

## CAMBRIA SUBSTATION: ADDENDUM SPECIFICATIONS

**4.3 GRADING**  
GRADING OPERATIONS ARE DEFINED AS THE PROCESS OF EXCAVATING (CUTTING), HAULING, SPREADING, FILLING, AND COMPACTING SOIL AND ROCK MATERIAL WITHIN THE CONSTRUCTION LIMITS. IF THERE IS INSUFFICIENT OR UNSUITABLE MATERIAL AVAILABLE ON SITE TO ESTABLISH THE REQUIRED LINES AND GRADES, THE CONTRACTOR SHALL OBTAIN BORROW MATERIAL IN ACCORDANCE WITH ARTICLE 4.5.1.

ESTIMATED QUANTITIES FOR CUT AND FILL WILL BE SHOWN ON THE CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL IMMEDIATELY STOP GRADING OPERATIONS AND NOTIFY THE PROJECT MANAGER-PROJECT ENGINEER-TCR IF IT IS SUSPECTED THAT THE CUT AND FILL QUANTITIES WILL VARY SIGNIFICANTLY FROM THESE ESTIMATED VALUES. GRADING OPERATIONS MAY NOT CONTINUE UNTIL THE PROJECT ENGINEER HAS APPROVED ALL CHANGES TO LINE AND GRADE AND THE PROJECT MANAGER HAS APPROVED ALL ADDITIONAL EXPENDITURES.

**4.6.2 FILL MATERIAL**  
ALL MATERIAL PLACED IN FILL AREAS SHALL BE FREE OF ORGANIC MATTER, TRASH, FROZEN MATERIAL, AND OTHER UNSUITABLE MATERIAL. SOILS CONTAINING COHESIVE MATERIAL SHALL HAVE A MAXIMUM PLASTICITY INDEX OF 30 PERCENT AS DEFINED BY ASTM D 4318 AND A MINIMUM DRY DENSITY OF 90 PCF AS DEFINED BY A STANDARD PROCTOR. ROCK FILL OR COMPACTED CRUSHED COARSE AGGREGATE FILL WILL BE PERMITTED AS SPECIFICALLY DESIGNATED ON THE CONSTRUCTION DRAWINGS.

ROCKS OR STONES WITH AN APPROXIMATE DIAMETER GREATER THAN 2 INCHES SHALL NOT BE PLACED IN THE UPPER 36 INCHES OF FILL LOCATED WITHIN THE LIMITS OF THE SUBSTATION PAD. ROCKS OR STONES MEASURING 6 INCHES AT THEIR LARGEST DIMENSION MAY BE INCORPORATED IN THE REMAINDER OF THE FILL PROVIDED THAT THEY ARE DISTRIBUTED SO THAT THEY DO NOT INTERFERE WITH PROPER COMPACTION. LARGER ROCKS OR STONES ARE NOT PERMITTED.

**4.6.3 PLACEMENT**  
FILL SHALL NOT BE PLACED ON MUDDY OR FROZEN SURFACES; NOR SHALL SNOW, ICE, OR FROZEN EARTH BE INCORPORATED INTO THE FILL MATERIAL. TEMPORARY CONSTRUCTION SLOPES WITHIN THE FILL SHALL NOT BE STEEPER THAN 2H:1V.

FILL MATERIAL SHALL BE PLACED SUCH THAT WHEN COMPACTED, IT FORMS A HOMOGENEOUS MASS THAT IS FREE FROM LENSES, POCKETS, STREAKS, AND LAYERS DIFFERING SUBSTANTIALLY IN TEXTURE AND GRADATION FROM THE SURROUNDING FILL MATERIAL. MATERIAL DEPOSITED IN PILES OR WINDROWS SHALL BE SPREAD AND LEVELED BEFORE COMPACTION.

FILL SHALL BE PLACED IN COMPACTED LIFTS NOT TO EXCEED 8 INCHES, EXCEPT WHERE NOTED OTHERWISE IN THIS SPECIFICATION OR ON THE CONSTRUCTION DRAWINGS. SUCCESSIVE LIFTS SHALL NOT BE PLACED UNTIL THE LIFT UNDER CONSTRUCTION HAS BEEN COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 4.6.4; BEEN INSPECTED AND TESTED, AND THE TCR HAS GIVEN AUTHORIZATION TO PROCEED. FOR AREAS DESIGNATED AS TREE ROOT ZONES, THE FILL SHALL BE PLACED IN 12-INCH THICK LOOSE LIFTS AND COMPACTED BY FOUR PASSES OF THE APPROPRIATE COMPACTOR. FILL MATERIAL SHALL NOT BE PLACED WITHIN THE DRIP LINE OF TREES DESIGNATED TO REMAIN.

