CHAPTER 4

Primary Line Extensions

If a new residence's electrical service is not located within 200 feet of existing primary electrical facilities, a primary line extension is required to place a transformer close to the structure. Primary line extensions are underground facilities.

Installation responsibilities

Clark Public Utilities' construction policy requires the customer to hire a utility-approved electrical contractor to provide materials and install underground primary line extensions. A utility representative will provide a current list of Clark Public Utilities approved electrical contractors and a primary line extension design that shows the location of the new high voltage facilities.

The list of approved electrical system installation contractors is also available on the Clark Public Utilities' website at **www.clarkpublicutilities.com**.

NOTE: Only authorized Clark Public Utilities personnel shall unlock and route conduit or wire into energized electrical facilities.

Maintenance responsibilities

Once the primary line extension is energized by the utility, Clark Public Utilities takes over ownership of the high voltage line extension, transformer and secondary electric service to the meter base. The utility is then responsible for repairing and maintaining the electric facilities up to the service entrance equipment.

Inspection and coordination

Clark Public Utilities will send a utility inspector to the job site in response to the approved electrical contractor's request for primary inspections of the trench, conduit, conductor and equipment makeup. Any variances from the approved electrical design require prior approval from a Clark Public Utilities design representative before primary inspections can take place.

NOTE: The approved primary contractor is responsible for calling and requesting all primary inspections.

A primary line extension shall meet the following general requirements:

- All work is subject to the inspection and satisfaction of Clark Public Utilities.
- No work shall be backfilled, covered, or concealed until it has been inspected and approved by Clark Public Utilities' inspector.

- After passing all inspections, complete backfill of trenches is required before the job can be scheduled to test and energize the facilities. The customer is responsible for notifying Clark Public Utilities ***after*** they have completed backfilling the trench.

NOTE: If a primary line extension job includes a new secondary service, a utility representative will inspect the primary service and the local governing office (Washington State Department of Labor and Industries or City of Vancouver) will inspect the secondary service.

Site preparation

The following site requirements must be met before the installation of new residential service can begin:

- Primary design has been completed by Clark Public Utilities.
- The customer has hired an electrical contractor from Clark Public Utilities' current list of approved electrical contractors.
- All required permits have been secured (right-of-way, crossing, etc.).
- The site is at final grade or acceptable sub-grade in the area of construction.
- The trench route is clear of construction materials and any obstructions.

Primary trench

Trench depth and width

The minimum depth of a primary trench is 36 inches. A 42-inch depth is preferred. The maximum trench depth allowed is 48 inches.

The preferred primary trench width is 24 inches unless otherwise approved by utility personnel. The excavator may need to increase the trench width to accommodate other conduits and/or lines installed in a joint use trench. When increasing the trench width, remember to allow a minimum of 12-inch horizontal (side to side) separation between Clark Public Utilities' electrical conduits and other utility service lines.

Figure 14 illustrates the utility's width and depth requirements for residential primary line extension trenches with and without a natural gas service line.

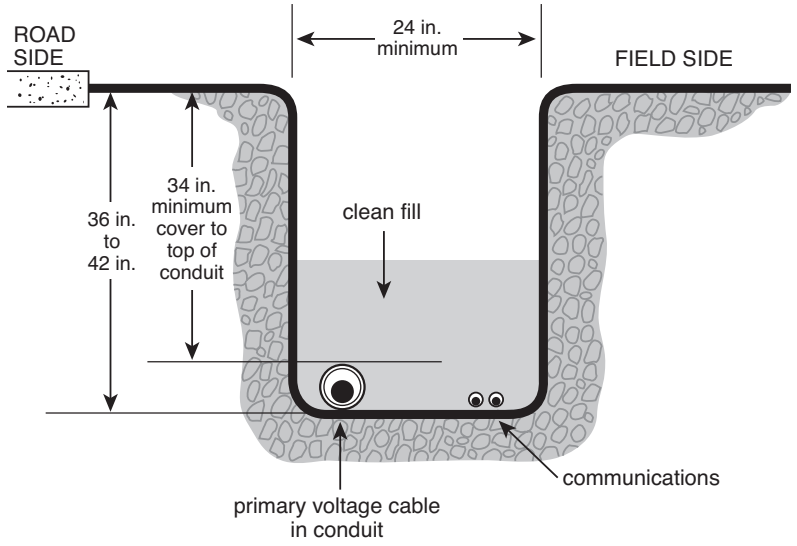
NOTE: Sewer lines, water mains and storm drainage systems are not allowed in a joint trench with Clark Public Utilities' electric service lines.

