



Cuiivre River Electric Cooperative

A Touchstone Energy® Cooperative 

1-800-392-3709 Ext. 392

Specification for:

Underground Commercial Electric Distribution

1. Application

This document specifies the minimum requirements an Owner/Developer must meet with the installation of overhead and underground electric facilities for the purpose of Cuivre River Electric Cooperative, Inc. providing electric service to a development. The Owner/Developer will be responsible for correcting or compensating the Cooperative for correcting any installed facilities not in compliance with these specifications. All facilities supplied and installed for the intended use of Cuivre River Electric Cooperative will upon acceptance by the Cooperative become the property of the Cooperative as contributed by the Owner/Developer as an aid to construction for the project.

2. General

2.1 The latest editions of all applicable building and safety codes will be followed in the installation of the electric underground distribution system. The editions include, but are not limited to:

2.1.1 National Electrical Safety Code (NESC)

2.1.2 Local City and County Building and Fire Codes

2.1.3 American Concrete Institute (ACI)

2.2 Upon receipt of necessary information, including but not limited to final project plans, building load sheet(s), building electric service entrance location(s), support service requirements, street lighting, easement restriction and all other information pertinent to utility service the Cooperative will provide a preliminary project plan indicating conduit routing, pull box, switch and transformer locations.

2.3 Prior to construction a meeting will be held to discuss and coordinate construction and inspection procedures and to develop a final electric facility plan.

2.4 Cooperative will require a notarized easement or recorded plat incorporating a ten (10) foot center line easement for all underground primary facilities and an effective thirty (30) foot centerline easement for all overhead facilities prior to Cooperative installing electric facilities.

2.5 Approval for joint use trenches will be determined on an individual basis with spacing requirements of twelve (12) inches horizontal and vertical.

3. Cooperative Responsibility

3.1 Cooperative will provide a conduit circuit diagram, equipment location specifications and any special instructions prior to construction.

- 3.2 Cooperative will provide timely inspections prior to the back filling of all conduit, pull box, switch and transformer locations. **Cooperative reserves the right to bill Developer at the rate of \$75.00 per hour for all man hours associated with second time inspection which fails to meet these specifications.**
- 3.3 Cooperative will inspect all transformer locations prior to pouring of concrete.
- 3.4 Cooperative will coordinate all changes with project manager.
- 3.5 Cooperative will supply and install all primary voltage conductors.
- 3.6 Cooperative will supply pull boxes and switch sleeves to be installed by Developer.
- 3.7 Cooperative will set transformers on pads installed by developer and will make all primary and secondary connections in the transformers.
- 3.8 Cooperative will supply all single service meter bases, current transformers (CTs) and potential transformers (PTs) necessary for electric point of service billing. Developer may provide Cooperative approved meter bases for special applications.

4. Owner/Developer Responsibility

4.1 General

- 4.1.1 Owner/Developer will provide a Site Plan indicating all easements, an Elevation Plan, a Storm Water and Sanitary Sewer Plan and electric load information. Owner/Developer will identify and correct any conflicts between the electric service plan and any other utilities both current and future.
- 4.1.2 Owner/Developer will coordinate the required inspections of all Owner/Developer installed Cooperative facilities.
- 4.1.3 Owner/Developer will coordinate and/or supervise all construction related activities and ensure the security and integrity of all staged and installed materials.
- 4.1.4 Owner/Developer will coordinate all excavation in the area of installed conduits to ensure the integrity of these facilities. Owner/Developer will provide flagged and painted locations for all installed conduits prior to Cooperative installing its conductors. If the responsible party cannot be determined Owner/Developer will be ultimately responsible for any excavation damage to conduits and related facilities.
- 4.1.5 Owner/Developer will provide for testing and specification verification of all installed facilities deemed necessary by Cooperative.