EACH LAYER OF FILL SHALL BE PLACED SUCH THAT THE SURFACE IS FREE DRaining. FILL SHALL BE SLOPED AND CROWNED TO PREVENT THE PONDING OF WATER. THIS SLOPE AND CROWN SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

**LAYERED ROCK/SOIL FILL:**  
ALTERNATE 2 COMPACTED LIFTS OF ROCK (EACH LIFT APPROXIMATELY 6 INCHES THICK) WITH 2 COMPACTED LIFTS OF SOIL (EACH LIFT APPROXIMATELY 6 INCHES THICK) WITH COMPACTION VERIFICATION TESTING COMPLETED ON THE SOIL LAYERS. COMPACTION SHALL MEET THE REQUIREMENTS OF ARTICLE 4.6.4.

**4.6.4 COMPACTION**  
COHESIVE SOILS ARE DEFINED AS CLAYS AND OTHER CLAYEY-SILT OR CLAYEY-SAND SOILS IN WHICH THE ABSORBED WATER AND PARTICLE ATTRACTION PRODUCES A MASS THAT BONDS TOGETHER AND DEFORMS PLASTICALLY AT VARYING WATER CONTENTS.

EACH LIFT OF COHESIVE MATERIAL SHALL BE COMPACTED WITH A SHEEPSFOOT OR PADFOOT ROLLER OR COMPACTOR TO THE FOLLOWING MINIMUM DENSITY REQUIREMENTS:

COMPACTED FILL MATERIAL IN THE STATION PAD AREA SHOULD BE COMPACTED TO A MINIMUM 98% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698 (STANDARD PROCTOR).

COMPACTED FILL MATERIAL PLACED IN SLOPES AND ADJACENT TO RETAINING WALL STRUCTURES SHOULD BE COMPACTED TO A MINIMUM 98% OF THE MATERIAL'S MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698 (STANDARD PROCTOR).

THE WATER CONTENT OF THE FILL MATERIAL SHALL BE MAINTAINED TO WITHIN 2 PERCENT OF THE OPTIMUM. IF THE FILL MATERIAL DOES NOT HAVE THE REQUIRED MOISTURE CONTENT UNIFORMLY DISTRIBUTED THROUGHOUT, THE CONTRACTOR SHALL CONDITION THE MATERIAL BY FLOODING, SPRINKLING, AERATING, HARROWING, DISKING, DRAINING, OR OTHER MEANS TO ENSURE SUITABLE COMPACTION.

COMPACTION TESTING SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF ARTICLE 4.6.5, UNLESS SPECIFICALLY WAIVED IN EACH CASE. WHEN LABORATORY AND FIELD DENSITY TESTING IS WAIVED, THE COHESIVE SOIL SHALL BE COMPACTED BY A MINIMUM OF SIX COMPLETE PASSES OF THE APPROPRIATE COMPACTOR.

THE COMPACTOR SHALL BE WEIGHTED SUCH THAT ITS FEET OR PADS PENETRATE THE ENTIRE LIFT IN THE INITIAL PASS AND WALK OUT ABOUT ONE-HALF THEIR LENGTH DURING SUBSEQUENT PASSES. THE TCR SHALL MAINTAIN THE RIGHT TO VARY THE WEIGHT OF THE ROLLER TO SECURE OPTIMUM COMPACTION. THE COMPACTION UNITS SHALL TRAVEL AT SPEEDS THAT DO NOT CAUSE THE PADS OR FEET TO CHURN UP OR TOSS THE SOIL. EACH PASS SHALL OVERLAP THE ADJACENT PASS BY A MINIMUM OF 1 FOOT. WHEN THE CONTRACTOR USES COMPACTORS WITH TANDEM DRUMS, ONE MACHINE PASS SHALL BE CONSIDERED EQUAL TO ONE COMPACTION PASS UNLESS OTHERWISE STATED IN WRITING BY THE PROJECT ENGINEER.

