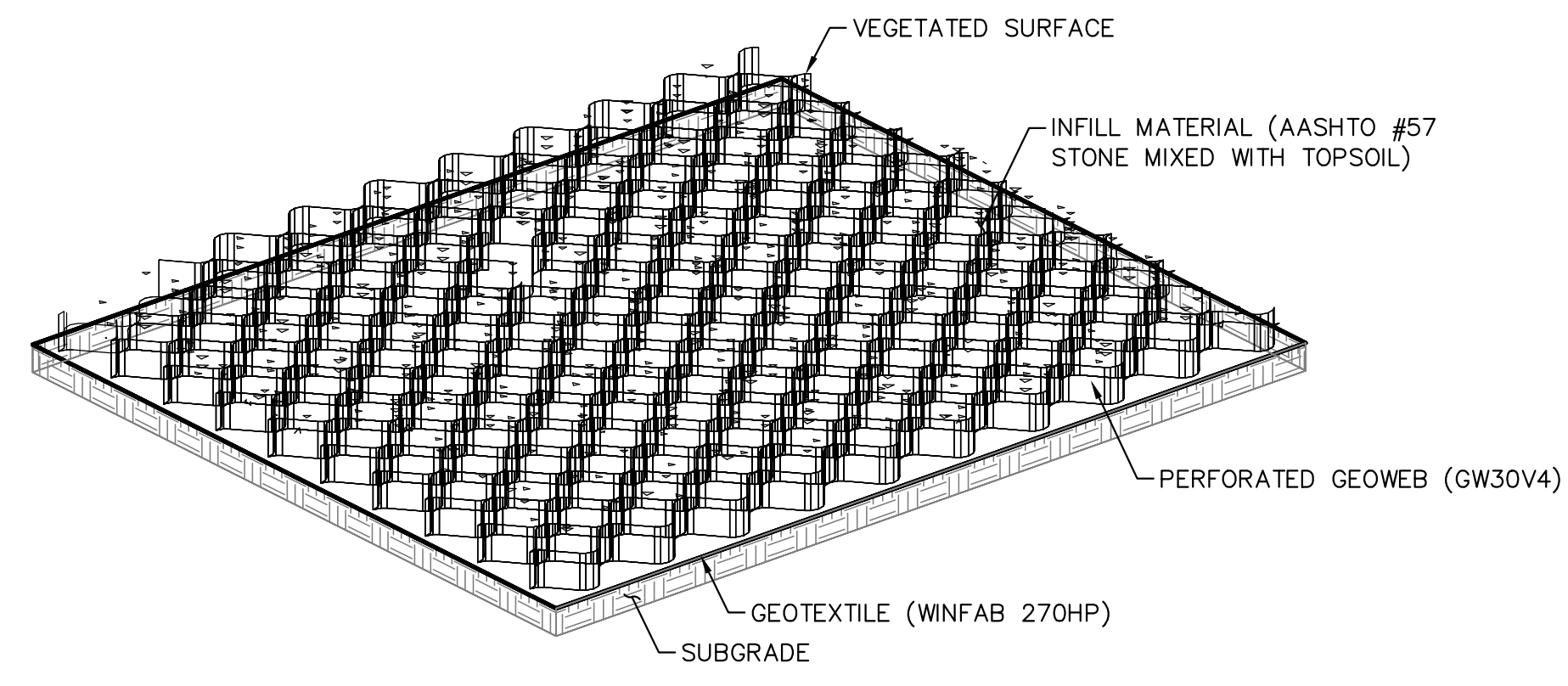
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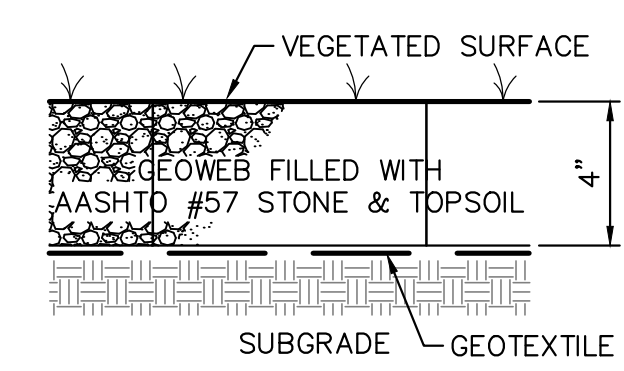
SUNOCO PIPELINE L.P.  
SINKING SPRING, PENNSYLVANIA  
**PENNSYLVANIA PIPELINE PROJECT**  
CONSTRUCTION SPREAD 5

