SECTION 02315 - TRENCHING, EXCAVATION, BACKFILL, COMPACTION, AND DEWATERING

1. GENERAL DESCRIPTION OF WORK

   A. EXCAVATION, SHORING, DEWATERING, PIPE BEDDING, TRENCH BACKFILL, COMPACTION, GRADING AND CLEANUP OF ALL PIPELINE TRENCHING FOR THE PROJECT.

   B. ALL WORK MUST BE DONE IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE SAFETY REQUIREMENTS OF THE STATE AND OSHA STANDARDS.

2. JOB CONDITIONS

   A. ACCEPT SITE IN CONDITION EXISTING DURING CONTRACT TIME FRAME.

   B. GROUNDWATER/SURFACE WATER FOUND DURING CONSTRUCTION ARE CONDITIONS OF THE CONTRACT AND RESPONSIBILITY OF CONTRACTOR. SEE GEOTECHNICAL REPORT FOR LOCATION OF FOUND GROUNDWATER.

3. PIPE BEDDING AND BACKFILL

   A. DETERMINATION OF SOURCE OF MATERIALS FOR BEDDING AND BACKFILL SHALL BE RESPONSIBILITY OF CONTRACTOR, BUT USE OF SUCH MATERIALS SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

   B. PIPE BEDDING AND BACKFILL MATERIAL SHALL BE SELECTED PER THE MANUFACTURER'S RECOMMENDATIONS.

5. GENERAL

   A. DEWATERING

      1. PREVENT SURFACE WATER FROM FLOWING INTO EXCAVATION.

      2. PROVIDE EQUIPMENT FOR HANDLING WATER ENCOUNTERED AS REQUIRED. OBTAIN APPROVAL OF PROPOSED METHOD OF DEWATERING.

      3. NO SANITARY SEWER SHALL BE USED FOR DISPOSAL OF TRENCH WATER.

   B. PROTECTION OF EXISTING UTILITIES

      1. NOTIFY ALL UTILITIES OF LOCATION AND SCHEDULE OF WORK.

      2. LOCATIONS AND ELEVATIONS OF UTILITIES SHOWN ON PLANS ARE TO BE CONSIDERED APPROXIMATE ONLY. THE CONTRACTOR SHALL EMPLOY THE USE OF GROUND PENETRATING RADAR (GPR) EQUIPMENT BY A QUALIFIED COMPANY AND PERSONNEL TO LOCATE, IDENTIFY AND PROTECT EXISTING UNDERGROUND UTILIZES IN THE AREA OF WORK. ANY UTILITIES SPOTTED SHALL BE DRAWN ON THE SITE PLAN PROVIDED BY THE ARCHITECT/ENGINEER AND SUBMITTED AS PART OF THE "AS-BUILT" DRAWINGS. COST OF GPR LOCATES SHALL BE INCLUDED IN THE CONTRACTORS BASE BID. NOTIFY UTILITY AND ARCHITECT/ENGINEER OF CONFLICTS BETWEEN EXISTING AND PROPOSED FACILITIES.

3. REPAIR, RELAY OR REPLACE EXISTING UTILITIES DAMAGED, DESTROYED OR DISRUPTED DURING WORK. UNLESS SPECIFIED OTHERWISE, REPLACEMENT WILL BE AT THE CONTRACTOR'S EXPENSE.

C. CHANGES IN GRADE

1. MINOR ADJUSTMENTS TO GRADES MAY BE MADE FROM PLAN GRADES TO SUIT UNFORESEEN CONSTRUCTION CONFLICTS OR CONDITIONS WITH APPROVAL FROM ENGINEER.

2. NO ADDITIONAL COMPENSATION WILL BE MADE FOR SUCH MINOR CHANGES.

6. EXCAVATION AND TRENCHING

A. GENERAL

1. METHOD OF EXCAVATION AT CONTRACTOR'S OPTION.

2. THE CONTRACTOR WILL USE CAUTION WHEN EXCAVATING UNDER TREE ROOTS AND UNDER AND AROUND STRUCTURES AND UTILITIES. EXCAVATE BY HAND WHEN NECESSARY.