- 4.1.6 Owner/Developer will guarantee the use for the intended purpose of all installed facilities.
- 4.1.7 Owner/Developer will replace, at Owner/Developer's expense, any damaged equipment or correct any work not in compliance with specifications.
- 4.1.8 Owner/Developer will determine and establish the final grade for the development including the final grade at all conduit, pull box and surface mounted equipment locations. Any changes in grade at equipment locations will be approved by and coordinated with Cooperative. Owner/Developer is responsible for staking prescribed locations for Cooperative improvements and equipment.
- 4.1.9 Owner/Developer will ensure that Cooperative equipment is not placed in swales, waterways, or at grades which would allow for surface water to enter the conduit system.
- 4.1.10 Owner/Developer will establish the location and elevations for Cooperative equipment and any reference points to curbs, buildings, or other utilities necessary for Cooperative to verify compatibility of the site.
- 4.1.11 Owner/Developer will install ground sleeves for Cooperative switch gear at specific locations in accordance with attached drawings.
- 4.1.12 Owner/Developer will pour in place or set concrete pads for Cooperative owned transformers utilized for supplying user rated voltage for buildings and other facilities.
- 4.1.13 Owner/Developer will install bollards to protect any Cooperative equipment installed near vehicle use areas as required by Cooperative. Bollards will be six (6) inch x 0.25 inch min. steel pipe set to a height of thirty-six (36) inches and a depth of thirty-six (36) inches in an eighteen (18) inch diameter concrete foundation. Bollards will be concrete filled and capped and painted to owners specifications. Bollards will be placed outside of obstruction free zones as indicated on Cooperative detail sheets.

4.2 Conduit

- 4.2.1 The standard minimum depths for all primary conduits is forty-eight (48) inches to the top of conduit. Cooperative recommends a depth of thirty (30) inches for all secondary conduits.
- 4.2.2 Conduits will transition to an installed depth of seventy two (72) inches at all ground sleeve locations (Cooperative switch locations) in order to allow for 90 degree conduit elbow with a thirty six (36) inch radius to be installed under the sleeves.

- 4.2.3 Installations will maintain a vertical clearance of twelve (12) inches for other utilities crossing the electric conduits or provide bedding, granular backfill, or concrete which prevents vertical pressure from the crossing utility on the electric conduit.
- 4.2.4 Owner/Developer will provide all labor, equipment and material to install a properly glued conduit system. Conduit will be electric grade, schedule 40 or 80 as gray PVC, black PE with one or more red stripes, or rigid galvanized steel. The standard conduit size is six (6) inches.
- 4.2.5 Owner/Developer will install galvanized steel elbows at all ninety (90) degree turns unless Cooperative exempts specific locations. Elbows will have a minimum bend radius of thirty-six (36) inches and a minimum sidewall of schedule 40.
- 4.2.6 Backfilling of conduit trenches under paved areas and backfilling under pad-mounted transformer, pull boxes and switch sleeves will be in accordance with city or county specifications but will be a minimum of two (2) inch clean rock or granular fill compacted to ninety-five (95) percent of the density of surrounding undisturbed soil.
- 4.2.7 All conduit installations will be protected from protruding objects such as rocks and other debris found in the bottom of the trench or in the backfill material. If the bottom of the trench contains this material, the conduit will be bedded in eighteen (18) inches of one (1) inch minus fill. All conduits installed will be covered with a minimum of twelve (12) inches of one (1) inch minus fill, prior to backfilling procedures.
- 4.2.8 Cooperative must specifically approve all conduit installations that will not be installed to required depth. Cooperative may require the breaking or cutting of rock to obtain depth, the use of a granular back fill with warning tap, and/or a dyed concrete cap.
- 4.2.9 Owner/Developer will install a one-half ($\frac{1}{2}$) inch pull tape with an embedded trace wire (Tone-Tape) equivalent to Anco WP12 LC in all conduits. The pull tape will allow for Cooperative to pull a mandrel and pulling cable through the conduit. The trace wire component will aid in locating conduits prior to cable installation.

4.3 Transformers

- 4.3.1 All foreign utilities located beneath the pad-mounted transformer will be in schedule 40 conduit. No access to foreign conduits will be provided at the pad opening. No water or sewer lines will be permitted below the transformer.

