

DIVISION 31 – EARTHWORK (CONTINUED)

- c. EXCAVATING (CONTINUED)
  - 13. FILL OVER-EXCAVATED AREAS UNDER STRUCTURE BEARING SURFACES BY EXTENDING INDICATED BOTTOM ELEVATION OF FOOTING OR BASE TO EXCAVATION BOTTOM WITHOUT CHANGING TOP ELEVATION OR BY FILLING UNAUTHORIZED EXCAVATION WITH 3000 PSI CONCRETE.
  - 14. TRENCHING
    - a) COMPLY WITH OSHA AND OTHER LOCAL REGULATIONS FOR TRENCHING REQUIREMENTS.
    - b) CONFORM EXCAVATIONS FOR PIPING TO LIMITS, DEPTHS, AND MATERIALS INDICATED ON THE DRAWINGS, AND TO APPLICABLE CODES AND REGULATIONS.
    - c) MECHANICAL EQUIPMENT SHALL BE DESIGNED AND OPERATED IN SUCH A MANNER THAT THE BOTTOM ELEVATION OF THE TRENCH CAN BE CONTROLLED WITH UNIFORM TRENCH WIDTHS AND VERTICAL SIDEWALLS WHICH EXTEND FROM THE BOTTOM OF THE TRENCH TO AN ELEVATION 1 FOOT ABOVE THE TOP OF THE INSTALLED PIPE.
    - d) TRENCHES SHALL BE EXCAVATED BY HAND IN LOCATION WHERE UNDERGROUND UTILITIES ARE KNOWN OR SUSPECTED.
    - e) DESIGN AND PROVIDE SHEETING, SHORING, OR BRACING AT ANY OPEN TRENCH.
    - f) EXCAVATE SUBSOIL REQUIRED TO INSTALL UNDERGROUND PIPING AND UTILITIES.
    - g) TRENCHES SHALL BE EXCAVATED BY OPEN-CUT METHODS, EXCEPT WHEN BORING OR TUNNELING IS INDICATED ON THE DRAWINGS OR APPROVED BY THE ENGINEER.
    - h) TRENCHES SHALL BE EXCAVATED TO A WIDTH NECESSARY TO PROVIDE A 1-PIPE DIAMETER MINIMUM WORKING SPACE BETWEEN THE PIPE AND THE TRENCH WALLS FOR PROPER PIPE INSTALLATION, JOINING, AND BEDDING.
    - i) TRENCH WIDTH SHALL BE MAINTAINED TO WITHIN THREE (3) INCHES OF THAT SPECIFIED ON PLANS.
      - 1) TRENCH ALIGNMENT SHALL BE SUFFICIENTLY ACCURATE TO PERMIT PIPE TO BE ALIGNED PROPERLY WITH A 6-INCH MINIMUM CLEARANCE BETWEEN THE PIPE AND THE SIDEWALLS OF THE TRENCH.
        - a) THE TRENCH SIDEWALL SHALL NOT BE UNDERCUT IN ORDER TO OBTAIN CLEARANCE.
    - j) CONTRACTOR SHALL OVER-EXCAVATE A MINIMUM OF SIX (6) INCHES BELOW THE BOTTOM OF THE PIPE WHEREVER THE TRENCH BOTTOM IS CONSIDERED TO BE BEDROCK OR OTHER UNSUITABLE MATERIAL.
      - 1) OVER-EXCAVATED SHALL BE BACKFILLED AND COMPACTED WITH ACCEPTABLE STABILIZATION MATERIAL.
    - k) WHERE INSTALLING PIPE OR CONDUIT, EXCAVATE OR REMOVE ROCK TO SIX INCHES BELOW THE REQUIRED ELEVATION.
      - 1) BACKFILL WITH CRUSHED STONE OR GRAVEL.
      - 2) HAND TRIM FOR BELL AND SPIGOT PIPE JOINTS.
      - 3) SUPPORT PIPE DURING PLACEMENT.
    - l) BACKFILL SYSTEMATICALLY, AS EARLY AS POSSIBLE, TO ALLOW MAXIMUM TIME FOR NATURAL SETTLEMENT.
    - m) DO NOT BACKFILL TRENCHES UNTIL TESTING THAT IS REQUIRED BY APPLICABLE CODES HAS BEEN CONDUCTED AND APPROVED.
    - n) STOCKPILING EXCAVATED MATERIALS
      - 1) SUITABLE MATERIAL FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER, AND A MINIMUM OF TWO (2) FEET FROM THE EDGE OF THE TRENCH.
      - 2) EXCESS EXCAVATED MATERIALS NOT SUITABLE OR NOT REQUIRED FOR BACKFILLING SHALL BE REMOVED AND DISPOSED OF OFFSITE BY THE CONTRACTOR.
      - 3) EXCAVATED MATERIAL SHALL NOT BE STOCKPILED AGAINST EXISTING STRUCTURES OR APPURTENANCES.
    - o) PREPARATION OF TRENCH BOTTOM.
      - 1) TRENCH BOTTOMS SHALL BE GRADED UNIFORMLY TO PROVIDE CLEARANCE FOR EACH SECTION OF PIPE.