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN  
SEEDING SPECIFICATIONS

|                  |                 |
|------------------|-----------------|
| DATE:            | 2/3/17          |
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| DESIGNED BY:     | JB              |
| DRAWN BY:        | BH              |
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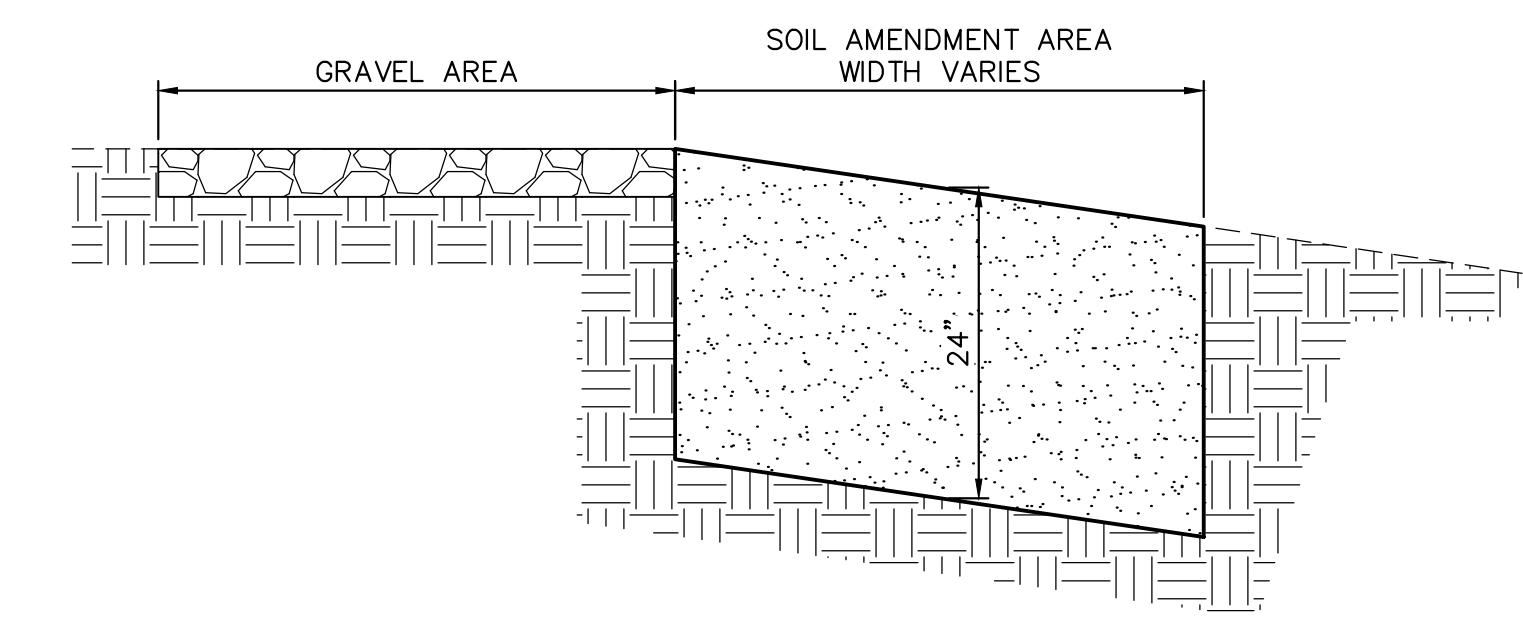


SECTION

**NOTES:**

1. PREPARE THE SUBGRADE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
2. DO NOT COMPACT SUBGRADE.
3. PROVIDE WOVEN HIGH STRENGTH STABILIZATION GEOTEXTILE (WINFAB 270HP).
4. EXPAND THE GEOWEB SECTIONS INTO POSITION AND CONNECT THE END TO END AND INTERLEAF CONNECTIONS WITH ATRA KEYS.
5. GEOWEB CELL INFILL MATERIAL SHALL BE A MIX OF AASHTO #57 STONE AND SCREENED TOPSOIL IN AN APPROXIMATE RATIO OF 2/3 #57 AND 1/3 TOPSOIL.
6. PLACE THE SPECIFIED INFILL MATERIAL INTO CELLS AND TRACK UNTIL CELL IS FILLED AND SETTLEMENT OF INFILL IS NEGLIGIBLE.
7. ROUGH GRADE CONTOURS DEPICT THE TOP OF SUBGRADE IN AREAS WHERE GEOWEB IS TO BE INSTALLED.
8. TOP OF GEOWEB IS AT ELEVATION 4 INCHES ABOVE ROUGH GRADE SHOWN ON GRADING PLAN.
9. ON SLOPES GREATER THAN 5%, ANCHOR GEOWEB WITH 24" ATRA ANCHORS IN A 3x8 CELL PATTERN.

