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**SECTION 2  
TRENCHING, BACKFILLING AND COMPACTING FOR UTILITIES**

**2.1 GENERAL**

The provisions of this section shall be applicable to all underground utility installations including water, sewer, reclaimed water and storm sewer piping, unless prior approval is obtained for alternate methods from the City of Groveland Public Works Director.

The Contractor shall examine the site, review any available geotechnical data and undertake whatever additional subsurface investigations deemed necessary, taking into consideration all conditions that may affect the work including seasonal high water levels. The City will not assume responsibility for variations in subsoil quality or water table.

**2.2 MATERIALS**

2.2.1 Sheeting and Bracing

- A) No wood sheeting shall be left in place.
- B) Steel sheeting to be left in place shall be as specified in ASTM Designation A328.

**2.3 WORKMANSHIP**

2.3.1 Trench Dimensions

The allowable width (minimum and maximum) of trenches shall vary according to the outside diameter of the pipe, as indicated on the standard details sheets for differing conditions of construction.

2.3.2 Utility Bedding

- A) Type A (Special Utility Bedding): Special bedding may be required due to depth of cover, impact loadings, or other conditions. Use of Type A bedding shall be determined in the field as directed by the City. Type A bedding methods and materials shall receive prior approval by the City.
- B) Type B (Normal Utility Bedding): The bottom of the trench shall be shaped to provide firm bedding for the pipe. The pipe shall be firmly bedded in undisturbed soil, to a minimum of two feet below the trench bottomhand shaped so that the pipe will be in continuous contact for its full length. Compaction on the sides and over the pipe shall be as shown on the standard details.

2.3.3 Unsuitable Material Below Trench Grade

Soil unsuitable for a proper foundation encountered at or below trench grade, such as muck or other deleterious material, shall be removed for the full width of the trench and to the depth required. Backfilling below trench grade shall be in compliance with the applicable provisions of subsection 2.41 "Backfill".

#### 2.3.4 Extra Utility-Bedding Material

When rock or other non-cushioning material is encountered at trench grade, excavation shall be extended to 6 inches below the outside of the bottom of the utility, and a cushion of sand shall be provided to fully cover the pipe or fittings to a minimum depth of 12”.

#### 2.3.5 Sheeting and Bracing

In order to prevent damage to property, injury to persons, erosion, cave-ins, or excessive trench widths, adequate sheeting and bracing shall be provided in accordance with standard practice and in accordance with all safety, protection of property, and other applicable laws and regulations, including the Florida Safe Trench Act.

A temporary trench box shoring system may be used provided it meets the requirements specified herein and in the contract drawings.

#### 2.3.6 Excavated Material

Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available at a safe distance to minimize collapse of the trench wall. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used. No excavated material shall be placed on private property without written permission of the property owner.

#### 2.3.7 Material Disposal

Excess, unsuitable, or cleared or grubbed material resulting from the utility installation shall be removed from the work site and disposed of at locations secured by the Contractor. Excess excavated material shall be spread on the disposal site and graded and grassed in such a manner as to drain properly and not disturb existing drainage conditions, runoff into or siltation of waterways.

#### 2.3.8 Borrow

Should there be insufficient satisfactory material from the excavations to meet the requirements for fill material, borrow materials shall be obtained from pits secured by the Contractor and approved by the City.

#### 2.3.9 Dewatering

Utility piping shall be installed “in the dry” unless otherwise approved. Dewatering systems shall be used in accordance with good standard practice and must be capable of lowering the water level in advance of the excavation and maintain it continuously to keep the trench bottom and sides firm and dry. Any Dewatering equipment to be used in a residential area shall be equipped with a sound attenuating enclosure and approved by the City. The Contractor shall be responsible for obtaining permits and meeting the requirements of applicable regulatory agencies for all dewatering

operations. Groundwater shall be maintained at a level of two feet minimum, below the bottom of all excavations until backfilling is complete.

