



**Pad-Mounted and
Submersible Transformers
Customer Reference Specification
6-17-122**

0000-000-ST-6017
Custom ID: DCS 6-17
Revision: 03
Effective Date: 3/27/2017
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6-17-122 – Customer Reference Specification

**Customer Installed
Three-Phase Pad-mounted
Precast Transformer Foundation**

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
RULES FOR ELECTRIC METER AND SERVICE INSTALLATION (REMSI) WEBSITE.



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This specification defines the customer's responsibilities and PPL EU's requirements for underground service from a three-phase pad-mounted distribution transformer as defined in Rule 9 and Sketch #40 of the REMSI website.

All details of this specification and those listed below must be strictly followed. Any deviation must be approved by the PPL EU engineer. Unapproved deviations are usually costly for the customer to correct and can result in delays or possible refusal to connect service.

Other Associated Specifications

CRS 6-14-125 ----- Customer Installed Screening of Pad-mounted Devices

CRS 6-15-160 ----- Customer Installed Pre-Cast Manhole

CRS 6-15-180 ----- Customer Installed Duct Systems

CRS 6-18-115 ----- Installation Instructions for Customer Installed Conduit Systems on PPL EU Terminal Poles

CRS 6-19-100 ----- Customer Low-Voltage Switchboards, Arrangements, and Clearances

General Instructions for Typical Installation:

1. Plot Plan

The customer must provide PPL EU with a detailed plot plan showing location of building and property lines, switchgear, metering, and service entrance.

2. Construction Plan

A PPL EU engineer will provide the customer with a construction plan showing the proposed location of overhead and/or underground electrical facilities including cable and conduit routes, precast transformer foundation and service conduit locations. The transformer must always be located in an area where there is free access for PPL EU mobile crane and maintenance vehicles.

3. Right-of-Way

When the customer and PPL EU reach final agreement on location of electric facilities and capacity of service, the customer signs associated agreements and grants the necessary right-of-way. Construction by PPL EU will not proceed until these documents are authorized by the customer or his representative.



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Notes: (cont'd.)

4. Precast Transformer Foundation (PTF)

The customer's contractor is responsible for purchasing the precast transformer foundation. A list of PPL EU approved suppliers is contained at the end of 6-17-122. The customer's contractor must coordinate site preparations with the desired delivery date. If site preparations are complete, the supplier will set foundation in final position. The customer's contractor must provide a clear and firm approach to the point of service.

5. Excavation for Transformer Foundation

The customer's contractor is responsible for the excavation to install transformer foundation and for backfill afterwards. The excavation should be at least 9 ft. by 9 ft. by 5 ft. deep.

Note: Actual excavation depth may vary from site to site depending upon difference between existing and finished grade at time of delivery.

Spread a six-inch layer of #2B crushed stone to level the bottom of the excavation and to act as a French drain. The bottom must be well tamped and level or transformer will lean and failure may occur.

6. Finished Grade

Finished grade around the transformer must be approximately 3 to 6 inches below top surface of the foundation. Never grade the area surrounding foundation in such a way that it forms a swale where ground water will collect.

7. Ground Ring

The customer's contractor digs a trench around the foundation (4 ft. off sides and 2 ft. deep) for installation of a ground rod and ground ring by PPL EU. The customer's contractor notifies PPL EU when the trench is open. After PPL EU installs the grounding, the customer's contractor backfills the trench.

8. Conduit Systems

The customer's contractor installs primary and service conduit systems in accordance with PPL EU's construction plan. All conduits must enter transformer foundation through knockout areas in sides. Never penetrate the floor or corners. A PPL EU engineer will specify the minimum number of conduits required. The quantity specified may be more than the minimum shown on Figure 4 due to the nature of the building load.

Notes: (cont'd.)