COHESIVE FILL AREAS SHALL BE UNIFORMLY SLOPED AND ROLLED WITH A SMOOTH DRUM OR PNEUMATIC-TIRED ROLLER TO A SMOOTH, TIGHT SURFACE PRIOR TO PERIODS OF ANTICIPATED RAIN TO SHED WATER. WHEN THE SURFACE OF A LIFT HAS BEEN SEALED FOR WEATHER PROTECTION, THAT SURFACE SHALL BE SCARIFIED PRIOR TO PLACING THE SUCCEEDING LIFT. THE TOTAL DEPTH OF THE SUCCEEDING LIFT, INCLUDING THE SCARIFIED MATERIAL SHALL NOT EXCEED A NOMINAL 6 INCHES LOOSE.

**4.7 ROCK EXCAVATION**  
THIS WORK SHALL CONSIST OF REMOVING ROCK MATERIAL FROM WITHIN THE CONSTRUCTION LIMITS OR FROM BORROW AREAS.

ROCK IS DEFINED AS IN-SITU BEDROCK THAT CANNOT BE RIPPED BY A D9 TRACTOR OR EQUIVALENT. SOFT ROCK AND ROCK-SOIL MIXTURES ARE DEFINED AS MATERIAL CONSISTING OF CLAY, SHALE, HIGHLY WEATHERED ROCK, AND GENERAL RANDOM COMBINATIONS OF ROCK AND SOIL. NO SOFT OR DISINTEGRATED ROCK, NOR ROCK-SOIL MIXTURE THAT CAN BE REMOVED WITH A PICK OR DIGGING MACHINE; NO LOOSE, SHAKEN OR PREVIOUSLY BLASTED ROCK; NO BROKEN STONES; AND NO ROCK WHICH MAY FALL OR MAY HAVE FALLEN INTO THE OPENED EXCAVATION FROM OUTSIDE THE LIMITS OF THE EXCAVATION WILL BE CONSIDERED AS ROCK EXCAVATION.

IN AREAS OF ROCK EXCAVATION WHEN ROCK IS PRESENT NEAR THE SURFACE OF THE SITE, A DEPTH OF 2.5 FEET OF ROCK BELOW THE PROPOSED EARTH GRADE SHOULD BE EXCAVATED AND REPLACED WITH SUITABLE FILL MATERIAL.

BLASTING IS NOT PERMITTED UNLESS AUTHORIZED IN WRITING BY THE PROJECT MANAGER. WHEN PERMITTED, BLASTING OPERATIONS SHALL BE SUBJECT TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, ORDINANCES, AND REGULATIONS RELATED TO THE SAFE STORAGE, HANDLING, AND USE OF EXPLOSIVES. THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE AND LIABLE FOR ALL NEGATIVE CONSEQUENCES RESULTING FROM NON-COMPLIANCE OF ALL APPLICABLE LAWS AND REGULATIONS; AND ALL INJURIES AND DAMAGE TO PERSONS, PROPERTY, AND EQUIPMENT.

**SUBGRADE STABILIZATION:**  
THE TOP LAYER OR UPPER 12 INCHES OF SOIL SUBGRADE WITHIN THE STATION PAD'S FOOTPRINT SHALL BE STABILIZED WITH HYDRATED LIME WHERE FAT CLAY (CH) TYPE SOILS ARE PRESENT. RATE OF APPLICATION SHALL BE A MINIMUM 5% LIME BY WEIGHT OF THE COMPACTED DRY SOIL UNIT WEIGHT AS DETERMINED BY A STANDARD PROCTOR (ASTM D698). ACTUAL RATE OF APPLICATION WILL BE DETERMINED BY THE OWNERS TESTING AGENCY.

METHOD OF PLACEMENT SHALL ENSURE THAT THE LIME IS THOROUGHLY AND UNIFORMLY MIXED WITH THE UPPER 12 INCHES OF SOIL SUBGRADE BY MEANS OF SCARIFICATION, ROTARY MIXING, AND/OR PULVERIZATION.

REQUIRED LIME QUANTITY SHALL BE VERIFIED DURING PLACEMENT WITH METHOD OF DETERMINATION PROVIDED TO OWNER FOR APPROVAL PRIOR TO LIME PLACEMENT.

