

# TRENCH AND EXCAVATION STANDARDS

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## 2.0 PURPOSE

The following Standards provide trench configurations and general requirements and guidelines for trenching and excavation for pipe, conduit, box, and vault installations within NVE service territory.

## 3.0 GENERAL


The trench is a critical and integral part of the electrical installation. Trenching needs to be undertaken in a workman-like manner and **must meet all applicable** City, County, State, and Federal Specifications in addition to the requirements of this Standard. In the case of a conflict, the more rigid Specification or Standard shall apply.

## 4.0 TRENCHING GUIDELINES

### 4.1 Trenching Configurations

Trench configuration drawings attached as part of this standard are the typical configurations used by NVE. In cases where a typical configuration does not apply, a trench section drawing shall be provided to the contractor or customer showing necessary dimensions and details. The following general rules apply to all trenches:

- 4.1.1 Backfill:** The top 18 inches minimum of all trenches in streets, highways, or other paved areas shall be backfilled with TYPE II base compacted to 95% maximum density in accordance with NVE Specification SUB01X, Section 5.4.1.

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**4.1.2 Bedding:** Compacted sand bedding shall be placed a minimum of 12 inches above and 6 inches below all pipes and conduits.

**4.1.3 Backfill Option:** Either TYPE II or sand bedding material may be used for backfill material in the trench area between 12 inches above the pipe or conduit, and 12 inches below finish grade. In either case, the material shall be compacted to 90% maximum density in accordance with NVE Specification SUB01X, Section 5.4.

**4.1.4 Warning Tape:** NONMETALLIC RED WARNING TAPE will be 6" wide, marked "NVE Utilities Buried Below" and shall be placed in ALL TRENCHES at least 18" below finish grade and 12" above NVE conduit.

**4.1.5 Conduit Installation:** Primary conduit shall be installed with a minimum clearance of six inches (6") from the sides of the excavation. Secondary electrical conduit shall maintain a one and one-half inch (1-1/2") clearance from other electrical conduits and a minimum clearance of two inches (2") from the sides of the excavation. All electrical facilities shall be installed with a minimum twelve inches (12") of clearance from any other nonelectric joint trench facility (i.e., gas, water, communications, etc.) See TE0003U Note #16 for other requirements.

**4.2 Trench Locations**

Trench locations are typically shown relative to street centerlines, right-of-way lines, or property lines in new and existing developments. It is the responsibility of the contractor or the customer to verify that these reference lines are established and accurate. Where such references are unavailable, alignment shall be established by NVE.

**4.3 Trench Depth**


Depths shown in the standard trench configurations are minimums. For trenches which fall on a side slope, the depth shall be measured from the low side.

**4.4 Dewatering**

Where ground water is encountered during trench excavation, it shall be the responsibility of the contractor or customer to adequately dewater the trench to provide for safe and convenient installation of pipe or conduit. See Section 6.0 of this standard and SUB01X, Section 5.6, for details.

**4.5 Other Utilities/Facilities**

**4.5.1 Joint Trenches:** Joint trench construction shall be by mutual agreement of all parties involved. Coordination of separate utility/ facility installations in a joint trench shall be by the contractor or the customer.

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**4.5.2 Customer facilities** (except fuel / sewage / leach lines) may be installed in a joint trench if (1) approved by all the utilities involved, (2) all clearances are met, and (3) on private property. *No customer facilities will be allowed in joint trenches in franchised right-of-ways.*

**4.5.3 Existing Utilities:** Prior to commencement of excavation, the contractor or customer shall telephone the Underground System Alert (USA) at 811. After existing utilities have been located, extreme caution shall be exercised while excavating in their vicinity. Once exposed, pipes, conduits, and cable shall be shored or supported as necessary to prevent damage. The full cost of repair or replacement of damaged utilities shall be borne by the contractor or customer.

**4.6 Installation Procedures**

Pipes, conduits, and cables shall be installed in the trench, in accordance with the manufacturer’s recommended procedures, NVE Specifications, and/or Standards and accepted practices.

**4.7 Bedding and Backfill**

Pipes, conduits, and cables shall be bedded, and trenches backfilled, in accordance with NVE Specification SUB01X. Conduits/trenches should be backfilled the same day as conduit is installed.