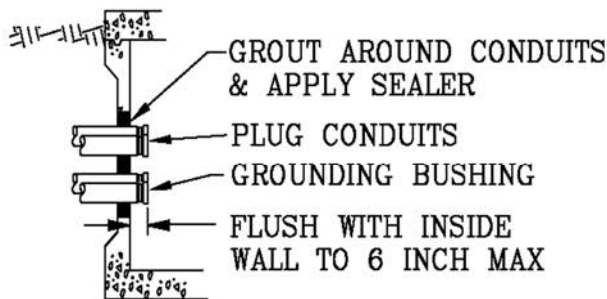
The customer's contractor must install conduits by one of these methods:

- A. Use 4-inch, hot-dipped, galvanized steel conduit (rigid or intermediate grade) directly buried in earth. All threaded couplings must be tightly joined using plumbers Teflon tape or similar joint compound designed to stop water leaks. All sweeps must be at least 36-inch radius. All steel conduits must have grounding bushings at the switchgear and transformer foundations.
- B. Use 4-inch type EB or DB PVC conduit encased in a concrete envelope as specified in CRS 6-15-180. All joints must be tightly sealed using the appropriate contact cement or joint compound. All 90° sweeps must be 4-inch, hot-dipped galvanized steel (rigid or intermediate grade) with at least a 36-inch radius. Concrete must also encase steel sweeps to prevent breakage at steel to plastic adaptors resulting from cable pulling tensions. All PVC conduit must have bell ends at the transformer foundation.

After installation, the customer's contractor must clean debris from the ducts by pulling a stiff bristled brush and some clean rags through each conduit. A pulling line must be provided in each conduit; the only approved pulling line is a flat polyester, woven, pre-lubed tape, ½ inch width, with a minimum breaking strength of 1200 pounds.

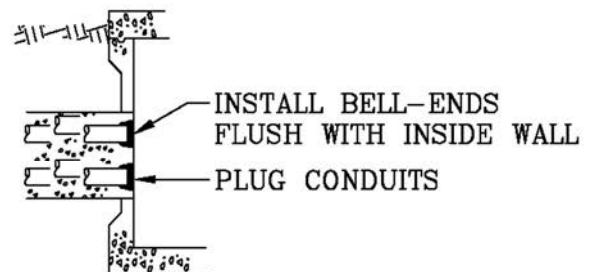
When installing the pulling line in the PVC conduit, be sure the conduit adhesive is dry before installing the pulling line to avoid gluing the pulling line to the joints. If joining two pulling lines, review the knot in CRS 6-19-133 or CRS 6-19-134. All conduit ends must be temporarily plugged to keep them clean and dry.

Regardless of which conduit installation method is used, the customer's contractor must seal and waterproof the knock-out area around the conduit penetration.



6-17-122-A

Steel Conduits



6-17-122-B

PVC Encased

Figure 1



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9. Switchgear

The customer's switchgear and metering cabinet design must be approved by the PPL EU engineer before units are built. The customer must provide minimum working clearances as shown in CRS 6-19-100.

10. Service Connectors

The customer's contractor must provide connectors at the customer's switchgear for the size and number of aluminum cables. (See CRS 6-19-100).

11. Cable Limiters

PPL EU will provide and install cable limiters (a type of current-limiting device) on certain WYE 277/480V services. The need for these cable limiters will be determined by a PPL EU engineer.

12. Notification to PPL EU of Delivery Time

It is the customer's responsibility to ensure that the PTF precaster notifies PPL EU 24 hours prior to delivery to job site. At PPL EU discretion, a PPL EU representative may be at job site during precaster's permanent placement of the PTF. All approved precasters have names and phone numbers of appropriate PPL EU personnel to be notified of PTF delivery date and time.

13. Protective Barriers

It is the customer's responsibility to install protective barriers. They are required when the transformer is located in an area exposed to vehicular traffic – for example, parking lots, loading docks, and driveways. Barriers must be located and installed in accordance with this specification (see Fig. 6-17-122-F), or as shown on the PPL EU construction plan. All protective barriers must be removable bollards (constructed as or equivalent to 6-17-122-G).