3. STOCKPILE AND REPLACE TOPSOIL EQUAL TO PREEXISTING DEPTH FOR SURFACE RESTORATION IN GRASSED OR AGRICULTURAL AREAS WHERE SPECIFIED OR SHOWN ON PLANS.

B. TRENCH CHARACTERISTICS

1. DEPTH: AS INDICATED FOR PIPE INSTALLATION TO LINES AND GRADES REQUIRED WITH PROPER ALLOWANCE FOR THICKNESS OF PIPE AND TYPE OF BEDDING SPECIFIED OR INDICATED.

2. WIDTH:

A. KEEP WIDTH OF TRENCH AS NARROW AS POSSIBLE AND YET PROVIDE ADEQUATE ROOM FOR BACKFILLING AND JOINTING.

B. MAXIMUM TRENCH WIDTH OF 30-INCH OR PIPE O.D. PLUS 18 INCHES WHERE SOIL CONDITIONS PERMIT.

3. PROVIDE BELL HOLES FOR EACH PIPE JOINT WHERE PIPE BEARS ON UNDISTURBED EARTH.

4. TRENCH BOTTOM SHALL BE FREE OF LARGE STONES AND OTHER FOREIGN MATERIAL.

7. ORGANIC OR UNSTABLE MATERIALS

A. STOP WORK AND NOTIFY ENGINEER.

B. PERFORM REMEDIAL WORK AS DIRECTED.

C. IF MATERIAL IS JUDGED UNSUITABLE AND REMOVAL IS AUTHORIZED, REMOVE AND REPLACE WITH TRENCH STABILIZING MATERIAL AS DIRECTED BY ENGINEER.

8. BEDDING

A. PLACE AFTER BOTTOM OF TRENCH HAS BEEN EXCAVATED TO PROPER DEPTH AND GRADE.

B. PLACE, COMPACT AND SHAPE BEDDING MATERIAL TO CONFORM TO BARREL OF PIPE TO INSURE CONTINUOUS FIRM BEDDING FOR FILL LENGTH OF PIPE.

9. TRENCH BACKFILL

A. ALL FILL AND BACKFILL SHALL BE FREE FROM ORGANIC MATTER SUCH AS ROOTS, STUMPS, TREES AND REFUSE OR OTHER OBJECTIONABLE MATERIAL. EXCEPT AS SPECIFIED OTHERWISE, FILL AND BACKFILL SHALL BE PLACED IN LAYERS NOT MORE THAN 12 INCHES THICK AND EACH LAYER SHALL BE COMPACTED THOROUGHLY AND EVENLY. THE MOISTURE CONTENT OF THE FILL MATERIAL SHALL BE SUCH THAT PROPER COMPACTION WILL BE OBTAINED. BACKFILL SHALL NOT BE PLACED AGAINST CONCRETE WITHIN SEVEN DAYS AFTER IT HAS BEEN POURED AND ONLY WHEN DIRECTED BY THE ENGINEER. IN AREAS TO BE GRASSED, THE TOP THREE INCHES SHALL NOT BE COMPACTED.