**5.0 SAFETY**

**5.1 Responsibility**

The contractor or customer shall be responsible for initiating, maintaining, and supervising all safety precautions in connection with the implementation of these standards, and shall comply with all applicable laws, rules and regulations of any public authority relative to the safety of persons or property, or their protection from damage, injury, or loss.

**5.2 Shoring or Sloping**

When applicable, trenches shall be shored or their sides sloped, in accordance with NVE Standard GI0003U, and Federal Occupational Safety and Health Act (OSHA) requirements.

**5.3 Excavated Material**


Soil and rock from the trench excavation shall be placed not closer than 24 inches to the edge of the trench.

**5.4 Protective Gear**

All workmen shall have adequate protective gear including, but not limited to, hard hats, gloves, goggles, respirators, boots, etc.

**5.5 Tools and Equipment**

All workmen shall be provided with safe, adequate, and well-maintained tools and equipment, including ladders for trench ingress and egress, in accordance with OSHA requirements.

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**6.0 BOX / VAULT / JUNCTION ENCLOSURE (JE'S) INSTALLATION**

**6.1 Application**

Selection of the correct type of box or vault involves judgment, taking into account the present and future intended traffic use for the area where the box will be located.

- a. H-10, Incidental (light) Traffic: For use in sidewalks, pedestrian traffic areas, where box is placed within 3' of parking lots or driveways where light traffic is expected. For use in private non commercial driveways and parking lots where light vehicular traffic is expected, i.e. driveways in residential subdivisions and parking strips. Incidental Traffic Boxes are not to be installed in traveled areas, i.e. highways, streets, bridges.
- b. H/20 Full Vehicular Traffic: For use in streets, driveways and parking lots where heavy vehicular traffic is expected.
- c. Non-Traffic: For use in areas where there is no current or future exposure to any type of vehicular traffic.

**6.2 Excavation**

Excavation for boxes/vaults/JE's shall be performed by the contractor or customer concurrent with adjacent trench excavation, unless otherwise directed by the NVE Engineer, Planner, or Inspector. Size, depth, and alignment of the excavation shall be as shown on the attached Standard Drawings. Boxes/vaults will be set on a 6" min. base of compacted 3/4" drain rock.

**6.3 Dewatering**


Where ground water is encountered during excavation, it shall be the responsibility of the contractor or customer to adequately dewater the excavation to provide for safe and convenient installation of the box/vault/JE's. See Section 6.0.

**6.4 Installation**

**6.4.1 General:** Boxes/vaults/JE's shall be installed using equipment with adequate load capacity to safely handle the components. No personnel shall be in the excavation during placement. All boxes and vaults shall be set level, squarely aligned with existing or proposed improvements. Exception: the top section/extension/lid may be sloped as stated in Sloped Areas:

**6.4.2 Unpaved Areas:** Boxes/Vaults

- a. Pedestrian Rated: The top section of box/vault will be installed 3" above dirt to accommodate future landscaping. The intent is for the top of box to be 1/2" above final finish grade.
- b. Incidental traffic rated: If box is installed within a 3' radius of driveway or driveway approach apron, the box and surrounding material will match the finish grade of driveway and/ or approach apron.

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- c. H10/H20 traffic rated: Box will be installed 1/2" above finish grade with a 12" X 12" concrete wrap around the top section. Concrete will match the grade at the box and slope away at 1/2" for the 12" (24:1) of concrete wrap where it will match the grade of unpaved material.

**6.4.3 Paved Areas:**


Boxes/Vaults will be installed 1/4" below finish grade with a concrete wrap around the top section of box/vault/extension. Note: The Tahoe area will meet local codes and concrete will be held down and the topping will match road material or local codes.

**6.4.4 Sidewalks:**

Boxes/Vaults will be installed 1/4" above sidewalk if box is installed touching sidewalk and flush if installed in sidewalks.