CAUTION! If barrier locations shown in this specification or on the PPL EU construction plan are directly over primary conduits, service conduits, or the ground ring, adjust the barrier locations as required. Barriers must be installed before service can be energized.



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14. Regulations and Clearances

The minimum clearances shown in this specification were set by PPL EU for maintenance and operating purposes. It is the customer's responsibility to comply with the National Electrical Code (NEC) and local municipal or fire insurance regulations regarding the location of an oil-filled transformer. Some fire codes may require transformer to be located 25 feet away from any building openings. Whenever fire resistant barriers, enclosures, or other safeguards are required by any authority, they are installed and maintained by customer.

15. Cover and Concealment

The customer must keep the area above the transformer clear of obstructions. This includes overhanging tree limbs which may block crane access to transformer.

All construction and maintenance work must be performed by the customer. Walls or fences which totally surround transformer must have access gates in front of transformer. Refer to CRS 6-14-125 for more details.

Minimum clearances to transformer are shown in Figure 3 (Fig. 6-17-122-D) and Figure 4 (Fig. 6-17-122-E). The customer must secure PPL EU approval before installing any of the above-mentioned concealments.

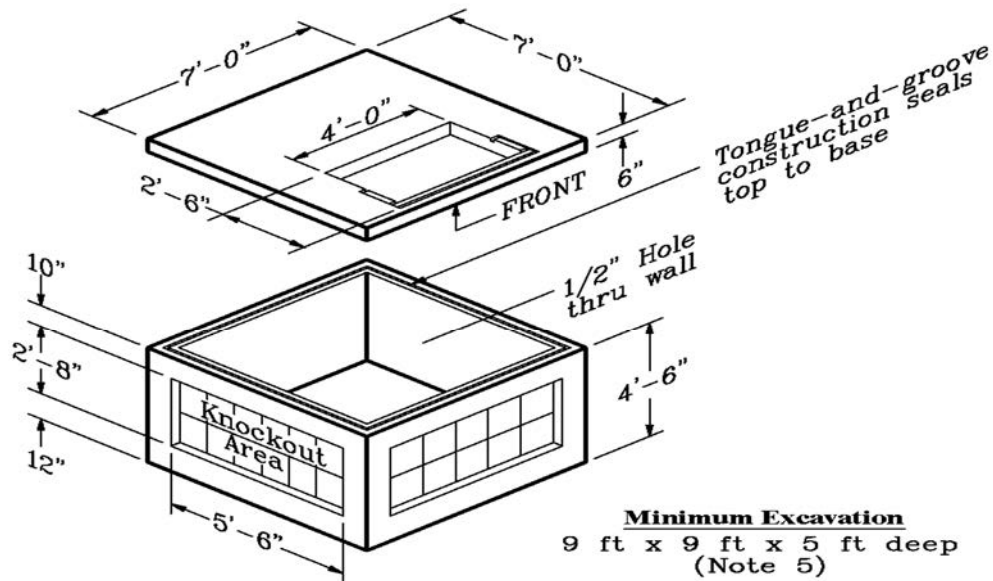
16. Sump Knockout

DO NOT open the sump knockout. Most installations do not use a sump hde and pump. An oil sensor device must be installed on any equipment that automatically pumps water from the unattended vault. Transformer oil shall **not** be drained or pumped into surrounding ground (earth).

17. Applicable Industry Standards

The customer shall comply with all applicable industry standards. PPL EU does not assume responsibility for customer's equipment and/or facilities, nor does PPL EU's installation of its equipment infer that customer's equipment and/or facilities comply with applicable industry standards.