      - 2) LOOSE MATERIAL, WATER, AND FOREIGN OBJECTS SHALL BE REMOVED FROM THE TRENCH.
      - 3) THE CONTRACTOR SHALL PROVIDE A FIRM SUB GRADE, WHICH IS SUITABLE FOR APPLICATION OF BEDDING MATERIAL.
      - 4) WHEREVER UNSTABLE MATERIAL IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SAID MATERIAL SHALL BE OVER-EXCAVATED TO A DEPTH SUITABLE FOR CONSTRUCTION OF A STABLE SUB-GRADE.
        - a) THE DEPTH SUITABLE FOR CONSTRUCTION OF A STABLE SUB GRADE SHALL BE DETERMINED BY THE ENGINEER.
        - b) THE OVER-EXCAVATION SHALL BE BACKFILLED WITH STABILIZATION MATERIAL AND COMPACTED AS REQUIRED BY THE ENGINEER.
- D. DEWATERING
  - 1. PREVENT SURFACE WATER AND SUBSURFACE OR GROUND WATER FROM FLOWING INTO EXCAVATIONS AND FROM FLOODING PROJECT SITE AND SURROUNDING AREA.
  - 2. AT NO TIME WILL PERSONNEL BE ALLOWED IN THE TRENCH UNLESS SUCH ENTRY COMPLIES WITH OSHA GUIDELINES AND WITH APPLICABLE STATE AND LOCAL REGULATIONS.
  - 3. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS.
  - 4. ANY WATER SUSPECTED OF BEING CONTAMINATED IS TO BE BROUGHT TO THE ATTENTION OF MURPHY OIL USA, INC.
  - 5. REMOVE WATER TO PREVENT SOIL CHANGES DETRIMENTAL TO THE STABILITY OF SUB-GRADES.
  - 6. PROVIDE AND MAINTAIN PUMPS, WELL POINTS, SUMPS, SLOTON AND DISCHARGE LINE, AND OTHER DEWATERING SYSTEM COMPONENTS NECESSARY TO CONVEY WATER AWAY FROM EXCAVATIONS.
  - 7. ESTABLISH AND MAINTAIN TEMPORARY DRAINAGE DITCHES AND OTHER DIVERSIONS OUTSIDE EXCAVATION LIMITS TO CONVEY RAIN WATER AND REMOVED FROM EXCAVATIONS TO COLLECTION OR RUN-OFF AREAS.
  - 8. DO NOT USE TRENCH EXCAVATIONS AS TEMPORARY DRAINAGE DITCHES.
  - 9. MAINTAIN WATER ON SITE, IF REQUIRED BY THE LOCAL AUTHORITY.
  - 10. TRENCHING
    - a) ALTHOUGH IT IS NOT ANTICIPATED THAT PIPING TRENCHES WILL BE EXCAVATED BELOW THE WATER TABLE, ALL TRENCHES SHOULD BE KEPT FREE FROM EXCESS GROUNDWATER DURING CONSTRUCTION.
    - b) ANY WATER WHICH IS ENCOUNTERED IN THE TRENCH SHALL BE REMOVED TO THE EXTENT NECESSARY TO PROVIDE A FIRM SUB GRADE AND PERMIT JOINTS TO BE MADE IN THE PIPING, AND TO PREVENT UNDERMINING OF WATER INTO THE PIPELINE.
    - c) SURFACE RUNOFF SHALL BE PREVENTED TO KEEP TRENCHES FREE FROM WATER, AS NECESSARY.
    - d) WATER SHALL NOT BE DISCHARGED FROM A TRENCH WITHOUT THE APPROVAL OF THE ENGINEER.
    - e) WATER SHALL BE PUMPED FROM THE TRENCH TO A HOLDING TANK FOR FUTURE TREATMENT, IF NECESSARY.
    - f) CONTRACTOR SHALL TREAT THE DISCHARGED WATER TO REMOVE VOLATILE CONTAMINANTS TO CONCENTRATIONS WITHIN LIMITS PRESCRIBED BY REGULATORY AUTHORITIES PRIOR TO DISPOSAL OF THE WATER.
    - g) THE CONTRACTOR MUST DISCHARGE TREATED WATER IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND ORDINANCES IN A MANNER WHICH PREVENTS DAMAGE TO PERSONAL PROPERTY.
    - h) THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 24 HOURS PRIOR TO HIS INTENT TO DISCHARGE WATER.
    - i) WATER SAMPLES MAY BE COLLECTED BY THE ENGINEER TO VERIFY CONTAMINANT CONCENTRATIONS.
    - j) THE CONTRACTOR SHALL PROVIDE DISCHARGE SAMPLES TO THE ENGINEER AS REQUESTED.
    - k) THE CONTRACTOR IS RESPONSIBLE FOR SECURING AND COMPLYING WITH ALL PERMITS AS REQUIRED BY f) ABOVE.