- 4.3.2 Transformer pads will be located to provide hard surface access within ten (10) feet of the location. Locations will be free of any obstruction which will impede the safe operation of transformer. Clearances will be three (3) feet on the sides and back and ten (10) feet in front of transformer. If transformer adjoins a public access area, site will be protected with bollards on adjoining sides set on centers not greater than six (6) feet set outside of the obstruction free zones surrounding the equipment.
- 4.3.3 Piers are required at all transformer locations sized 500 KVA or greater, unless waived by Cooperative. Piers may be waived if suitable compacted backfill material is provided. The depth of piers will extend to native rock or a change in soil conditions sufficient to bear the load of the pad and transformer.
- 4.3.4 Transformers 500 KVA and less, Owner/Developer has the option of installing a manufactured pad provided by Cooperative or pouring pads in place. Manufactured pads will not be permitted at sloped terrain locations. Pads at sloped terrain locations will be formed such that the uphill side of the pad is at least six (6) inches above final grade. Retaining walls will be provided by Owner/Developers to control erosion of soil onto Cooperative equipment.
- 4.3.5 Owner/Developer will secure the inspection and approval of premise facilities by county or city inspector prior to connection of electric facilities.
- 4.3.6 Owner/Developer will make all connections on load side of the point of delivery. These connections include all labor and materials necessary to install meter bases, current transformers (CTs) and potential transformers (PTs). Point of delivery for commercial service is the secondary bushings on the utility transformer. Connectors and terminations in transformer will be provided by Cooperative.
- 4.3.7 Owner/Developer will supply and install all secondary conduits and three-phase service conductors.

4.4 Pull Boxes

- 4.4.1 Owner/Developer will install pull boxes supplied by Cooperative. Pull boxes will be set on prepared granular backfill. Top of pull box will be at grade level or contour.
- 4.4.2 Conduits will enter pull boxes on the short faces. Ninety (90) degree elbows will be installed beyond pull boxes for conduits perpendicular to the length of the pull box. Exceptions may be granted for conduit runs which may be difficult to pull wire through by nature of length or number of bends.
- 4.4.3 Conduit continuations will be within the same line and plane within pull boxes.

4.4.4 Conduits will enter pull boxes in holes provided by Owner/Developer. Conduit will be slip fit through the pull box wall with all intrusion sealed with caulk or foam to prevent erosion. All conduit ends will be within two (2) to six (6) inches from inside walls, with temporary plugs installed.

4.4.5 Pull boxes will be backfilled with gravel to within six (6) inches of final grade.

4.5 Switches

4.5.1 Owner/Developer will install switch ground sleeves supplied by Cooperative. Sleeves will be set on prepared granular backfill. Top of sleeve will be set level at six (6) inches above final grade.

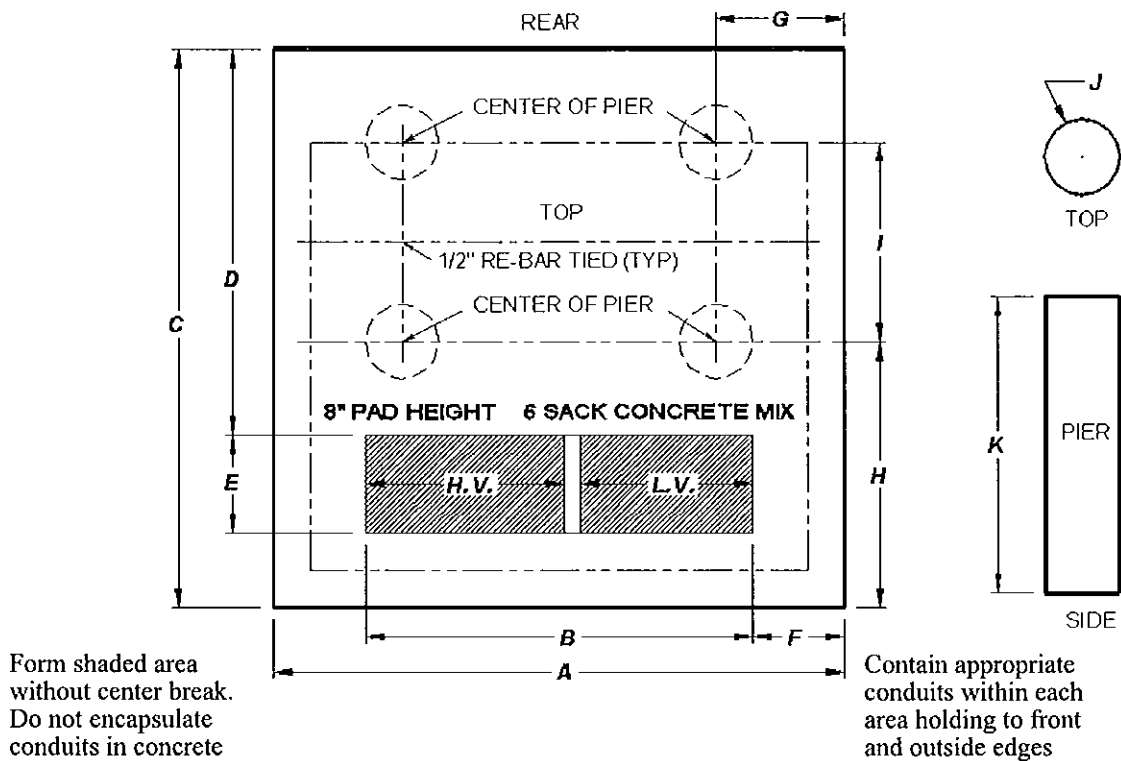
4.5.2 Conduit will enter below the switch sleeve at locations specified by Cooperative. Conduits will gradually transition, without the use of elbows, to a depth of seventy two (72) inches below the switch to allow for the installation of thirtysix (36) inch sweep 90s at the required locations.