VEGETATED GEOWEB DETAIL (1) / 0.04  
NOT TO SCALE



**NOTES:**

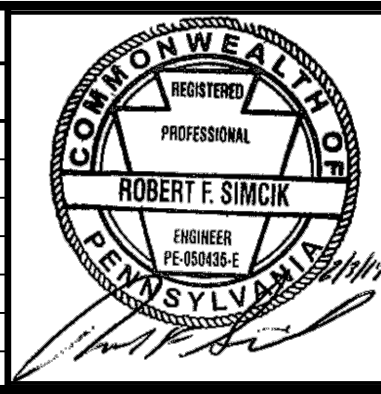
1. SOIL AMENDMENT MEDIUM SHOULD CONSIST OF SOIL AND COMPOST AT A RATIO OF 2:1 (SOIL:COMPOST).
2. SOIL AMENDMENT SHOULD NOT BE USED ON SLOPES GREATER THAN 30%.
3. COMPOST CAN BE SUBSTITUTED WITH MULCH, MANURE, SAND.
4. NO VEHICULAR TRAFFIC WILL BE PERMITTED TO DRIVE IN THE SOIL AMENDMENT AREA TO MINIMIZE 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 (2) / 0.04  
NOT TO SCALE



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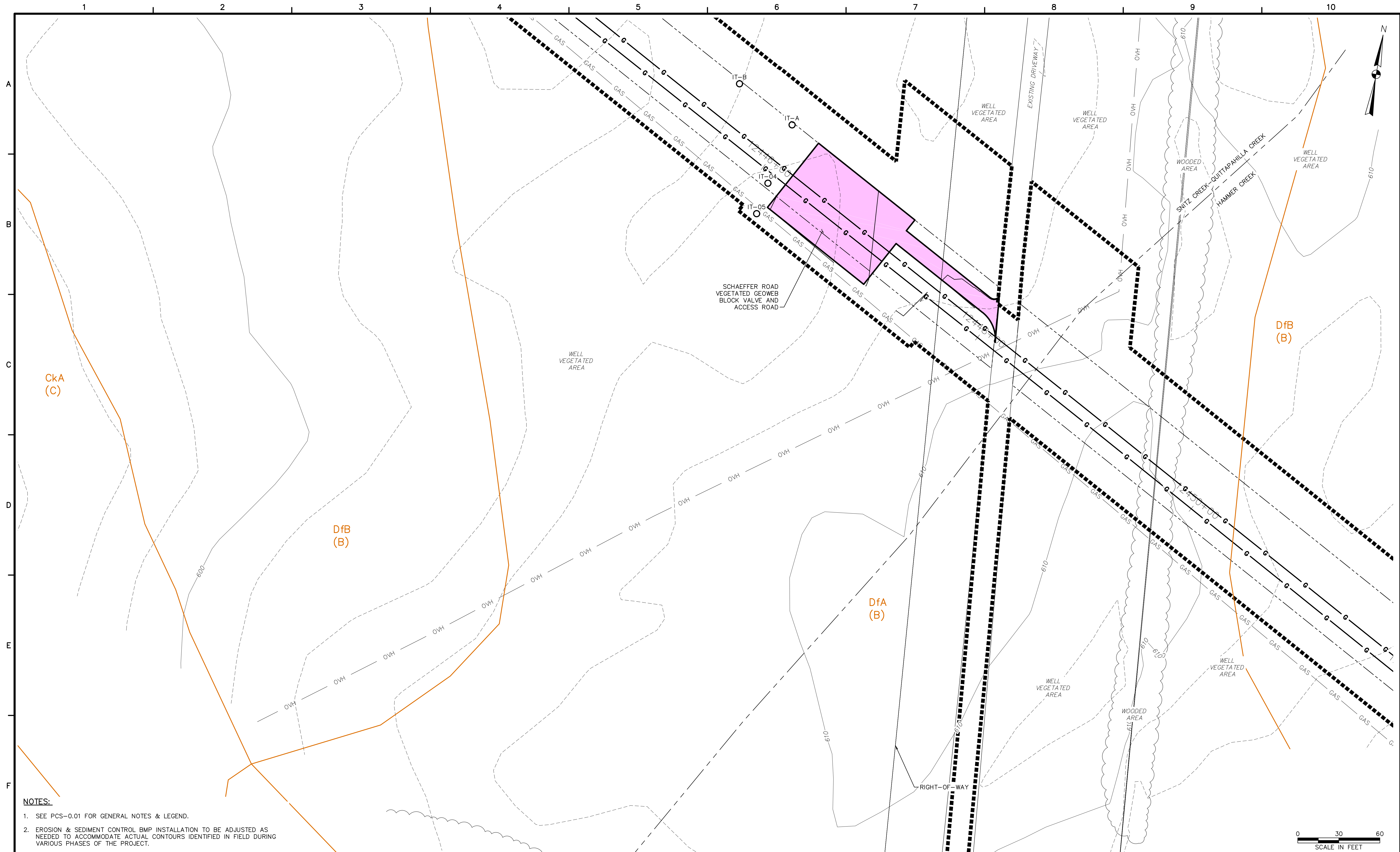


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PENNSYLVANIA PIPELINE PROJECT  
CONSTRUCTION SPREAD 5

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
POST CONSTRUCTION STORMWATER MANAGEMENT PLAN  
DETAILS

|                           |            |
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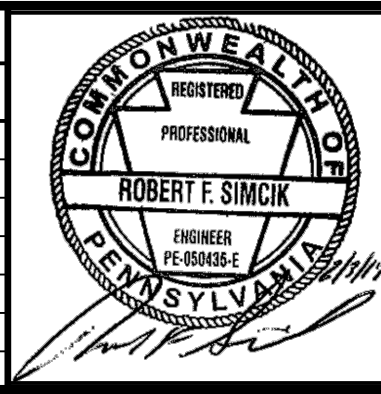


- NOTES:**
- SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
  - EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.