### 2.3.10 Existing Utilities and Structures

The Contractor shall be responsible for locating and protecting all existing utilities and structures prior to commencing any construction and shall notify utilities companies sufficiently in advance for them to make the necessary arrangements for field location of existing utilities. Extreme caution shall be exercised when crossing or working alongside existing utilities and structures to avoid damage. In the event existing utilities or structures are damaged, the Contractor shall cooperate, provide all necessary manpower, equipment and materials to assist the utility owner in repairing the damage and restore the service as soon as possible. It shall be the Contractor's further responsibility to coordinate relocation, disruption of service. No utility service shall be disrupted without the prior approval of the utility owner and sufficient advance notice being provided to affected customers.

### 2.3.11 Backfill

- A) Backfill material shall be clean earth fill composed of sand, or other materials approved by the City. Fill material shall be free from organic matter, muck, marl and rock exceeding 2½ in diameter or other deleterious materials and shall not contain broken concrete, masonry, rubble or other similar materials.
- B) When trenches are cut in pavements or areas to be paved, compaction shall be as indicated in the standard details. In the absence of specified detailed compaction requirements on the standard details, in paved areas compaction shall be as determined by AASHTO Specification T-180, shall be at least 98% of maximum density, for each 12" backfill lift, compaction in other areas shall not be less than 95% of maximum density. Density tests are required for trenches within pavement, across roads and areas adjacent to proposed building structures.

Backfilling of pipe trench under and around structures shall be, for each 12 inch backfill lift, compacted to 98 percent of maximum density as determined by AASHTO Specification T-180.

One compaction test shall be conducted for each 400 linear feet of pipe and for every 100 square feet of backfill under and around structures, and pavement as a minimum.

- C) If, in the opinion of the City, densities are questionable, additional density tests for determination of compliance with the above specified compaction requirements shall be made by a testing laboratory approved by the City at the expense of the Contractor. Test locations will be determined by the City.
- D) If any test results are unsatisfactory, the Contractor shall re-excavate and re-compact the backfill at his expense until the desired compaction is obtained.

- E) Protective concrete slabs (“shock pads”) shall be installed over the top of trenches, where required, to protect the installed pipe against excessive loads across roadways and river/swamp areas, as required by the City. The use of these shall be considered only after all other feasible means have been exhausted for obtaining the required depth of cover.
- F) Existing sidewalks and driveways removed, disturbed, or destroyed by construction, shall be replaced or repaired by the Contractor at his expense.
- G) All water, reuse and sewer lines must have a continuous metallic tracing tape placed 18” above them, labeled with the appropriate designation of pipe use, as shown in the standard details.
- H) All water mains, reclaimed mains and sewage force mains shall have a continuous type TWH PVC insulated copper conductor (#10 solid single strand wire) strapped to the top of pipe at pipe bells and at least four other equally spaced intervals per pipe length and pulled up into all valve boxes and all meter boxes. Locating wires shall be spliced and taped 12 inches back from the splice to insure electrical continuity for the entire length of constructed pressure main. Refer to the details for additional information. A continuity test shall be conducted by the Contractor prior to acceptance by the City.
- I) Piping shall not be backfilled until inspected and approved by the City.
- J) All piping shall be laid with the lettering facing up for identification purposes.
- K) Trenches shall be backfilled, compacted and graded prior to the end of the work day.

### 2.3.12 Roadway and Pavement Restoration

Open cuts of City streets are not permitted without written approval from the Public Works Director.

- A) Pavement or roadway surfaces cut or damaged shall be replaced by the Contractor to equal or better condition than the original, including stabilization, base course, surface course, curb and gutter, or other appurtenances. The Contractor shall obtain the necessary permits and all applicable authorizations from the proper agencies prior to any roadway work. Additionally, the Contractor shall provide advance notice to the appropriate authority and local emergency services agencies, as required, prior to construction operations.
- B) Restoration shall be in accordance with requirements set forth by the City Public Works Director. The materials of construction and method of installation, along with the proposed restoration design for items not referred to or specified herein, shall receive prior approval from the Public Works Director.
- C) Where existing pavements is removed, the surfacing shall be mechanical saw cut prior to trench excavation, leaving a uniform and straight edge, with

minimum disturbance to the remaining adjacent surfacing. The width of cut for this phase of existing pavement removal shall be minimized.

- D) Immediately following the specified backfilling and compaction, a temporary sand seal coat surface shall be applied to the cut areas. This temporary surfacing shall provide a smooth traffic surface with the existing roadway and shall be maintained on a daily basis until final restoration.
- E) Density tests shall be provided for trenches in pavements across roadways as specified in Section 2.41.