WATER SHALL BE ADDED AS NECESSARY BEFORE FINAL MIXING TO ENSURE COMPLETE HYDRATION AND TO BRING THE SOIL MOISTURE CONTENT 3 PERCENT ABOVE OPTIMUM BEFORE COMPACTION.

A MINIMUM MELLING PERIOD OF 24 HOURS TO ENSURE COMPLETE HYDRATION SHALL BE IMPLEMENTED PRIOR TO FINAL MIXING, SHAPING, AND COMPACTION.

COMPACTION VERIFICATION MEETING A MINIMUM 98% SHALL BE BASED ON A STANDARD PROCTOR (ASTM D698) CURVE FROM A REPRESENTATIVE FIELD SAMPLE OF THE LIME-SOIL MIXTURE. COMPACTION SHALL OCCUR IMMEDIATELY AFTER FINAL MIXING USING A HEAVY VIBRATORY SHEEPSFOOT OR PADFOOT ROLLER. EQUIPMENT SHOULD BE CAPABLE OF COMPACTING THE ENTIRE TOP 12 INCHES OF SUBGRADE.

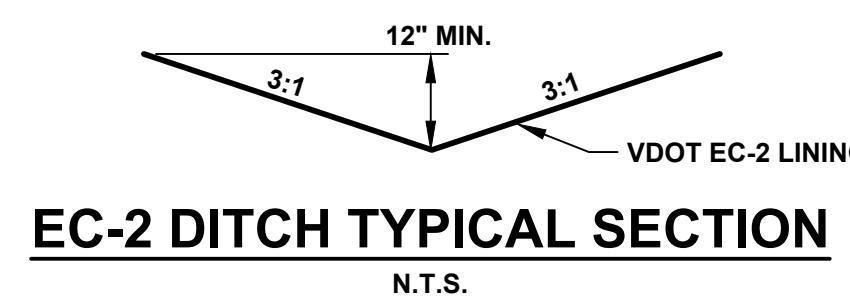
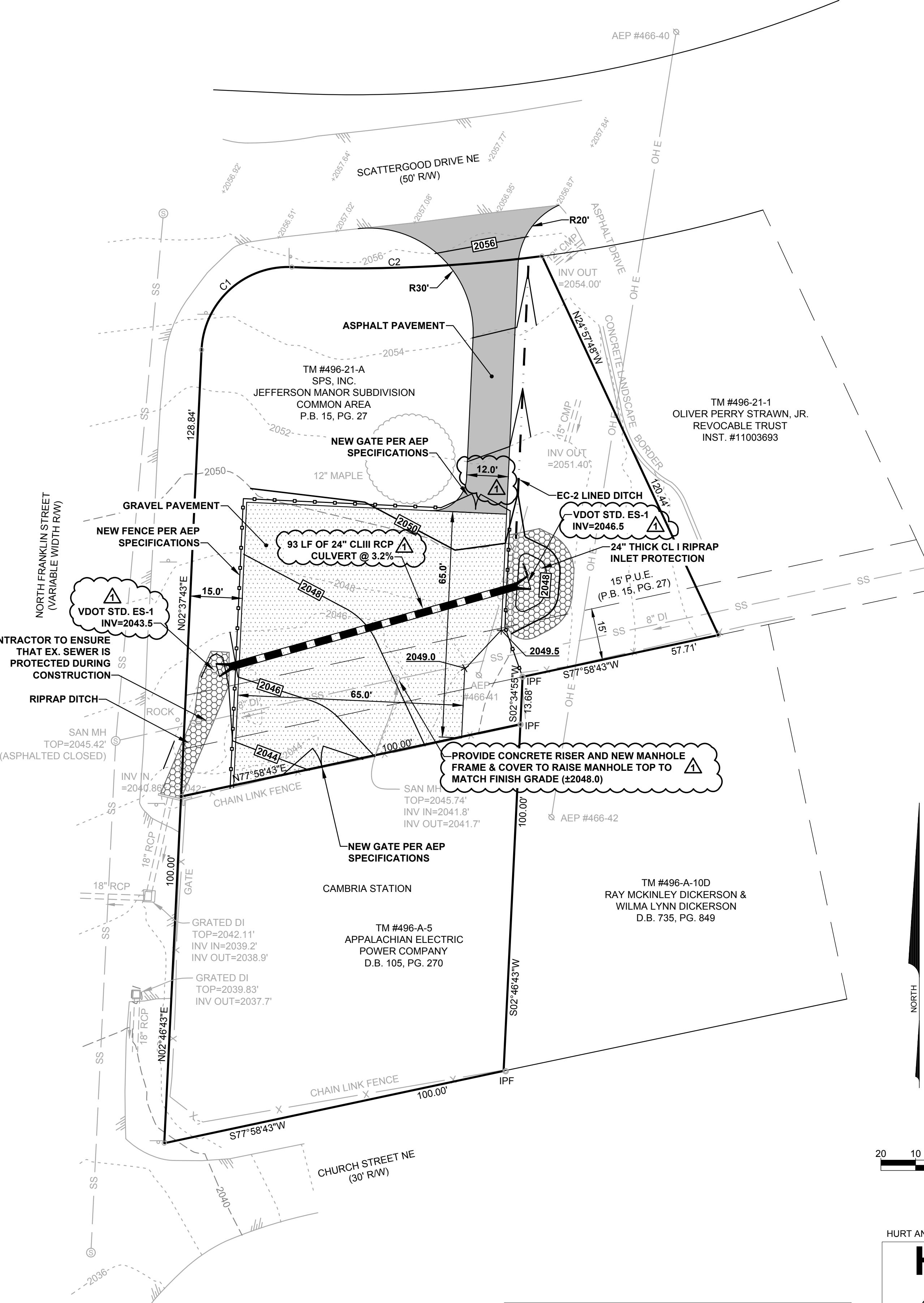
REFERENCE: NATIONAL LIME ASSOCIATION (WWW.LIME.ORG) - LIME-TREATED SOIL CONSTRUCTION MANUAL - BULLETIN 326, JANUARY 2004