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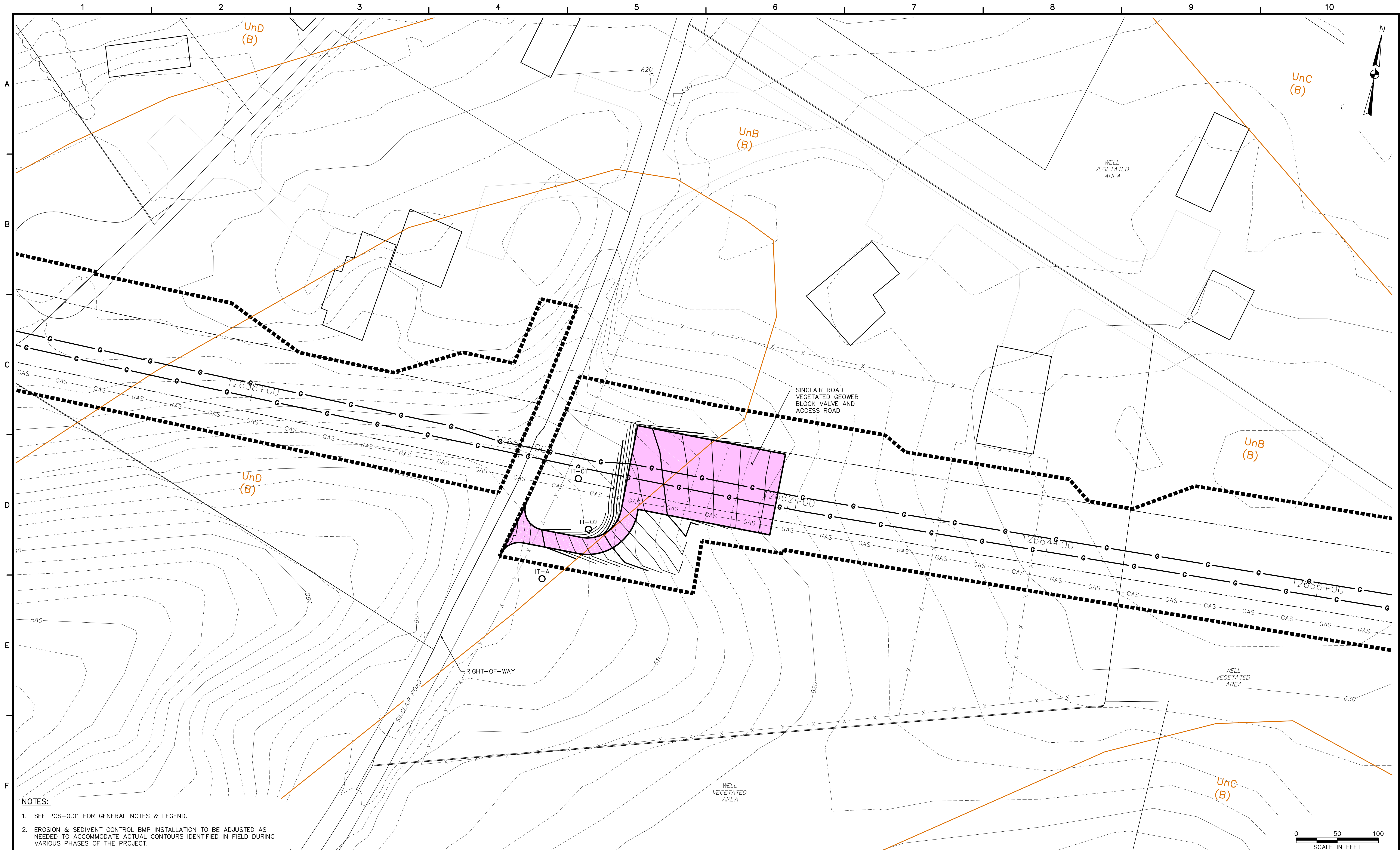
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CONSTRUCTION SPREAD 5**

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

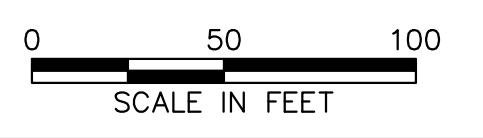
SCHAEFFER ROAD BLOCK VALVE  
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN

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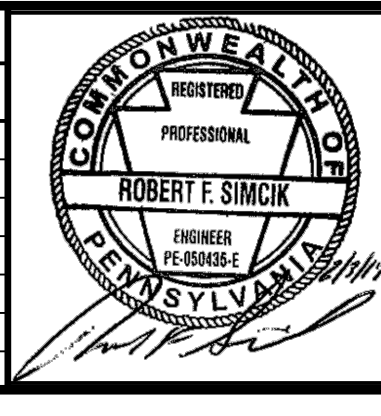


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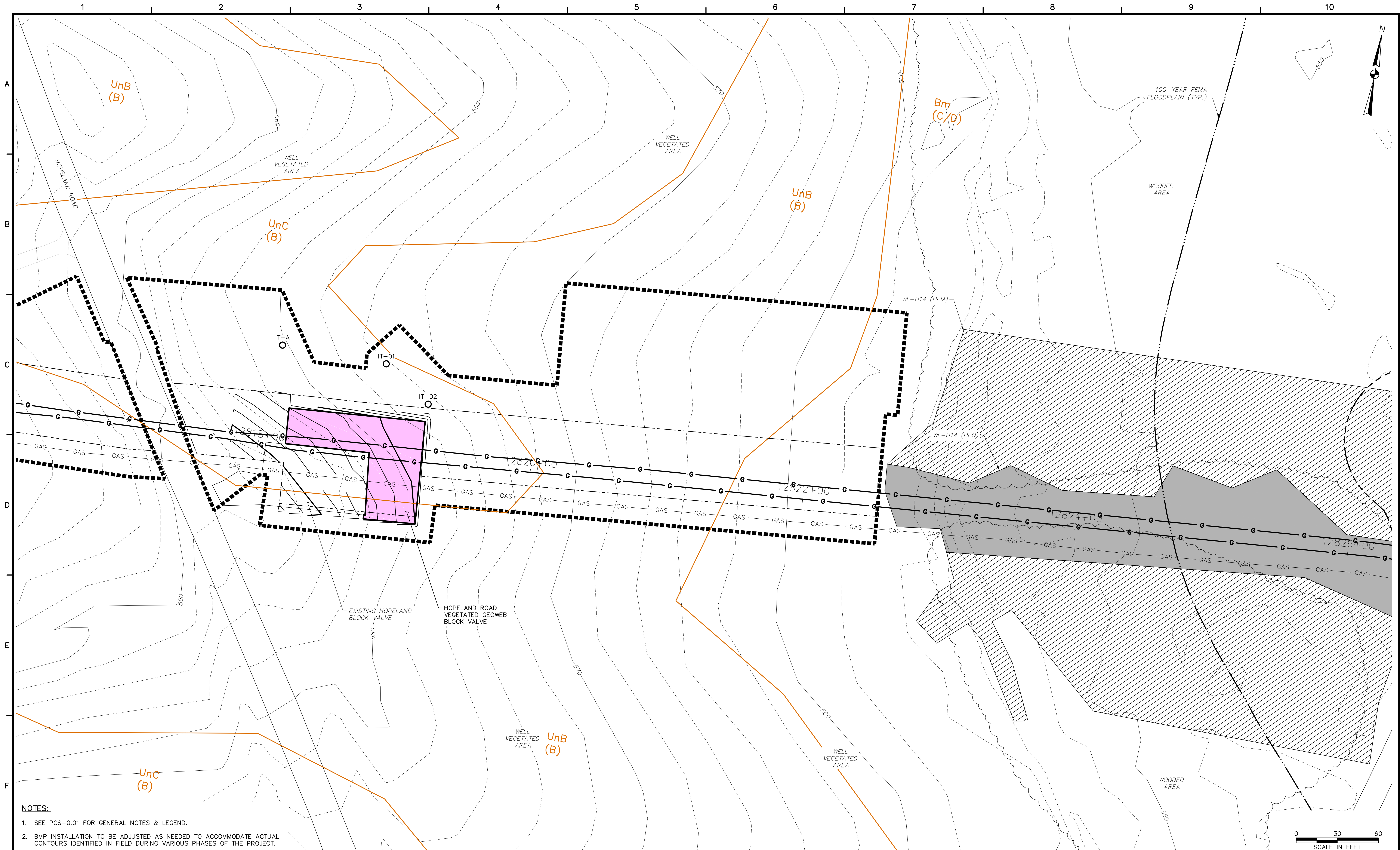


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CONSTRUCTION SPREAD 5**

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
**SINCLAIR ROAD BLOCK VALVE  
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN**

|                           |            |
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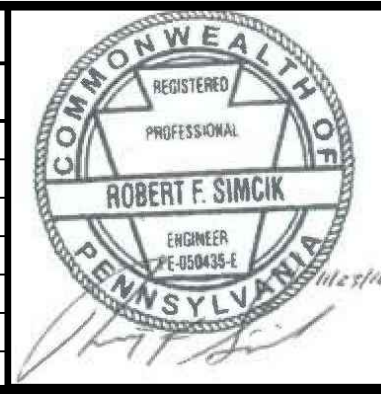