**6.4.5 Sloped Areas:**

- a. Boxes/Vaults will match the finish grade of driveway/approach if placed within a 3' radius of driveway or driveway approach apron.
  - Box/Vault top section may be sloped and concrete encased with a 12" x 12" section around the top section of box/vault. Reference TE0020U Sloped Box Detail for clarification.
  - The top section of box may be cut to slope, but cut will be limited to the bottom 6" of the top section. The gap or seam between the top section and the first extension will be filled with grout either fine or coarse in accordance with ASTM C-476 with minimum compression strength of 2000 PSI at 28 days.
- b. Boxes/Vaults set outside of the 3' radius in unpaved areas of slopes of 6:1 (10°) or less will be set to match finish grade to accommodate future landscaping. The intent is for the top of box to be at least 1/2" above final finish grade.
  - Alternate method: Level a 3' radius area around the box. For vaults level an area covering a 3' radius on 3 sides and 8' on street or operability side. Note: box/vault will be set 3" above finish grade to accommodate future landscaping. The intent is for the top of the box to be 1/2" above final finish grade.
- c. Boxes/Vaults set in areas with slopes above 3:1 (20°) will be installed per the following criteria:
  - Box will be set level and protected from slopes with a retaining wall supplied and installed by the applicant.
  - The wall will extend at least 3" above cut slope.
  - Front area will be clear of obstacles for at least 3' for boxes and 10' for vaults. This is for operability and working space.
  - Reference TE0040U for retaining wall specifications.
  - Boxes can be set with the provisions listed above in Sloped Areas "7.4.5a".

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- d. Inspector and "on-site" contractor may field determine the proper installation based on customer needs while providing adequate protection for NVE facilities.
- e. Hill holders, (preformed fiberglass or concrete) will be acceptable applications in slopes of 3:1 or less.

**6.5 Bedding and Backfill**

Boxes/vaults/JE's shall be bedded and the surrounding excavation backfilled, in accordance with NVE Specification SUB01X. Class C (3/4") drain rock may be substituted for sand bedding and backfilling of vaults.

**7.0 PAD INSTALLATION**

**7.1 Excavation**

Excavation for pads shall be performed by the contractor or customer concurrent with adjacent trench excavation, unless otherwise directed by the NVE Engineer or Inspector. Size, depth, and alignment of the excavation shall be as shown on Standard Drawings.

**7.2 Dewatering**


Where ground water is encountered during excavation, it shall be the responsibility of the contractor or customer to adequately dewater the excavation to provide for safe and convenient installation of the pads. See Section 6.0.

**7.3 Installation**

Transformer and switch pads shall be installed using equipment with adequate load capacity to safely handle the components. All pads and enclosures shall be set level, squarely aligned with the base at existing or proposed finish grade. The 10' area in front of all pads (equipment doors) shall be level.

**7.4 Bedding and Backfill**

Pads shall be bedded with 8" - 12" Type II subbase, depths as indicated on Standard Drawings, at 95% compaction and the surrounding excavation backfilled, in accordance with NVE Specification SUB01X.

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**8.0 STREET LIGHT INSTALLATION**

**8.1 Excavation**

Excavation for streetlights shall be performed by the contractor or customer concurrent with adjacent trench excavation, unless otherwise directed by the NVE Engineer or Inspector. Size, depth, and alignment of the excavation shall be shown on standard drawings See SLB02U and SLB12U, Standards Volume 17, Section 6. For imbedded poles, see sonotube specification shown on the Work Order Drawing. Note: Sonotube only, NO PVC water or sewer pipe can be used.

**8.2 Dewatering**


Where ground water is encountered during excavation, it shall be the responsibility of the contractor or customer to adequately dewater the excavation to provide for safe and convenient installation of the streetlight substructure, sonotube, or precast base. See Section 6.0.

**8.3 Installation**

Precast streetlight bases shall be installed using equipment with adequate load capacity to safely handle the components. All bases shall be set 3" - 6" above proposed finish grade with bolt pattern aligned for proper arm direction as shown on work order drawings, typically 90° off curb line.