Trench excavating requirements

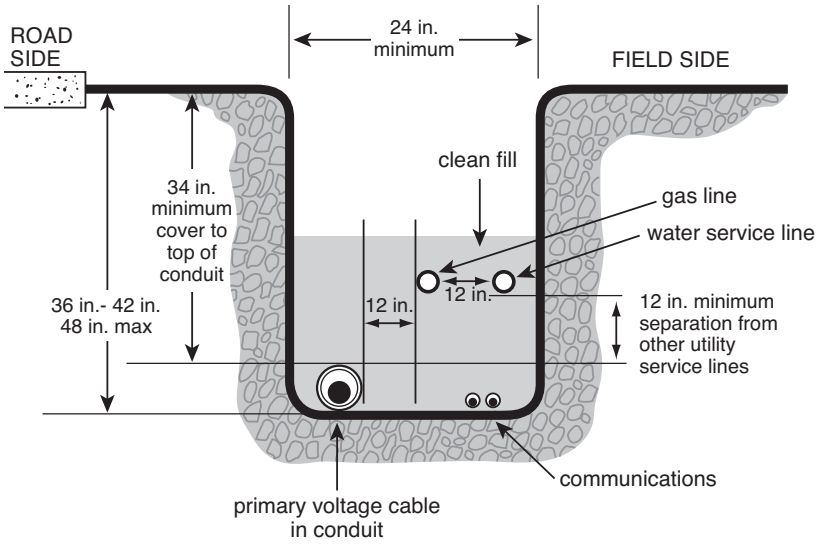
The following trench requirements must be met before primary power conduits can be installed:

Figure 14 Typical utility trenches with primary voltage cable

trench with primary voltage cable (no gas line)



trench with primary voltage cable, gas line and water service line



- Trenching in a public right-of-way or crossing under a public roadway requires a roadway use permit, applied for and issued to Clark Public Utilities by the governing jurisdiction. Fees for this permit will be added to the customer's construction billing. No work in the right-of-way shall be performed until this permit has been secured.
- All state and county road crossings shall meet the installation requirements outlined in the right-of-way permit issued by the authority having jurisdiction and Clark Public Utilities' electrical design.
- A licensed and bonded excavation contractor hired by the customer must perform all work in the road right-of-way and on property that is not owned by the customer.

- Any work in the public right-of-way must meet the erosion and sediment control requirements of the local jurisdiction.
- All electrical trenches shall be excavated according to the trench detail, and Clark Public Utilities' electrical design.
- The trench shall be straight and the bottom smooth, level, and free from rocks, obstructions and sharp objects.
- The customer shall remove all standing water in electric service trenches prior to inspection by pumping or draining.

Primary voltage conduit

Conduit for primary voltage cable is installed by a utility-approved electrical contractor hired by the customer. It is the electrical contractor's responsibility to contact Clark Public Utilities and request the conduit inspection.

The primary voltage conduit shall meet the following specifications:

- 2-inch diameter, or as specified on the electrical design.
- Electrical grade, UL listed, schedule 40, PVC.
- Gray in color.
- Conduit elbows installed as specified on the utility-approved electrical design. Install only manufactured radii. Heat bending conduit is not acceptable.
- No more than three, 90-degree bends (270 degrees total) allowed in the total conduit run. This total includes the elbow into the source facility.
- All conduit joints shall be permanently connected using PVC cement.

Trench and backfill requirements

Clark Public Utilities will not energize electrical facilities until all primary trenches are backfilled by the customer.

The customer is responsible for the following:

- Providing a minimum 4- to 6-inch layer of clean backfill (with rocks no larger than 5/8 inch and no sharp objects) placed above power conduit(s). The remaining trench shall be backfilled with soil that is free of rocks larger than 5 inches and any foreign objects.
- Allowing PVC cement to cure according to manufacturer's recommendations prior to backfill.
- Completing backfill as soon as practical after facilities are placed and inspected.
- Carefully placing backfill to prevent damage or movement of the conduit(s).
- Relocation costs due to change in grade or alignment.