4.5.3 Conduits will terminate inside sleeve with a ninety (90) degree elbow and short section pipe to allow for twelve (12) inches of one (1) inch clean creek gravel backfill in sleeve cavity. Center of the vertical rise of conduit will be in accordance with attached detail sheets but in no case less than six (6) inches from upper inside lip of sleeve. Entry point of conduit into sleeve will be within six (6) inches of indicated position.

4.5.4 Switch sleeve may be backfilled with one (1) inch clean creek gravel to within six (6) inches of final grade and covered with weed barrier. The creek gravel provides a barrier to rodent intrusion.

Cuivre River Electric Cooperative, Inc.

Three Phase Transformer Pad Dimensions



Transf. KVA	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G* (in.)	H* (in.)	I* (in.)	HV (in.)	LV (in.)
45-75	70	54	58	35	15	8	NA	NA	NA	33	20
100-500	85	65	66	43	15	10	NA	NA	NA	38	25
750-1000	85	65	80	54	16	10	21	34	24	38	25
1500-3000	88	68	106	76	20	10	21	38	26	38	27

1. Soil Stability

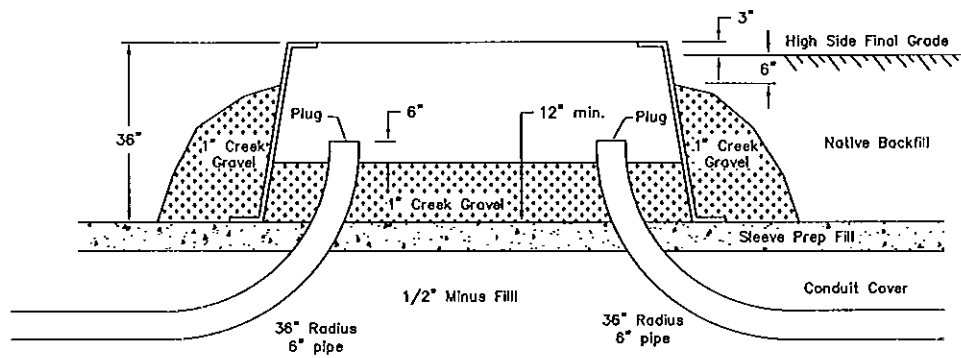
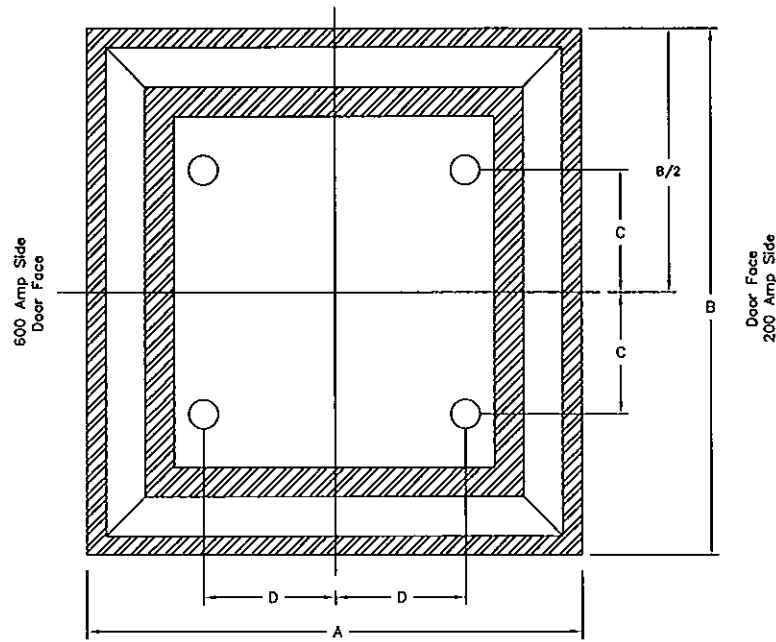
- A. Pads for transformer sized greater than 500 KVA must be poured on pier unless requirement specifically waived by Cooperative.
- B. Soil bearing strength must be 7 lbs./sq. in. to qualify for substitution of 12" of compacted granular fill foundation in lieu of piers.
- C. Piers (J=12") to be built and poured separately from pouring pad.
- D. Pier depth (K) will be the greater of 48" or depth of firm native soil.