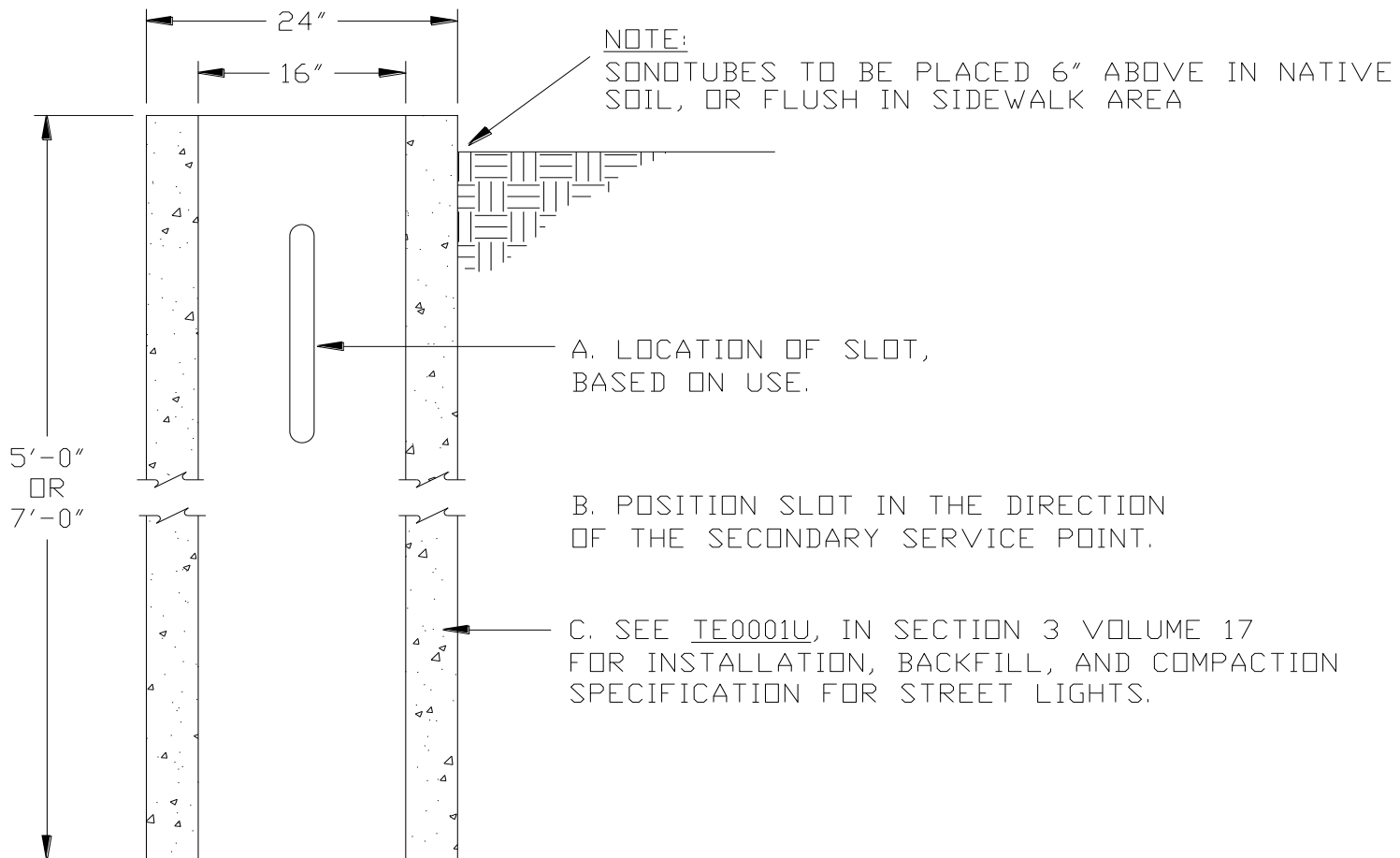
**8.4 Bedding and Backfill**

Streetlights, sonotubes and precast bases shall be bedded with Type II subbase for the full depth of component at 90% compaction surrounding the component at a 2' radius in accordance with NVE Specification SUB01X.