**Figure 2
Customer Installed Precast Transformer Foundation**



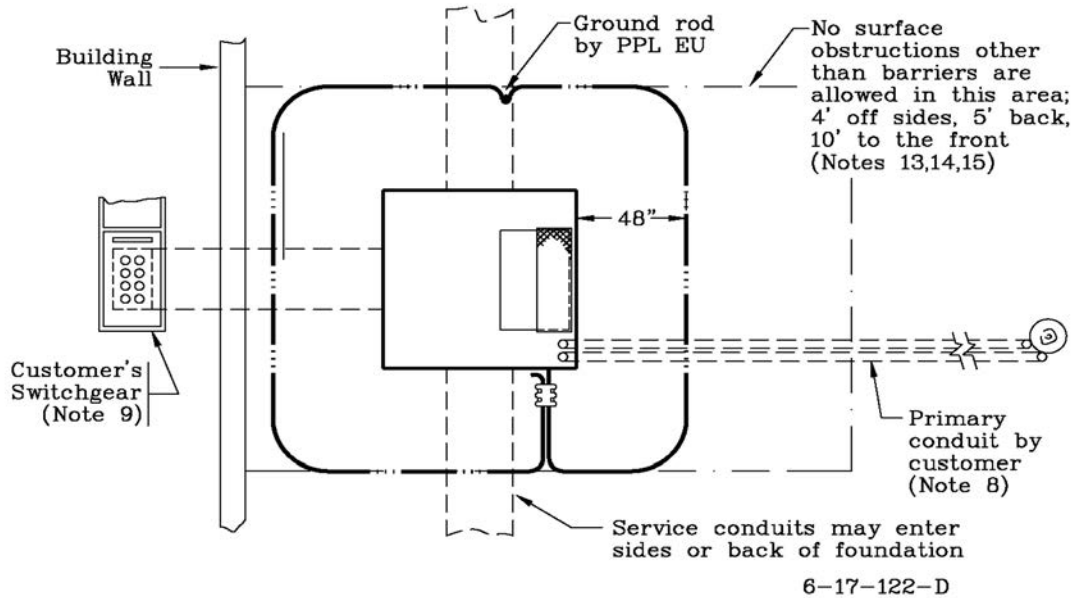
6-17-122-C

Order from these suppliers **only**:

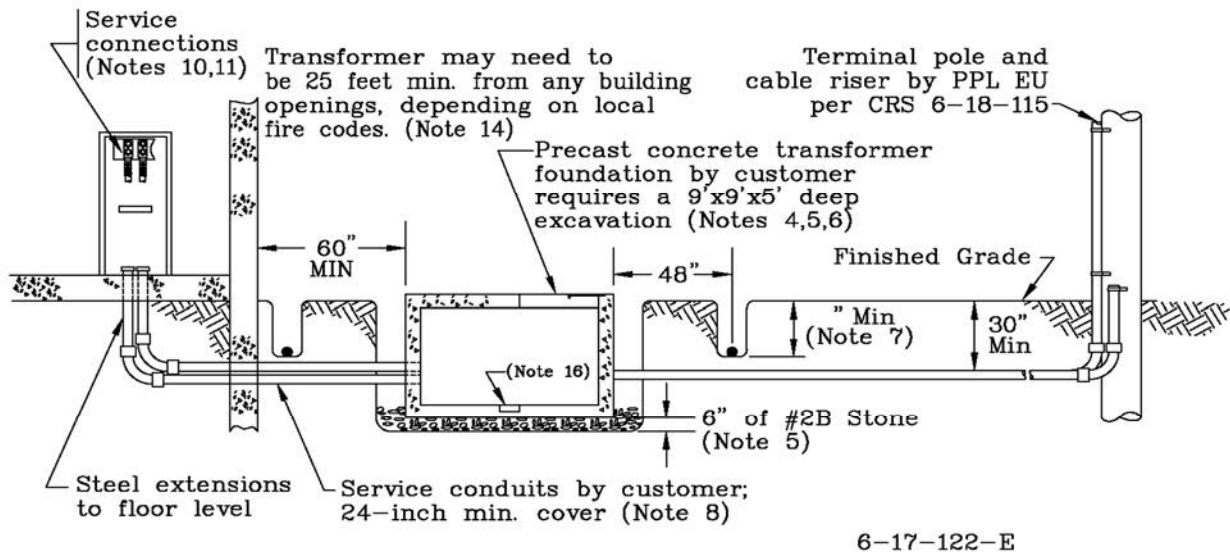
Approved Suppliers: Please allow approximately 3 days to coordinate delivery.