2. Clearances

- A. Front: ten (10) feet clear of all obstructions
- B. Rear and Sides: three (3) feet clear of all obstructions
- C. No water, gas, or sewer lines permitted below transformer pad

3. Access

- A. Hard surface vehicle access within ten (10) feet of transformer.

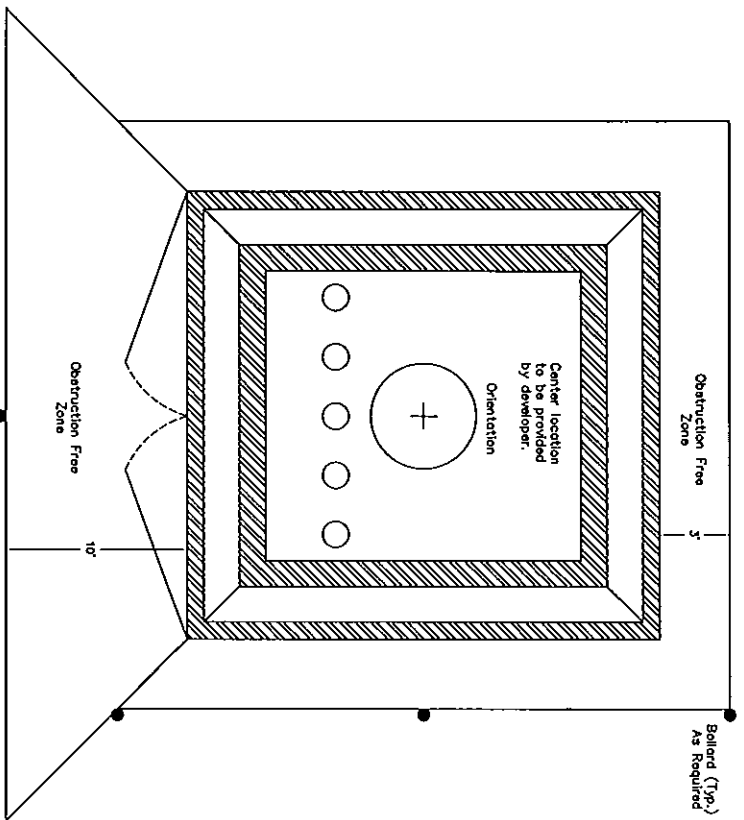


Type	A (in.)	B (in.)	C (in.)	D (in.)
12 kV	83	87	16	17
25 kV	96	104	19	25
Special				