B. BACKFILLING TRENCHES

1. THE INITIAL BACKFILL SHALL BE CAREFULLY DEPOSITED ON BOTH SIDES OF THE PIPE AT THE SAME TIME IN WELL COMPACTED SIX-INCH LAYERS TO A DENSITY NOT LESS THAN 95% OF THE MODIFIED PROCTOR DENSITY UNTIL ENOUGH HAS BEEN PLACED TO PROVIDE A COVER OF ONE FOOT ABOVE THE BELL OF THE PIPE. THE REMAINDER OF THE TRENCH SHALL BE BACKFILLED IN WELL COMPACTED 8-INCH LAYERS UNDER ROADWAYS AND WELL COMPACTED 12-INCH LAYERS ELSEWHERE. BACKFILL SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MODIFIED PROCTOR DENSITY FOR TRENCHES UNDER ROADWAYS AND COMPACTED TO A DENSITY NOT LESS THAN 90% OF THE MODIFIED PROCTOR ELSEWHERE, WITH APPROVED MECHANICAL TAMPERS TO THE TOP OF THE TRENCH. WATER SETTLING MAY BE USED WHERE APPROVED AND SHALL BE USED WHERE DIRECTED BY THE ENGINEER. THE TOP MATERIAL SHALL BE USED LAST AND THE SURFACE OF THE TRENCH RESTORED TO ITS ORIGINAL ELEVATION. UNDER NO CONDITIONS IS CONSTRUCTION DEBRIS TO BE INCLUDED WITH THE BACKFILL. EXCAVATED MATERIAL CONSISTING OF MUCK, MUD, CLAY OR OTHER UNSTABLE MATERIAL MAY NOT BE UTILIZED IN THE BACKFILL.

C. BACKFILL AND EMBANKMENT

1. COMPACTION OF GENERAL BACKFILL AND EMBANKMENT SHALL BE ACCOMPLISHED BY MEANS OF MECHANICAL ROLLERS OR OTHER SUITABLE MEANS APPROVED BY THE ENGINEER. EACH LAYER OR LIFT OF EMBANKMENT OR BACKFILL SHALL NOT EXCEED 12 INCHES AND SHALL BE COMPACTED INDIVIDUALLY SO THAT UPON COMPLETION, THE BACKFILL OR EMBANKMENT SHALL HAVE ATTAINED A COMPACTION OF 95% OF MODIFIED PROCTOR DENSITY, ASTM D1557.

10. EXCESS MATERIAL: DISPOSE OF WASTE EXCESS EXCAVATED MATERIAL AS DIRECTED BY ENGINEER.

11. TESTING

A. PAYMENT FOR TESTING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

B. DENSITY OF FILL UNDER STRUCTURES AND ROAD BEDS, WHERE PERMITTED OR INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY IN-PLACE DENSITY TESTS MADE IN ACCORDANCE WITH STANDARD METHOD ASTM D1556. THE IN-PLACE DENSITIES ACTUALLY OBTAINED SHALL EQUAL OR EXCEED 95% OF LABORATORY MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT (MODIFIED PROCTOR). ONE TEST SHALL BE PERFORMED FOR EACH 2000 SQUARE FEET PER LAYER OF FILL PLACED UNDER EACH STRUCTURE OR ROADWAY WITH A MINIMUM OF ONE TEST PER LAYER FOR EACH STRUCTURE AND ROADWAY. IN-PLACE DENSITY TESTS FOR TRENCHES THAT ARE NOT UNDER ROADBEDS SHALL BE MADE FOR EACH 1000 LINEAR FEET OF TRENCH, PER LAYER OF FILL, WITH A MINIMUM OF ONE TEST PER LAYER AND SHALL EQUAL OR EXCEED 95% OF LABORATORY MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT (MODIFIED PROCTOR).

C. LABORATORY TESTS: MAXIMUM DENSITIES AT OPTIMUM MOISTURE CONTENT SHALL BE DETERMINED IN ACCORDANCE WITH STANDARD METHOD ASTM D1557. THE TEST PROCEDURE METHOD SHALL BE IN ACCORDANCE WITH SOIL TYPE ENCOUNTERED.

D. PROCEDURE: TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY APPROVED BY THE ENGINEER AND REPORTS OF RESULTS SHALL BE SENT DIRECTLY TO THE ENGINEER. FOR EACH TEST THAT FAILS TO MEET THE SPECIFIED DENSITY, ONE ADDITIONAL TEST SHALL BE MADE AFTER ADDITIONAL COMPACTION WORK IS PERFORMED. COSTS OF SOIL TESTING SHALL BE PAID BY THE CONTRACTOR.

END OF SECTION