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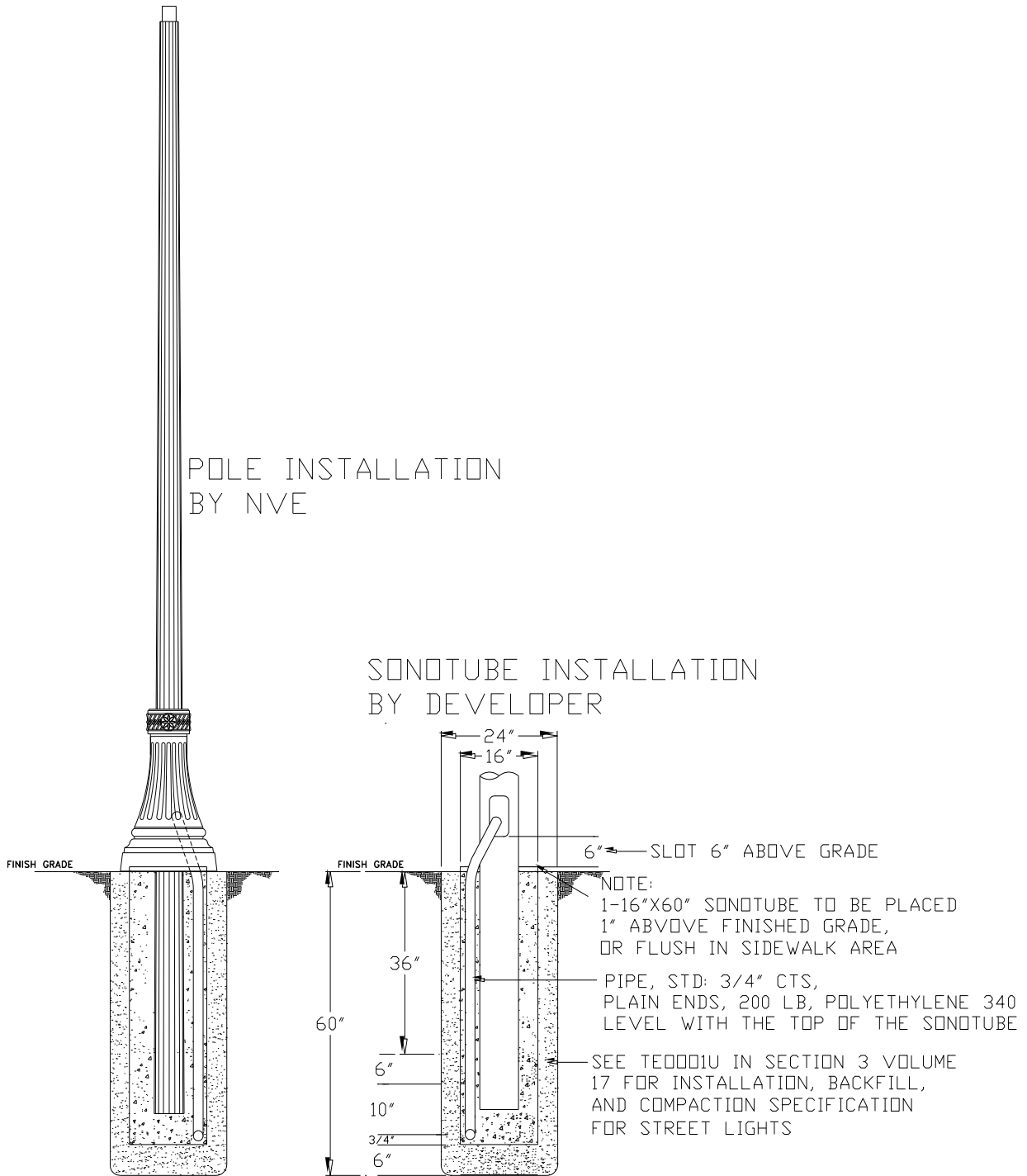
INSTALLATION TABLE FOR STREET LIGHT POLES							
DESCRIPTION	Embedded 30' Steel	Embedded 42' Steel	30' Bolted Base *	Embedded 23' Square Decorative	Embedded 20' Round Concrete	Embedded 34' Round Concrete	Fluted Steel Decorative
STOCK #	28-0830	28-0840	28-0800	28-0750	28-0745	28-0740	28-1106 & 08
POLE INSTALLATION DEPTH	5'	7'	6'	4'-3"	3'-7"	5'-3"	Detail On Next Page
SONOTUBE DIAMETER	16"	16"	N/A	16"	16"	24"	16"
SONOTUBE DEPTH	5 FT	7 FT	N/A	5 FT	5 FT	5 FT	5 FT
SLOT LOCATION FROM TOP OF TUBE	3'-0"	3'-0"	N/A	1'-6"	1'-6"	1'-6"	Detail On Next Page


\* For Reference Only Not For New Construction See SLB 02U Section 6 Volume 17 for Base Detail





**Embedded Decorative Steel Pole Installation  
For 17' and 19' Fluted Decorative Steel Poles.**



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