- | | | |
|--|--|--|
| 1. Oldcastle Precast
200 Keystone Drive
Telford, PA 18969
(215) 257-8081 | 5. Binghamton Precast & Supply
18 Phelps Street
Binghamton, NY 13901
(607) 722-0334 | |
| 2. A.C. Miller Concrete Products, Inc.
31 E. Bridge Street
Spring City, PA 19475
(610) 948-4600, 800-229-2922 | 6. By-Crete
517 King Street
Lebanon, PA 17042
(717) 866-7690 | |
| 3. Monarch Products Co., Inc.
385 Snipe Road
York Haven, PA 17370-9705
(717) 938-8303 | 7. Modern Precast Concrete Products
& Construction Supplies
3900 Glover Road
Easton, PA 18040
(610) 997-3119 | |
| 4. Monarch Precast Concrete Corp
425 North Dauphin Street
Allentown, PA 18109-2199
(610) 435-6746 | 8. Scranton Craftsmen, Inc.
930 Dunmore Street
Throop, PA 18512
(800) 775-1479 | <u>Mailing Address</u>
P.O. Box 97
Dunmore, PA 18512 |

**Figure 3
Typical Installation: Plan View**

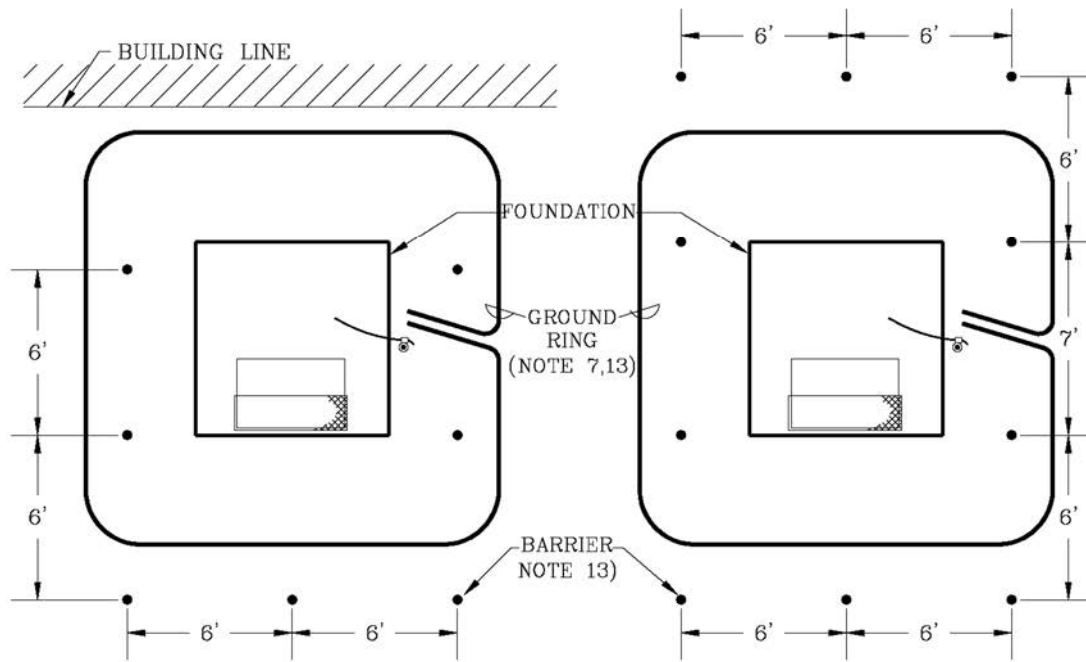


**Figure 4
Typical Installation: Elevation View**



KVA	75	150	300	500	750	1000	1500	2000	2500
WYE 120/208	2	2	4	8	10	12	--	--	--
WYE 277/480	--	2	2	3	4	8	10	12	14

Figure 5
Customer Installed Protective Barriers
Barriers are required when a transformer is located in an area exposed to traffic.