### 2.3.13 Protection and Restoration of Property

During the course of construction, the Contractor shall provide adequate protection to minimize damage to trees, vegetation, surfaced areas, and structures within the construction right-of-way, easement or site, and take full responsibility for repair or replacement of any damage.

Existing trees within the limits of construction that are to remain shall be so noted on the construction plans.

Trenching is not permitted within the root system area of trees that are to remain as shown in the details. If the status of any tree is in question the Contractor shall obtain clarification from a City representative prior to any disturbance of the root system area.

### 2.3.14 Cleanup

Site cleanup and property restoration shall follow immediately behind construction operations. Cleanup shall be done on an ongoing basis as construction proceeds and normally should be complete at the end of the work day. In addition, the foreman, superintendent or other management representative of the Contractor shall insure that the construction area is "safed up" for the protection of the public prior to the end of each workday and prior to the end of the work week.

### 2.3.15 Removal of Pavement, Driveways, Sidewalks, Curbs and Gutters

Edges of permanent pavement shall be pre-cut straight, clean and square beyond any damaged base area, including well point locations. Utility cuts in existing pavements shall be restored as indicated elsewhere in these standards. When the removal of sidewalks, curbs or gutters is necessary for construction, they shall be removed in full sections or a minimum of five feet in length, and all broken edges cut smooth by use of a suitable power saw or other appropriate means.

### 2.3.16 Disposition of Excavated Materials

Broken pavement and other debris shall be removed from the site as soon as practical, unless otherwise directed by the Public Works Department. Excavated materials shall not be stockpiled in the right-of-way during construction without specific approval of the

Public Works Department. All excess materials shall be removed from the work site and disposed of legally by the Contractor at its own expense.

### 2.3.17 Sheeting, Bracing and Shoring

Sheeting, bracing and shoring shall be used as required to support the sides of the excavation and to prevent any movements which can in any way alter the grade or injure the facility being installed, diminish the width of excavation or otherwise injure or delay the work or endanger personnel, adjacent pavements or other structures. Safety procedures shall be followed and adequate protection shall be furnished to all personnel as required by OSHA and other appropriate health and safety standards. All sheeting or bracing which is not to be left in place shall be cut off at a level of one foot above the top of the installed facility and removed in a manner that will not endanger the work, personnel or adjacent structures.

### 2.3.18 Traffic and Utility Controls

Excavation for pipe, structures or cable laying operations shall be conducted in a manner that will cause the least interruption to traffic and existing utilities. To the extent possible, fire hydrants, valve boxes, fire and police call boxes and other utility controls shall be left unobstructed and accessible during the construction period. When such obstruction is unavoidable, it must be held to the minimum, and the affected parties given sufficient notice to allow other provisions to be made.

### 2.3.19 Backfill, Embankment and Compaction

2.3.19.1 Earth Materials. Earth materials for backfill and embankment shall be clean earth fill comprised of sand, sand and clay, gravel crushed rock or other materials from Groups A-1, A-2 or A-3, AASHTO classification, and shall be free from organic matter and vegetation, debris, large clods of earth or stones, and shall be acceptable to the Department of Public Works.

2.3.19.2 Flowable Fill. Where approved, or required by, the Public Works Department, ready-mixed flowable fill consisting of portland cement, aggregates, water and mineral admixtures may be used for beddings, encasements for pipes and for backfill applications for trenches, as an alternate to compacted earth fill. Materials and placement shall comply with FDOT Standard Specifications for Road and Bridge Construction, latest edition. Design information and information on materials shall be provided to the Public Works Department.

2.3.19.3 Crushed Concrete. Where approved by the Department of Public Works, recycled crushed concrete may be used as an alternate material to granular material for road base in trench crossings. Prior to use, gradation and Proctor Test data shall be submitted and approved by the Engineer of Record and the Department of Public Works. Gradation of crushed concrete materials shall comply with the specifications for granular materials. Gradation analyses shall be taken at intervals determined by the Engineer of Record, and approved by the Department of Public Works, or if changing the source of the material, to evaluate the uniformity of materials. Compaction requirements shall be the same as required for granular materials.

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