

Section 601 Water Consolidation Specs

601.4.2 Bedding: Bedding shall consist of granular material containing no pieces larger than 1 ½ inches and free of broken concrete, broken pavement, wood or other deleterious material. Open graded rock will not be used without the written approval of the Engineer.

Where **water consolidation** is used, bedding for conduits, 24 inches or less in I.D., may be placed in one lift. For larger conduits the first lift shall not exceed the springline of the pipe.

Where mechanical compaction is used, the moisture content shall be such that the specified compaction can be obtained. The first lift shall be 8 inches or two-thirds of the distance to the springline whichever is greater. Succeeding lifts shall not exceed 2 feet loose and extreme care will be taken to prevent damage to or movement of the conduit by the compaction equipment.

601.4.3 Backfill: Backfill shall be sound earthen material free from broken concrete, broken pavement, wood or other deleterious material. Unless otherwise specified, this may be native material with no piece larger than 4 inches, select material or aggregate base course. Backfill under street pavement shall be constructed per Detail 200-1 with the type of replacement noted on the plans or in the special provisions. Unless otherwise noted, backfill under single curb, curb and gutter, sidewalk, driveways, valley gutters, etc. shall be the same as the adjacent street pavement.

~~Where water consolidation is used, backfill will be placed in lifts as required in the following table prior to settlement.~~

Trench Width	Backfill Lifts
18" to 24"	Not to exceed 4'
25" to 36"	Not to exceed 6'
Over 36"	Not to exceed 8'

Comment [RTH1]: This only applies to flooding based on the succeeding sentence.

~~The above backfill lift limitations are not applicable when water saturation is done by the jetting method.~~

Comment [RTH2]: Since flooding is not an acceptable consolidation method, this and the preceding paragraph should be deleted.

Where mechanical compaction is used, backfill shall be placed in lifts the height of which shall not exceed that which can be effectively compacted depending on the type of material, type of equipment and methods used, and under no circumstances shall exceed 4 feet.

Backfill, around utilities that are exposed during trench excavation, shall be placed in accordance with the bedding methods.

301.3 RELATIVE COMPACTION:

The subgrade shall be scarified and loosened to a depth of 6 inches. Rock 6-inches or greater in size that becomes exposed due to scarification shall be removed from the scarified subgrade. When fill material is required, a layer of approximately 3 inches may be spread and compacted with the subgrade material to provide a better bond. The subgrade cut and fill areas shall be constructed to achieve a uniform soil structure having the following minimum compaction, measured as a percentage of maximum dry density when tested in accordance with AASHTO T-99, Method A, and T191 or ASTM D6938 with the percent of density adjusted in accordance with the rock correction procedures for maximum density determination, ARIZ-227c¹ to compensate for the rock content larger than that which will pass a No. 4 sieve. Unless otherwise noted in the project plans or project specifications, compaction shall be performed within 2 percentage points of the optimum moisture content.

(A) Below pavement, curb and gutter, attached sidewalk, roadway shoulders, and other areas within right-of-way subject to vehicular traffic 95 percent

(B) Below detached sidewalk not subject to vehicular traffic 85 percent

TABLE 601-2				
MINIMUM TRENCH COMPACTION DENSITIES				
Backfill Type	Location	From Surface To 2 feet Below Surface	From 2 feet Below Surface To 1 foot Above Top of Pipe	From 1 foot Above Top of Pipe to Bottom of Trench
I	Under any existing or proposed pavement, curb, gutter, attached sidewalk, roadway shoulders, and other areas within right-of-way subject to vehicular traffic or such construction included in the contract, or when any part of the trench excavation is within 2-feet of existing pavement, curb, gutter the above	100% for granular 95% for non-granular	90%	90%
II	On any utility easement or on any street, road or alley right-of-way outside limits of (for Type I) backfill.	85%	85%	90%
III	Around any structures or exposed utilities.	95% in all cases		

Comment [RTH3]: Revised description to coordinate with section 301.3(A) description.

Comment [RTH4]: Revised description to coordinate with section 301.3(B) description.

Note: The type required will generally be shown on the plans and the plans will govern. Where no type is shown on the plans, the type shall comply with Table 601-2.

601.4.5 Compaction Methods: **Water consolidation** by **jetting** shall be accomplished with a 1 ½ inches pipe of sufficient length to reach the bottom of the lift being settled with adequate hose attached and a water pressure of not less than 30 psi. All **jetting** shall be accomplished **trans**versely across the trench at intervals of not more than 6 feet with the **jetting** locations on one side of the trench offset to the **jetting** locations on the other side of the trench. The entire lift shall be leveled and completely saturated working from the top to the bottom.

Jetting shall be used as the consolidation method for all conduit bedding. The **contractor** shall be entirely responsible for establishing each lift depth so as to avoid floating the conduit being placed and shall make any repair or replacement at no cost to the Contracting Agency. However, for conduit larger than 24 inches I.D. the first lift shall not exceed the springline of the conduit.

Flooding is not acceptable as a **water consolidation** method unless authorized in the specification or by a written change order. It will consist of the inundation of the entire lift with water and then puddle with poles or bars to insure saturation of the entire lift.

Where **jetting** or **flooding** is utilized and the surrounding material is such that it does not permit proper drainage, the Contractor shall provide, at his expense a sump and a pump at the downstream end to remove the accumulated water.

The use of **water consolidation** does not relieve the Contractor from the responsibility to make his own determination that such methods will not result in damage to existing improvements. The Contractor shall be responsible for any damage incurred.

Where **water consolidation** is not permitted or does not result in adequate compaction, the backfill material shall be compacted with hand and/or mechanical work methods using equipment such as rollers, pneumatic tamps, and hydro-hammers or other approved devices which secure uniform and required density without injury to the pipe or related structures.

Where Type I backfill is required, ~~water consolidation will shall not only be permitted when the material in which the trench is located and the backfill material both are for non-granular material with a, except in the following situation. In a new development prior to paving and prior to opening the area to public traffic, water consolidation, will be permitted for non-granular material at the Contractor's discretion and responsibility.~~

601.4.6 Specifications for Granular Material: ~~For purposes of this specification, granular material shall mean material for which the sum of the~~ plasticity index not exceeding 5 and the percent of the material passing a No. 200 sieve ~~shall does~~ not exceed 23~~20~~. The plasticity index shall be tested in accordance with AASHTO T-146 Method A (Wet Preparation), T-89 and T-90.

No except will be made for construction within new developments.