## GENERAL CONSTRUCTION NOTES

1. DISTURBED AREA: ±9,500 SF. A VIRGINIA STORM WATER MANAGEMENT PERMIT (VSMP) AND SWPPP WILL NOT BE REQUIRED.
2. CONTRACTOR TO COORDINATE WITH APPALACHIAN POWER COMPANY PROJECT MANAGER TO DETERMINE ANY PERMITTING OR BONDING RESPONSIBILITIES.
3. CONTRACTOR SHALL ENSURE THAT ANY OFFSITE WORK SUCH AS LANDFILLING OPERATIONS SHALL BE PRE-APPROVED BY THE OFFSITE PROPERTY OWNER ACCEPTING THE MATERIAL AND SHALL SUBMIT AN APPROVED EROSION CONTROL PLAN TO THE LOCAL AUTHORITY FOR ALL OFFSITE BORROW OR WASTE AREAS.
4. ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF AMERICAN ELECTRIC POWER COMPANY SPECIFICATION SS-160102, "TECHNICAL SPECIFICATION FOR SUBSTATION AND SWITCHING STATION CONSTRUCTION", AND LOCAL ZONING AND CONSTRUCTION ORDINANCES, REGULATIONS, AND STANDARDS. IN CASE OF CONFLICT BETWEEN REGULATIONS, THE MOST STRINGENT SHALL BE USED, AS DETERMINED BY APPALACHIAN POWER COMPANY.
5. THE MINIMUM REQUIRED DENSITY FOR ALL COMPACTION SHALL BE 98% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN ± 2% OF THE OPTIMUM. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH TESTING LABORATORY ENGAGED TO MEET AEP SPECIFICATION SS-160102 TESTING REQUIREMENTS. REFER TO SECTION 4.6 FOR COMPACTION REQUIREMENTS UNDER ROAD. ALL FILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR, PLACED IN 8" LOOSE LIFTS.
6. CONTRACTOR SHALL CALL MISS UTILITY AT PHONE NUMBER 811 TO LOCATE EXISTING UTILITIES AT LEAST 48 HOURS PRIOR TO ANY EARTHWORK BEGINNING.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MEET COMPLIANCE REQUIREMENTS WITH SECTION 59.1-406, ET SEQ. OF THE CODE OF VIRGINIA (OVERHEAD HIGH VOLTAGE LINES SAFETY ACT).
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS FROM ALL OTHER APPLICABLE AGENCIES NOT OBTAINED BY THE OWNER BEFORE BEGINNING CONSTRUCTION.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY UTILITIES DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES. VERIFY LOCATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING WORK.
10. DISTANCES AND RADII REFERRED TO ARE TO THE EDGE OF GRAVEL, UNLESS OTHERWISE NOTED.
11. RIGHT-OF-WAY LOT LINES AND EASEMENTS ARE DEDICATED ON PLATS SEPARATE FROM THESE PLANS.
12. A SOIL TEST IS REQUIRED, PRIOR TO FINAL SITE STABILIZATION, TO DETERMINE FERTILIZER APPLICATION RATES FOR THE ESTABLISHMENT OF GRASS ON THE SITE. CONTACT VIRGINIA COOPERATIVE EXTENSION OR A QUALIFIED GEOTECHNICAL FIRM (WITH SOIL TESTING FACILITIES) TO OBTAIN A SOILS REPORT FOR NUTRIENT APPLICATION.
13. BURNING OF DEBRIS AND OTHER MATERIALS IS PROHIBITED.
14. STORM PIPING SHALL BE INSTALLED PER VDOT STD. PB-1.