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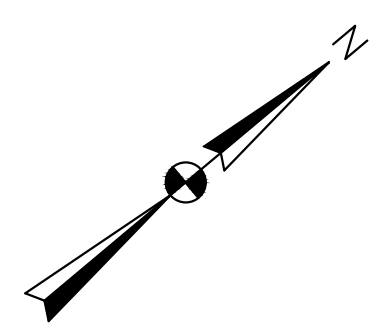
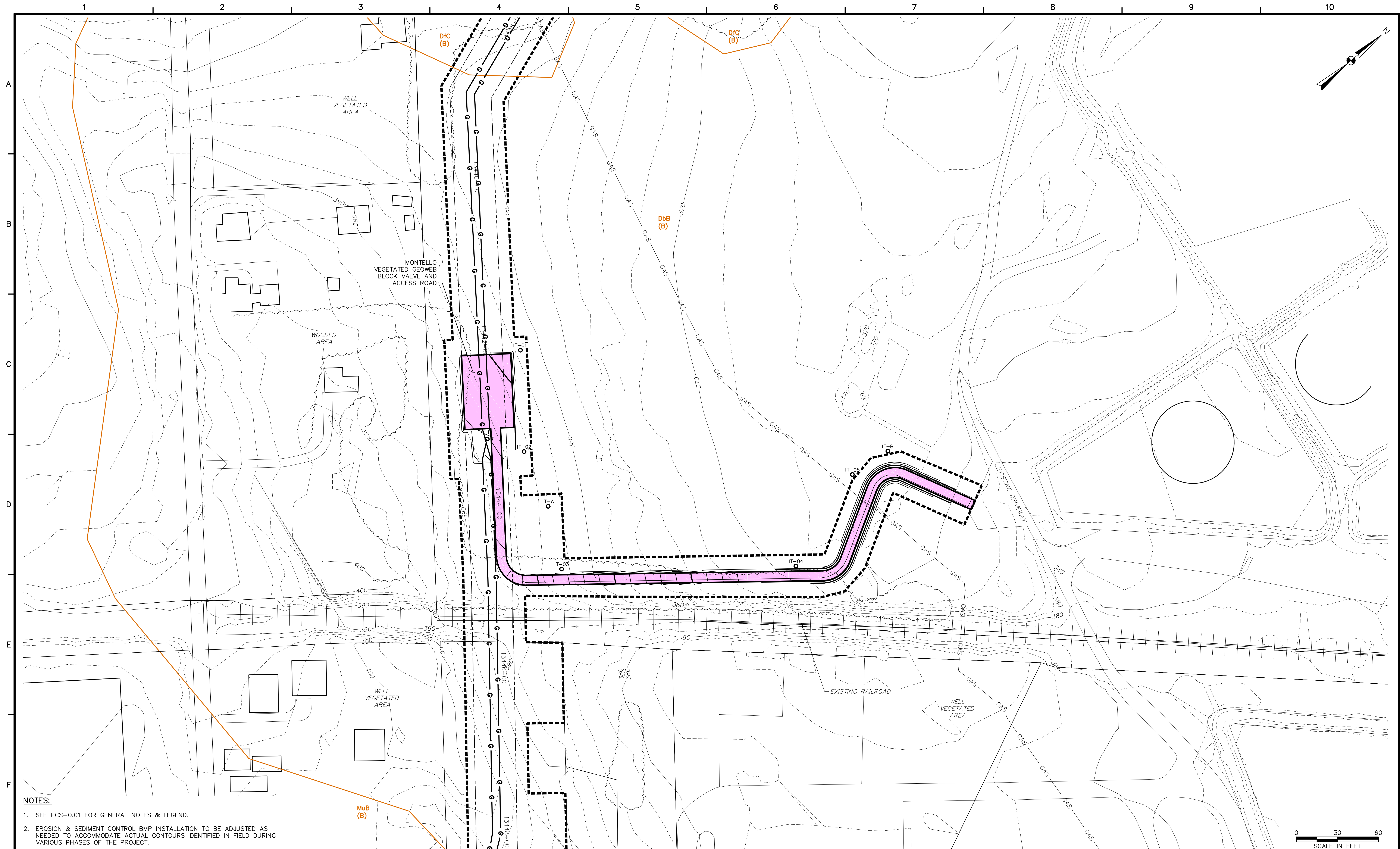