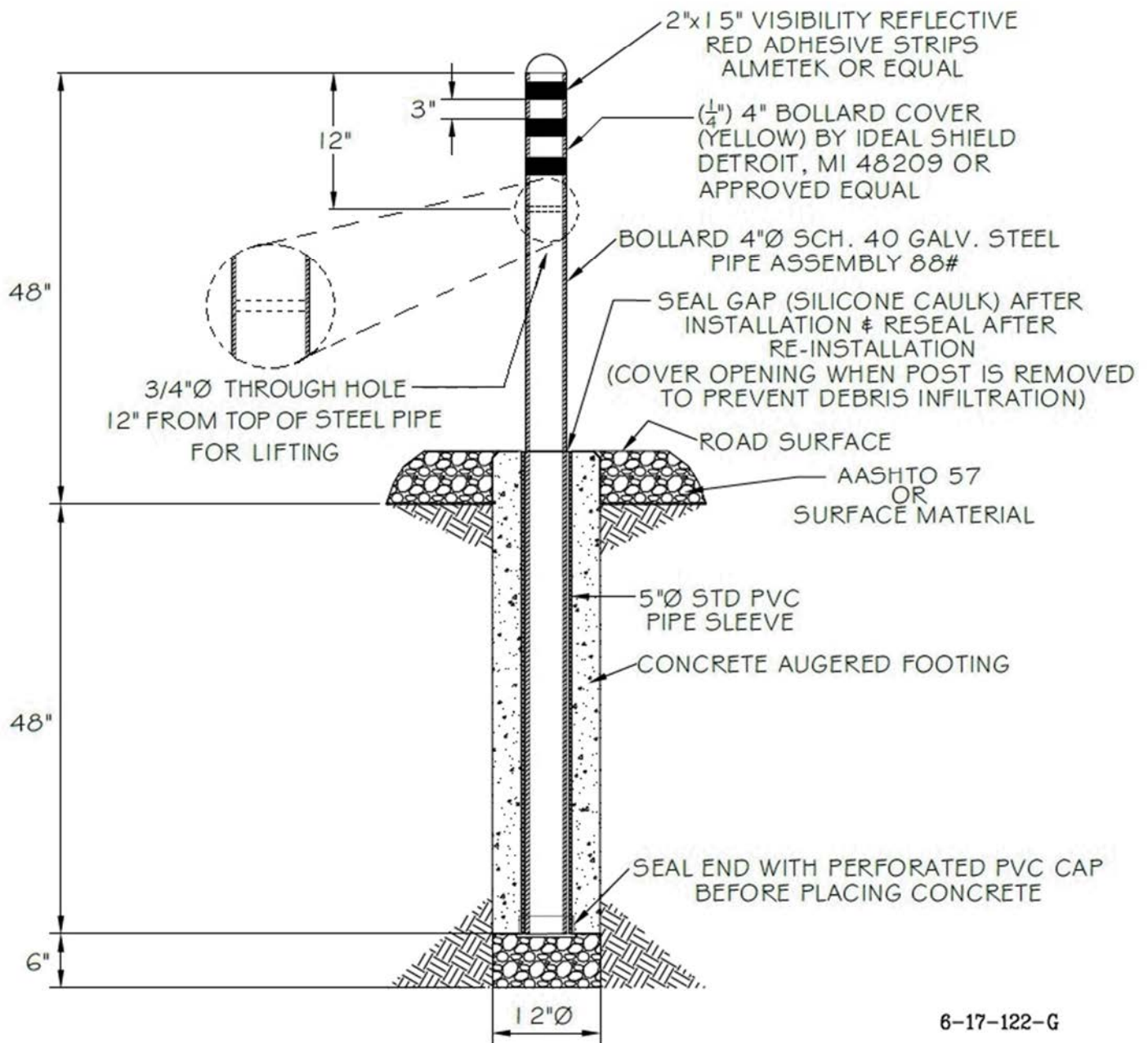


6-17-122-F

Example A
**Transformer located in parking
lot adjacent to building**

Example B
**Transformer located in open
area of parking lot**

REMOVABLE BOLLARD



6-17-122-G

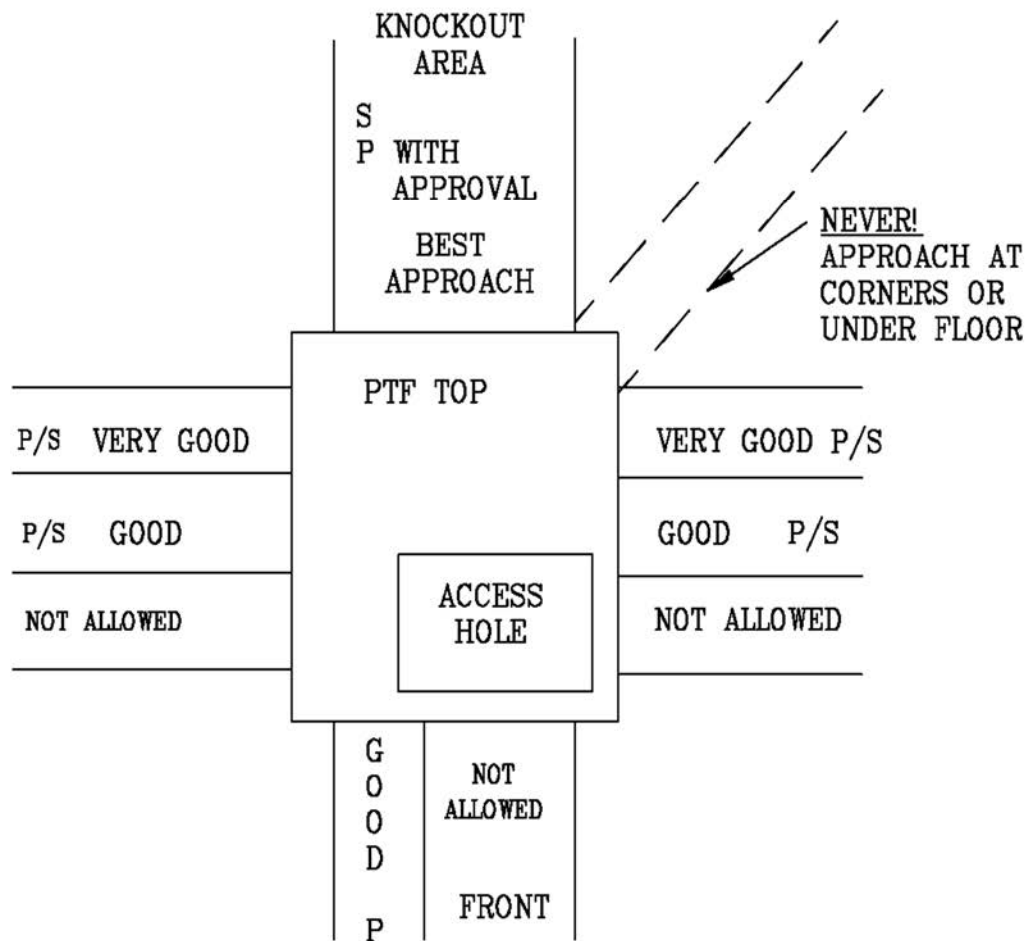


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Not To Scale

Conduits Entering PTF – It is very important to consider the transformer orientation (with respect to front) when designing the conduit system. Always face front of transformer so that conduit entrances will not obstruct the access hole.



6-17-122-H