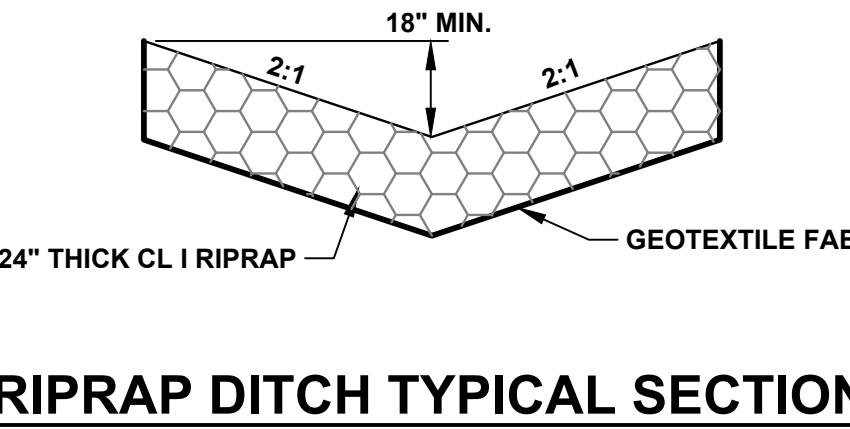
## SURVEY NOTES

1. THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT RESPONSIBLE CHARGE OF M. BRADLEY TATE FROM AN ACTUAL GROUND SURVEY MADE UNDER HIS SUPERVISION. THE DATA WAS OBTAINED ON OCTOBER 7, 2019. THIS MAP MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.
2. THIS SURVEY HAS BEEN PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND DOES NOT, THEREFORE, NECESSARILY INDICATE ALL ENCUMBRANCES ON THE PROPERTY.
3. THE AREA SHOWN HEREON IS LOCATED IN FLOOD HAZARD ZONE 'X' AND IS NOT LOCATED WITHIN FLOOD HAZARD ZONE 'AE' FOR A 100 YEAR FLOOD AS DETERMINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY AS SHOWN ON FEMA MAP #51121C0143C DATED SEPTEMBER 25, 2009.
4. A COMPLETE BOUNDARY SURVEY HAS NOT BEEN PERFORMED AT THIS TIME.
5. HORIZONTAL CONTROL FOR THIS PROJECT IS BASED ON VIRGINIA STATE PLANE GRID SOUTH ZONE (NAD 83). VERTICAL CONTROL FOR THIS PROJECT IS BASED ON NAVD 88, GEOD MODEL 12B.
6. THE UTILITIES SHOWN HEREON ARE PLOTTED PER VISIBLE EVIDENCE AND THE MARKINGS OF MISS UTILITY. THIS SURVEY CANNOT GUARANTEE THAT ALL UNDERGROUND UTILITIES WITHIN THE PROPERTY INCLUDED IN THIS SURVEY HAVE BEEN MAPPED. IT SHALL BE THE RESPONSIBILITY OF THE OWNER/CONTRACTOR TO HAVE UNDERGROUND UTILITIES MAPPED PRIOR TO LAND DISTURBANCE/EXCAVATION OF ANY KIND.
7. THIS SURVEY WAS PREPARED AT THE REQUEST OF AMERICAN ELECTRIC POWER.