DIVISION 31 – EARTHWORK (CONTINUED)

- E. BACKFILL
  - 1. BEFORE COMPACTING, MOISTEN OR AERATE EACH LAYER OF BACKFILL AS REQUIRED TO OBTAIN OPTIMUM MOISTURE CONTENT TO ATTAIN REQUIRED COMPACTING DENSITY.
    - a) CINDERS, ASHES, ORGANIC MATTER, RUBBISH, OR OTHER DELETERIOUS MATERIALS WILL NOT BE PERMITTED.
    - b) PLACE FILL IN LAYERS NOT MORE THAN EIGHT INCHES IN LOOSE DEPTH.
  - 2. ROLL AREAS WITH SOILS CONTAINING CLAY OR SILT (COHESIVE SOILS) UNDER PAVING AND BUILDINGS WITH A SHEEP'S FOOT ROLLER.
    - a) COMPACT FILL WITH COHESIVE MATERIALS TO A DENSITY EQUAL TO 95 PERCENT OF RELATIVE DENSITY AS DETERMINED BY ASTM D 698.
    - b) DETERMINE FIELD DENSITY FOR COHESIVE SOILS BY THE SAND CONE METHOD FOLLOWING ASTM D 1556.
  - 3. ROLL AREAS WITH SOILS CONTAINING SAND AND GRAVEL (COHESION-LESS SOILS) UNDER PAVING AND BUILDINGS WITH EITHER A THREE WHEEL TEN TON VIBRATOR ROLLER OR SEVEN TON TRACTOR.
    - a) COMPACT FILL WITH COHESION-LESS SOILS TO A DENSITY EQUAL TO 65 PERCENT OF RELATIVE DENSITY AS DETERMINED BY ASTM D 4254.
    - b) DETERMINE FIELD DENSITY FOR COHESION-LESS SOILS BY THE RUBBER BALLOON METHOD FOLLOWING ASTM D 2167.
  - 4. THE OWNER MAY EMPLOY AND PAY FOR AN INDEPENDENT TESTING LABORATORY TO PERFORM ANY TEST OR INSPECTION TO SHOW COMPLIANCE WITH THESE SPECIFICATIONS. IF TESTS INDICATE WORK DOES NOT MEET SPECIFIED REQUIREMENTS, REMOVE WORK, REPLACE, AND RETEST WITHOUT ADDITIONAL COST TO THE OWNER.
  - 5. BACKFILL FOR UNDERGROUND STORAGE TANKS IS SPECIFIED ON THE TANK INSTALLATION DRAWINGS.
  - 7. TRENCHING
    - a) BACKFILLING WITH SAND OR PEA GRAVEL TO A DEPTH OF FOUR INCHES ABOVE THE TOP OF THE CONDUIT.
      - 1) DO NOT USE SAND IN CONJUNCTION WITH FILTER FABRIC.
      - 2) VOIDS BETWEEN CONDUITS WILL NOT BE PERMITTED.
      - 3) CLEAN EARTH MAY BE SUBSTITUTED FOR SAND WHEN THE TRENCH CONTAINS ONLY ONE CONDUIT.
    - b) COMPRESSED AIR AND POTABLE WATER PIPING
      - 1) LAY PIPING ON A FOUR INCH COMPACTED BEDDING OF CLEAN SAND OR PEA GRAVEL.
      - 2) CONTINUE SAND BACKFILL TO A DEPTH OF FOUR INCHES ABOVE THE TOP OF THE PIPE.
    - c) SEWER PIPING
      - 1) LAY SEWER PIPING SUPPORTED CONTINUOUSLY ON A SIX INCH COMPACTED BEDDING OF GRAVEL OR CRUSHED STONE OF WHICH 100 PERCENT WILL PASS THROUGH A 1/2 INCH SIEVE.
      - 2) SHAPE BEDDING FOR CLEARANCE OF ALL JOINTS AND FITTINGS, TAMPED IN PLACE, AND GRADED EVENLY TO ENSURE A UNIFORM BEARING FOR THE LENGTH OF THE PIPE.
      - 3) DO NOT SUPPORT PIPING BY BLOCKS, PLANKS, OR KINDS OF BEDDING MATERIAL.
    - d) BACKFILL ONLY AFTER PIPING AND APPURTENANCES HAVE BEEN INSPECTED, TESTED AND APPROVED.
      - 1) PROVIDE GRANULAR BACKFILL MATERIAL FREE OF STONES LARGER THAN THREE INCHES IN DIAMETER, NON-CORROSIVE AND NON-ORGANIC IN NATURE.
      - 2) DO NOT USE MATERIAL WITH CINDERS, BUILDING MATERIALS, WASTE, OR RUBBISH.
      - 3) DO NOT USE FROZEN OR SLIT-FROZEN BACKFILL MATERIALS.
      - 4) BACKFILL AROUND PIPE TO A DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE IN LAYERS.
      - 5) USE GRAVEL OR CRUSHED STONE OF WHICH 100 PERCENT WILL PASS THROUGH A 1/2 INCH SIEVE.
      - 6) INSTALL IN LAYERS NOT TO EXCEED FOUR INCHES IN DEPTH.
      - 7) TAKE CARE NOT TO DAMAGE THE PIPE OR DAMAGE ANY PIPE COATING.