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4 Position Switch Sleeve

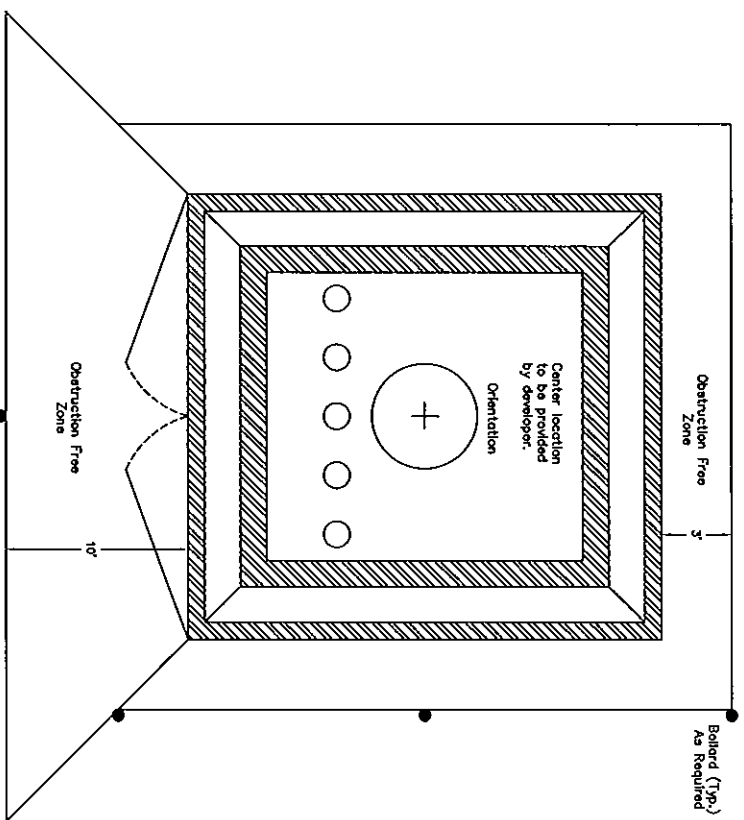
Location _____



Cooperative to indicate conduit departure direction and destination.

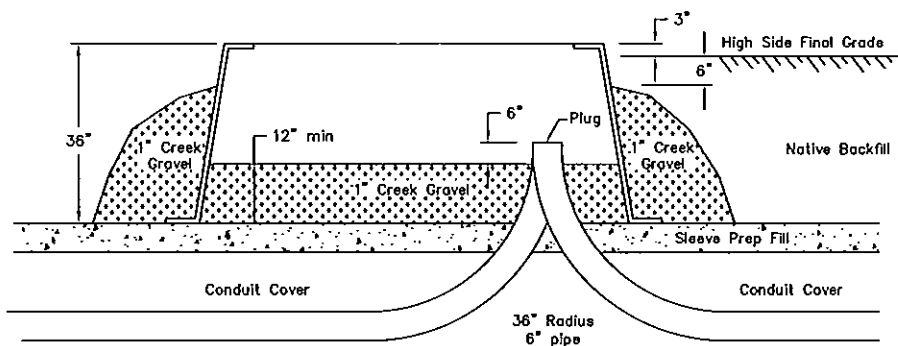
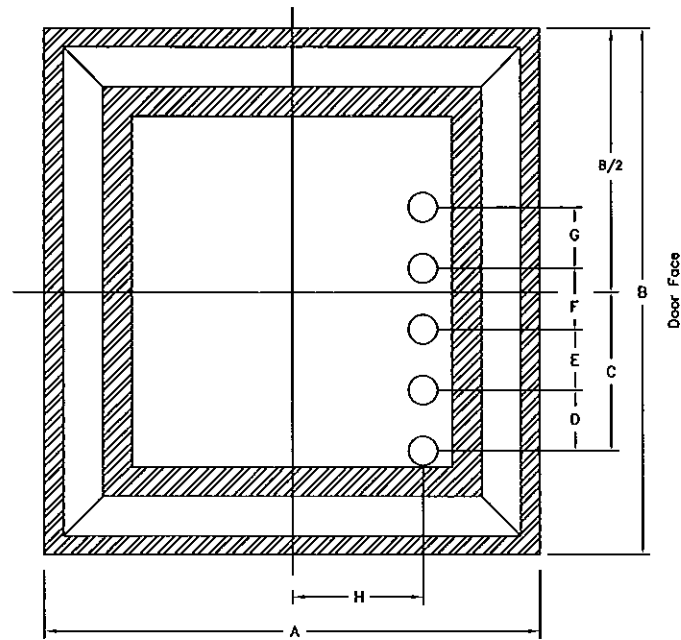
Cuivre River Electric Cooperative, Inc.

Location _____



Cooperative to indicate conduit departure direction and destination.