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CONSTRUCTION SPREAD 5**

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
**HOPELAND ROAD BLOCK VALVE  
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN**

|                           |            |
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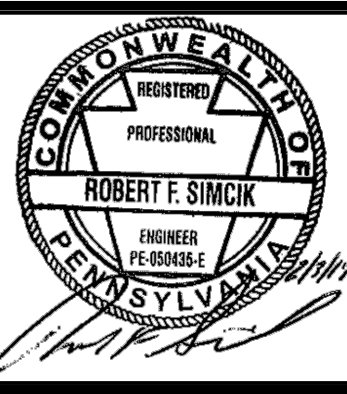
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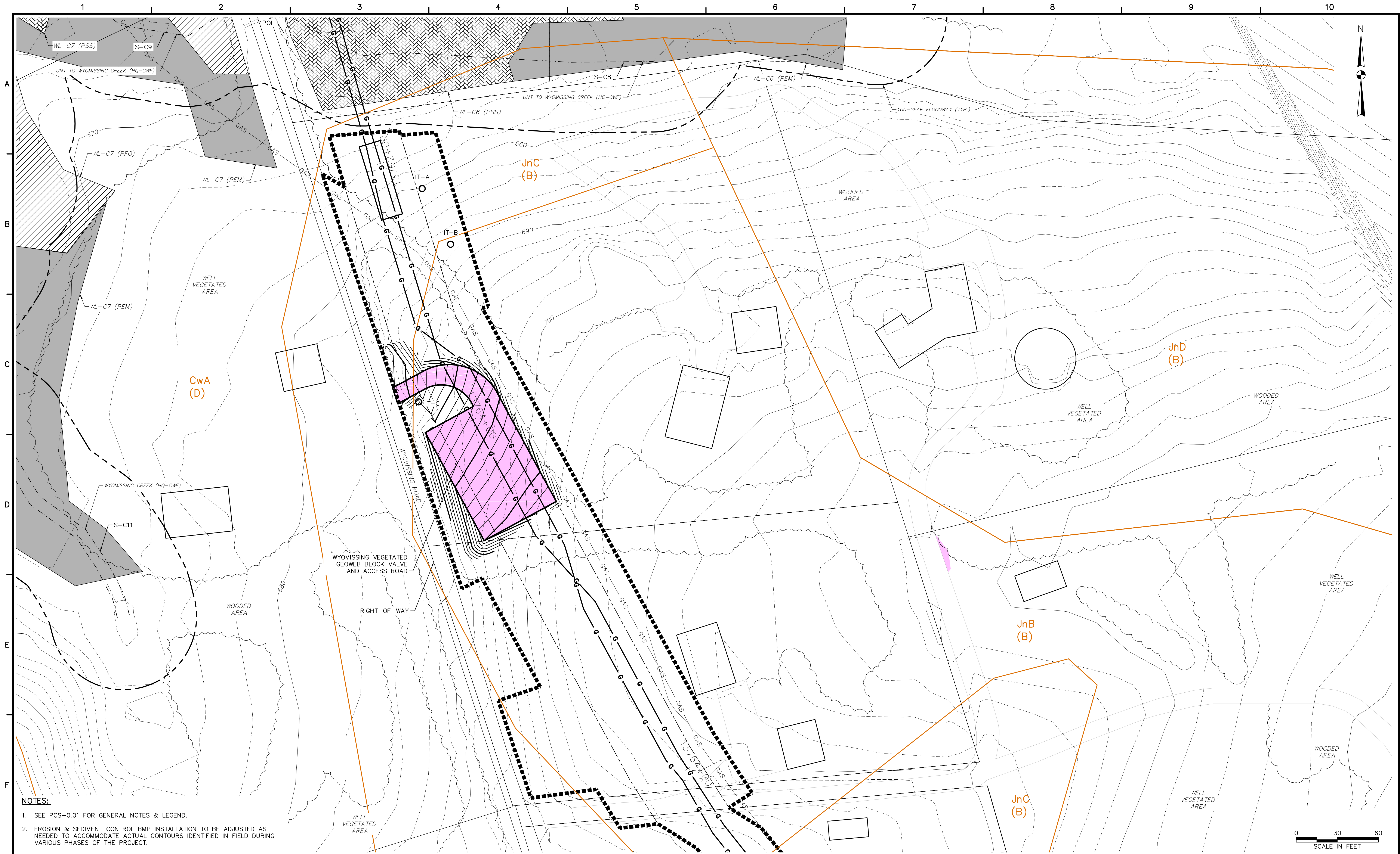
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CONSTRUCTION SPREAD 5**

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

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**MONTELLO BLOCK VALVE  
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN**

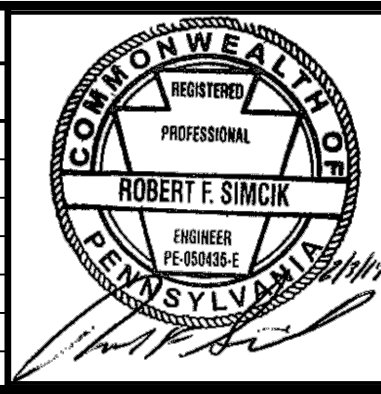




- NOTES:**
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  2. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.