DIVISION 33 – UTILITIES

- A. MONITORING WELLS
  - 1. REFER TO DRAWING F-4.
- B. LIQUID FUEL DISTRIBUTION
  - 1. GENERAL
    - a) PRIMARY PRODUCT PIPING TO BE AS PER SHEET F-5 AND F-6.
    - b) STEEL PIPE TO BE SCHEDULE 40 BLACK STEEL.
    - c) ALL PIPING AND SEALANT TO BE ALCOHOL COMPATIBLE.
    - d) GASOLINE SOFT SET SHALL BE USED ON ALL STEEL PIPE FITTINGS AND THREADED METAL CONNECTIONS.
    - e) TANK VENTS
      - 1) ALL TANKS VENTS SHALL BE UPP PIPING.
      - 2) RISERS WILL BE SCHEDULE 40 BLACK STEEL.
      - 3) REFER TO DETAILS F-4 AND F-5 FOR SIZING.
      - 4) CANOPY MANUFACTURER SUPPLIES IN-COLUMN PORTION OF TANK RISER.
      - 5) IN ILLINOIS ONLY, THE DIESEL COMPARTMENT WILL BE VENTED INSIDE THE CANOPY COLUMN AND THE GASOLINE GRADES WILL BE VENTED EXTERNALLY ON A COMMON FACE OF THE DESIGNATED COLUMN.
    - f) VENT AND VAPOR RECOVERY PIPING MUST SLOPE AT A MINIMUM RATE OF 1/8" PER FOOT.
- C. UNDERGROUND FUEL-STORAGE TANKS
  - 1. GENERAL
    - a) EXCAVATE FOR, SET AND FILL AROUND UNDERGROUND TANKS AS SHOWN ON DRAWINGS AND SPECIFICATIONS.
    - b) FOLLOW TANK SET PROCEDURES LISTED BELOW.
    - c) TANKS ARE TO BE BALLED WITH CLEAN, FRESH WATER AND FILLED TO CAPACITY (SEE PROCEDURES BELOW). CONTRACTOR IS COMPLETELY RESPONSIBLE FOR THE FURNISHING OF WATER AND ASSOCIATED COSTS WHETHER PROVIDED BY A TANKER TRUCK, BY HYDRANT OR OTHERWISE.
    - d) FILL THE LARGE COMPARTMENT OF SPLIT TANK 50% BEFORE INTRODUCING BALLAST WATER TO THE SMALL COMPARTMENT.
    - e) AFTER FILLING SMALL COMPARTMENT, FILL REMAINDER OF LARGE COMPARTMENT.
    - f) DISPOSE OF CLEAN BALLAST WATER AS DIRECTED BY LOCAL AUTHORITIES.
    - g) DO NOT REMOVE BALLAST UNTIL INSTALLATION OF TANK SLABS HAS CURED FOR SEVEN (7) DAYS.
    - h) HAND PUMP ANY WATER AT THE BOTTOM OF TANKS PRIOR TO INTRODUCTION OF PRODUCT.
    - i) SUFFICIENT WATER BALLAST AND BACKFILL MATERIAL MUST BE AVAILABLE ON SITE TO COMPLETE THE SETTING OF TANKS IN ONE DAY.
    - j) NO TANK SETTING SHALL BE SCHEDULED FOR ANY FRIDAY WITHOUT PRIOR ARRANGEMENT WITH MURPHY OIL USA, INC. INSPECTOR.
    - k) PROVIDE 2" TEMPORARY VENTS UNTIL PERMANENT VENTING IS OPERATIONAL.