5 Position Switch Orientation

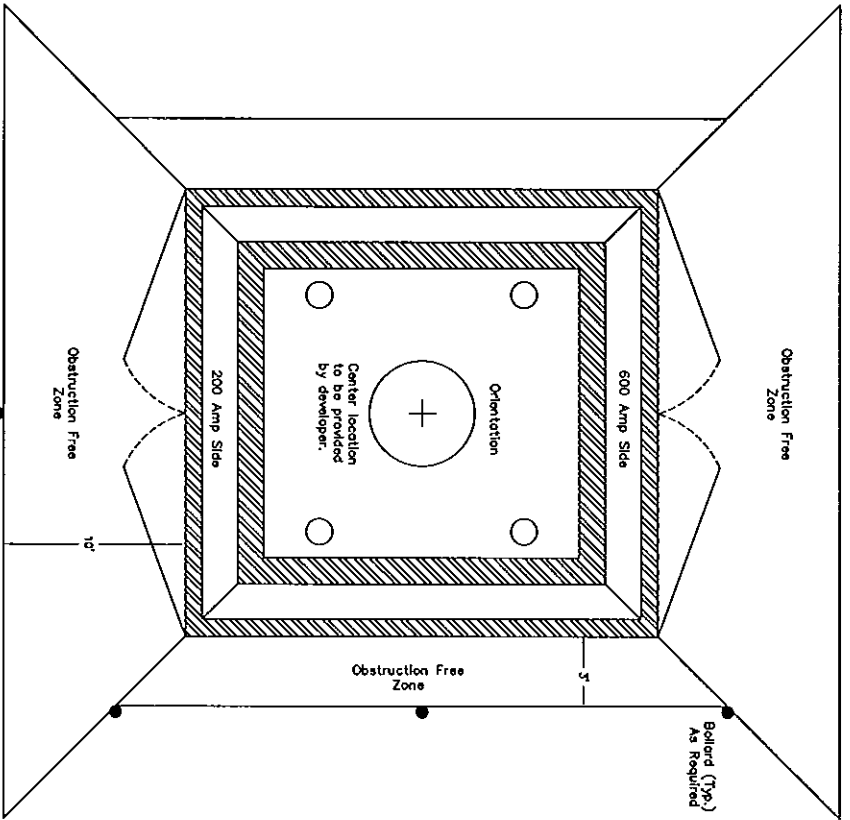


Type	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)	H (in.)
52-25	72	98	32	12	16	12	12	12
53-25	72	98	32	12	12	16	12	12
Special								

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5 Position Switch Sleeve

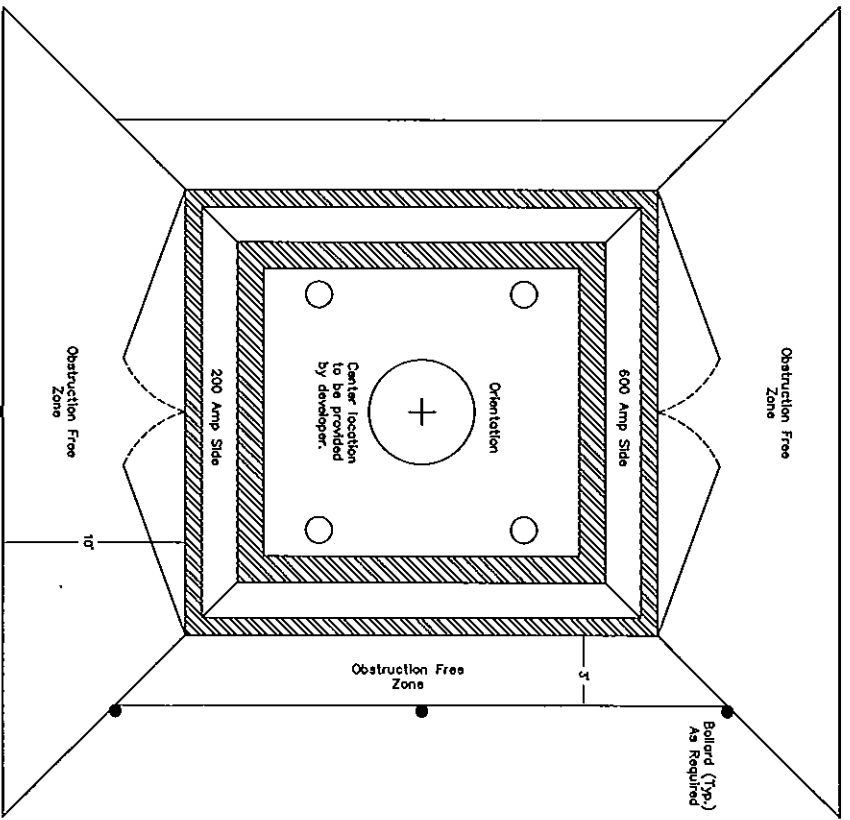
Location _____



Cooperative to indicate conduit departure direction and destination.