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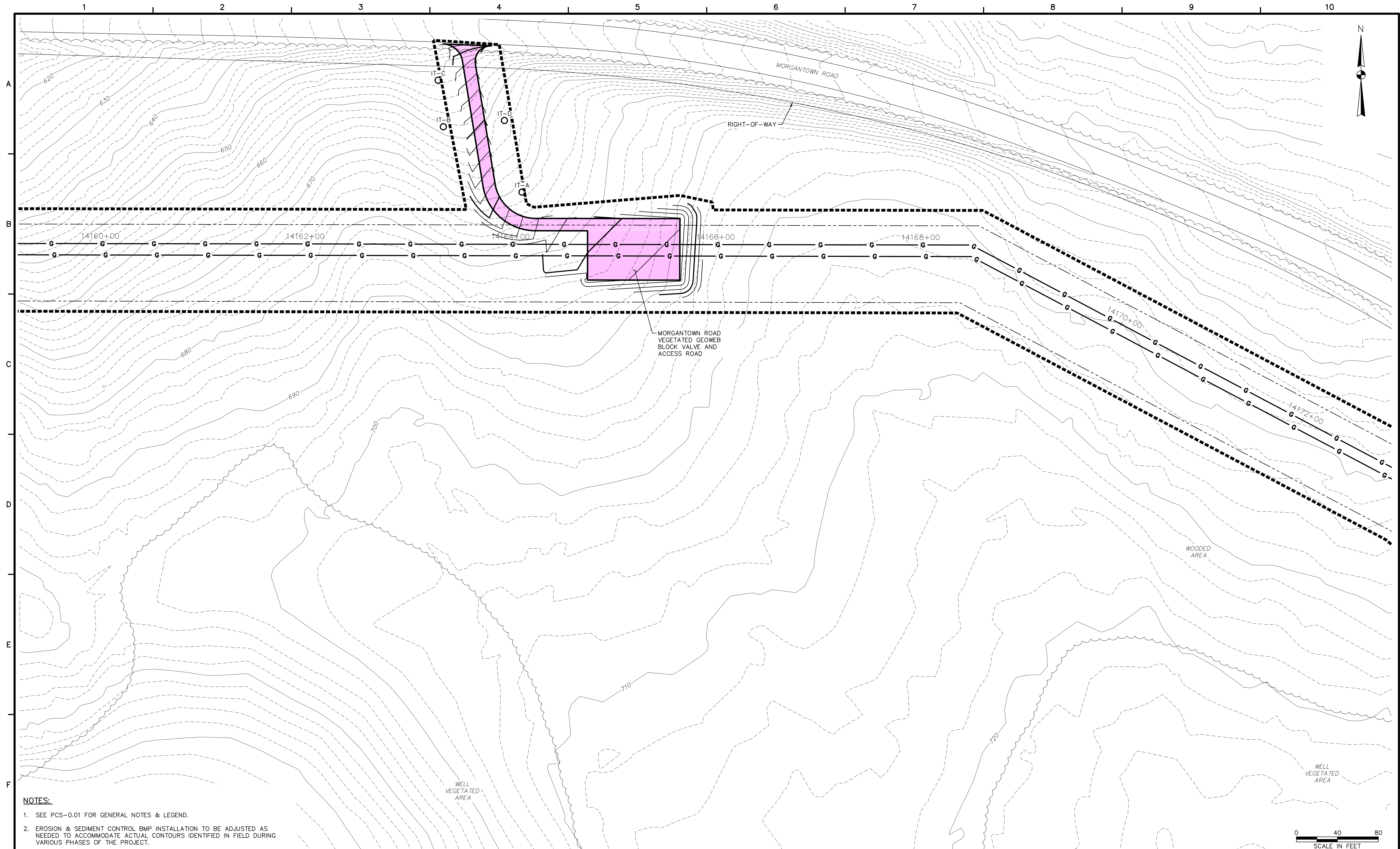


SUNOCO PIPELINE L.P.  
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**PENNSYLVANIA PIPELINE PROJECT  
CONSTRUCTION SPREAD 5**

1-20" & 1-16" PROPOSED WELDED STEEL NATURAL GAS LIQUIDS PIPELINES  
**WYOMISSING BLOCK VALVE  
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN**

|                           |            |
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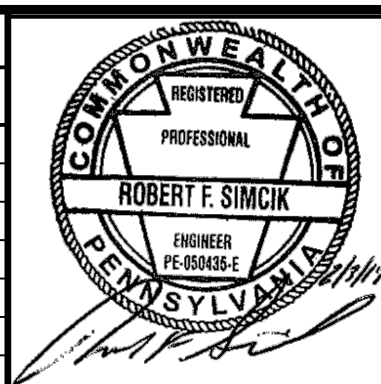
**NOTES:**

1. SEE PCS-0.01 FOR GENERAL NOTES & LEGEND.
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**PENNSYLVANIA PIPELINE PROJECT  
 CONSTRUCTION SPREAD 5**

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

**MORGANTOWN ROAD BLOCK VALVE  
 POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN**

|                           |            |
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