    - l) THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE EXCAVATION IN A DEWATERED STATE DURING THE ENTIRETY OF CONSTRUCTION.
      - 1) BERMING OF THE EXCAVATION SHALL BE PROVIDED WHERE SURFACE DRAINAGE MAY ENTER THE OPEN TANK CAVITY.
    - m) WHERE THIS DRAWING IS IN CONFLICT WITH THE LOCAL REGULATIONS NOTIFY MURPHY OIL USA, INC.
      - 1) LOCAL REGULATIONS WILL SUPERSEDE DRAWINGS IF MORE STRINGENT.
    - n) SUPPLY MURPHY OIL USA, INC. WITH AS-BUILT PLANS.
    - o) BACKFILL
      - 1) USE PEA GRAVEL (ROUNDED PARTICLES) WITH A MINIMUM DIAMETER OF 1/8" AND MAXIMUM DIAMETER OF 3/4".
      - 2) IF APPROVED AS A SUBSTITUTE FOR PEA GRAVEL, STONE CRUSHINGS SHOULD BE WASHED AND FREE FLOWING ANGULAR PARTICLE SIZE SHOULD BE BETWEEN 1/8" AND 1/2" AND MUST MEET ASTM C-33 PARAGRAPH 9.1 REQUIREMENTS.
      - 3) NO MORE THAN 5% OF BACKFILL MATERIAL SHALL PASS THROUGH A NUMBER 8 SIEVE.
      - 4) SUPPLY QUARRY CERTIFICATION.
    - p) TANK TEST
      - 1) TANKS MUST BE TESTED ACCORDING TO CURRENT MANUFACTURER'S PROCEDURES.
      - 2) AFTER COMPLETION OF ALL YARD PAVEMENT WORK, INCLUDING TANK PADS AND PUMP ISLANDS, AN APPROVED PRECISION TANK TEST SHALL BE PERFORMED ON THE TANK, ULLAGE, PRODUCT AND VENT LINES (NITROGEN TEST FOR VAPOR RECOVERY PIPING) AT THE EXPENSE OF MURPHY OIL USA, INC.
      - 3) CONTRACTOR SHALL COMPLETE THE TANK MANUFACTURER'S CHECKLIST AND SUBMIT THIS LIST TO THE OWNER'S REPRESENTATIVE.
    - q) SUMPS
      - 1) FIBERGLASS SUMP UNITS ARE TO BE SEALED PER MANUFACTURER INSTALLATION INSTRUCTIONS.
      - 2) EACH SUMP SHALL BE FILLED WITH WATER FOR 24 HOURS BEFORE BACKFILL TO VERIFY WATER TIGHT.

Order Plans

CONTRACTOR SHALL REVIEW THE GEOTECHNICAL REPORT AND ALL CIVIL DOCUMENTS. THE GEOTECHNICAL REPORT AND CIVIL DOCUMENT SUPERCEDE ANY OF THE STANDARD SPECIFICATIONS ON THIS SHEET.

FS-3  
WAYNE  
OCTOBER 2017  
STANDARDS



SPECIFICATIONS

DATE: MARCH, 2018	FILE NAME: 04-Moc800616_FS-3
SCALE: N/A	DATE:
No.:	REVISION:

508 SC - 72  
GREENWOOD SOUTH CAROLINA

**Galloway**  
Planning, Architecture, Engineering  
6162 S. Wilcox Drive, Suite 330  
Greenwood Village, CO 80111  
303.770.8500  
www.gallowayUS.com



**MURPHY OIL USA**

MURPHY OIL U.S.A. INC.  
200 EAST PEACH STREET  
EL DORADO, ARKANSAS 71730