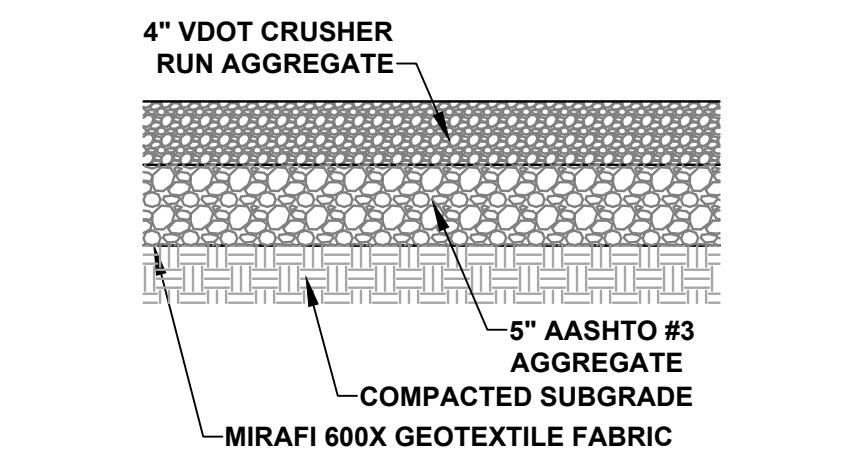
EC-2 DITCH TYPICAL SECTION

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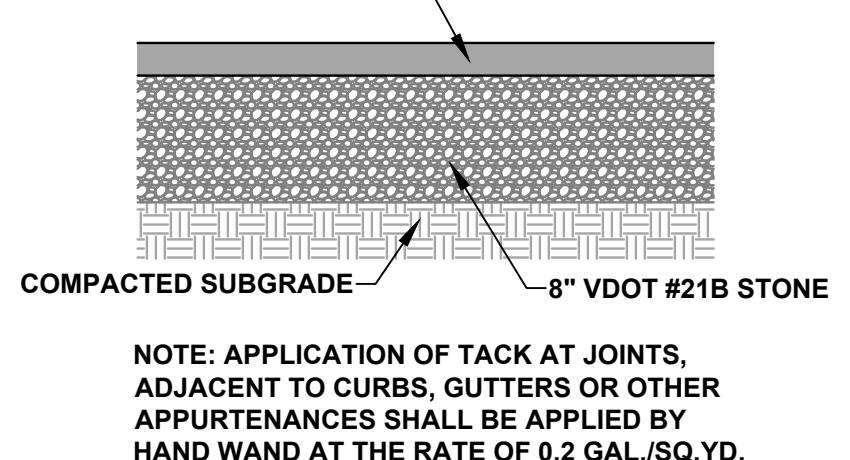
RIPRAP DITCH TYPICAL SECTION

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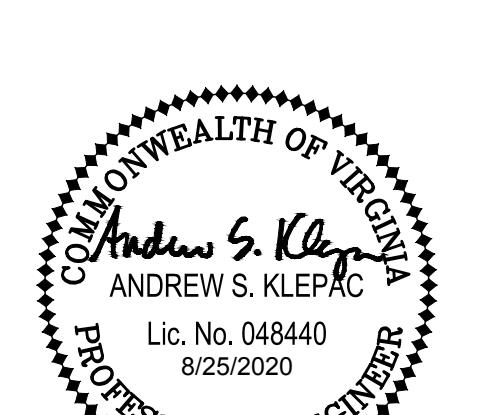
GRAVEL PAVEMENT

N.T.S.



ASPHALT PAVEMENT

N.T.S.



HURT AND PROFFITT, INC. PROJECT NO. 20191608

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ENGINEERING • SURVEYING • LAND DEVELOPMENT • ENVIRONMENTAL GEOTECHNICAL • CONSTRUCTION TESTING &amp; INSPECTION • CULTURAL RESOURCES

OLD DWG #: STD DWG #:

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APALACHIAN POWER CO.

CAMBRIA SUBSTATION

TOWN OF CHRISTIANSBURG VIRGINIA

8/25/2020

SITE PLAN

SITE AND GRADING PLAN

GEOTECHNICAL • CONSTRUCTION TESTING &amp; INSPECTION • CULTURAL RESOURCES

SCALE: DR: ASK ENG: ASK CH: ASK

WOF#: APPD: ASK DATE: 10/24/2019

DWG. NO. E-1 REV 1

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