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Location _____

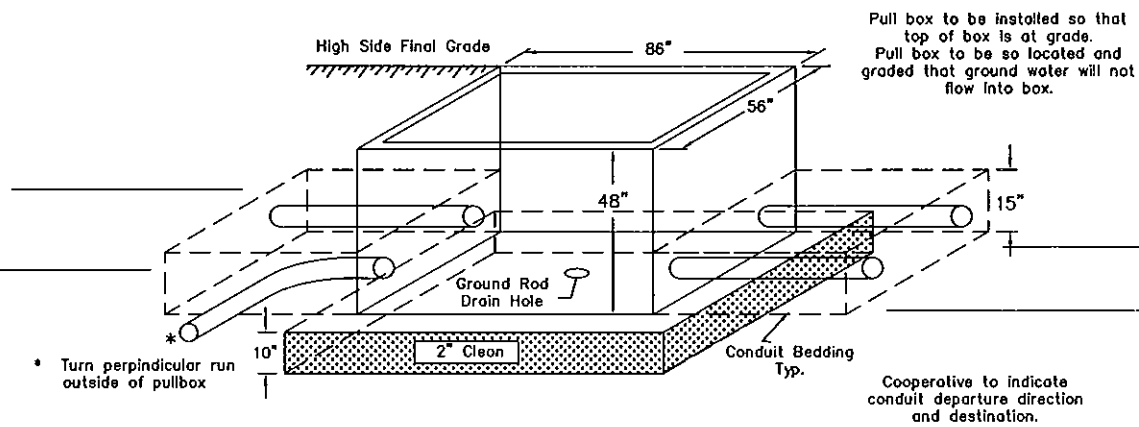


Cooperative to indicate conduit departure direction and destination.

4 Position Switch Orientation

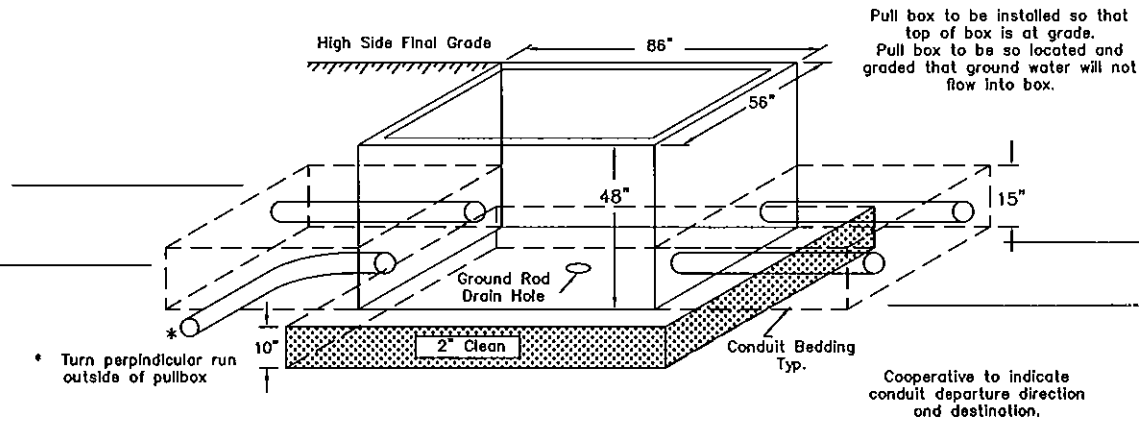
Location _____

Conduit entrance holes cut on minimum of 9" centers from bottom and sides of pull box



Location _____

Conduit entrance holes cut on minimum of 9" centers from bottom and sides of pull box



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Pullbox