Section 206

Excavation and Backfill for Culverts

PRECONSTRUCTION

The materials and geology programs of the department are available for consultation for any problems incurred during this work.

Stake the sites as set forth in Chapter 10 of this Manual. The staking should be completed before advertising the project. Document the staking for culverts and leave room for documentation of the installation.

It should be noted that the staked length, length, end of culvert, flow line at ends are indicative of the pipe without end treatment, such as flared ends. Reference stakes will reference the end of the culvert not any attachment.

Reinforced Concrete Pipe and Corrugated Metal Pipe will be staked to the nearest 2' increment while excavation will be done as set forth in the contract.

Slope staking should be in place by the time culvert staking takes place.

EQUIPMENT

The following equipment will be required for inspection purposes:

1. Staking/grade setting equipment.
2. Tape Measure.
3. Hand Level.
5. Equipment for testing density of backfill or concrete testing equipment.
6. Documentation Resource

INSPECTION

The following items in addition to the staking data should be noted in the culvert documentation prior to installation:

1. Station
2. Planned diameter and type of culvert
4. Planned flow inlet and outlet elevation.
5. Date staked.
6. CMP heat treatment number

When excavating for culverts, unless there is to be a bedding material placed under the
culvert, excavate no farther than finish grade for the base of the culvert to sit on. If culverts have bells and spigots on there are to be placed, the contractor should establish a template to allow the lowering of the bell into the grade so that the entire base of the culvert rests on grade.

Before beginning backfill verify that grade hubs are undisturbed, alignment is true and flow line is as staked.

**CULVERT SUBEXCAVATION**

Culvert subexcavation can be attributed to any of the following circumstances:

1. Discovery of rock upon which the culvert would directly rest. Remove rock for a minimum depth of 6 inches and replace with granular fill, compacted to grade.
2. Discovery of soft yielding subgrade. Replace with compacted granular backfill for a minimum of 6 inches deep.
3. When any of these conditions are encountered on large culvert installations, consult the geology program to ascertain the correct means of remedying the bedding or foundation for the culvert.

When culvert subexcavation is encountered or required, and the item is not set up as a pay item, then a contract amendment will be executed to provide payment to the contractor for the extra work.

**BACKFILLING**

Ensure that the backfill is properly placed. Special care will be taken when beginning the backfill so that material is evenly distributed around the bottom portion of the circumference of the culvert. This precludes the raising of the culvert, lateral movement of the culvert and/or possible crushing of the culvert.

Backfill the sides of the culvert evenly by either alternate backfilling the sides or simultaneously backfill both sides of the culvert.

Ensure that sufficient backfill has been placed to carry construction loads without compromising the structural integrity of the newly installed culvert(s). When in doubt or any question arises, discuss with supervisor, who in turn may contact the bridge or geology programs for opinions.

Measure culvert length before backfilling begins.

Test and establish density family of curves at various culvert locations.
Record each installation in the project records as it is worked on, dating each location as it is complete, verifying measurements and staked data.

Dimensions of excavation areas should be entered as placement comments. If the quantities are computed in a different location (such as a field book or survey file) note the location of the computations as a remark in the electronic files.

Be sure to delineate differences in volumes of material between culvert excavation and subexcavation regardless of whether or not agreement has been reached on how to pay for any extra work.

SAFETY

Use the following safety equipment:
1. Hard Hat and Vest
2. Eye Protection and Hearing protection as required
3. Enter culvert excavations only when required for inspection purposes. When a competent person is on site follow all recommendations made by that person.
4. Do not enter excavations where required shoring or trench boxes are not in place.
5. Remain vigilant regarding proximity to excavation edges and back filling operations.