Transformers

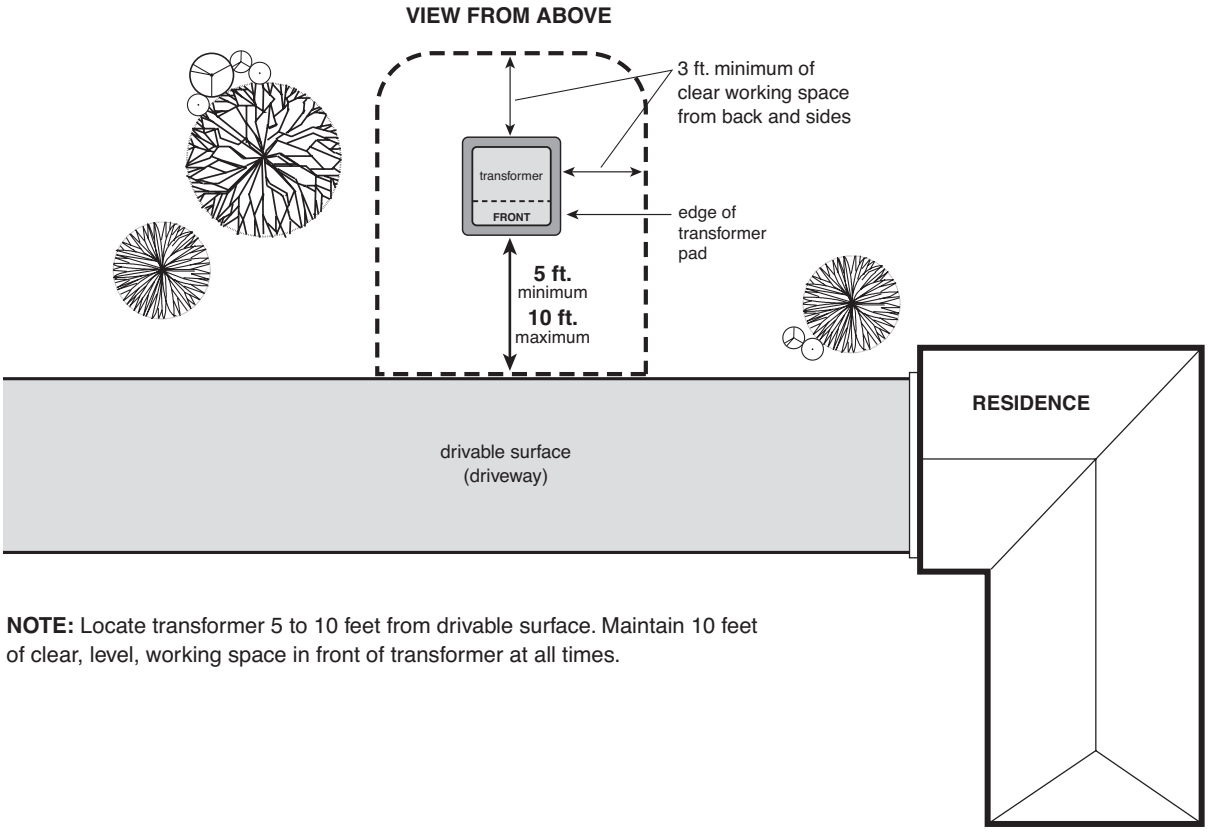
Transformer location and access

Underground electrical facilities must be readily accessible by the utility during construction and for future operation and maintenance. The area around padmounted electrical equipment should remain free from obstructions such as trees, shrubbery, poles, retaining walls, structures, fences, etc.

All transformers and padmounted equipment are to be located:

- Within 10 feet of a drivable surface but not closer than 5 feet.
- With the front of the equipment (door & lock side) facing toward the drivable surface.
- Allowing 10 feet of clearance in front and 3 feet from the back and sides of the equipment ***(Figure 15)***.

Figure 15 Residential padmounted transformer location and access



NOTE: Locate transformer 5 to 10 feet from drivable surface. Maintain 10 feet of clear, level, working space in front of transformer at all times.

Safety clearances around transformers

Clearances from padmount transformers to structures are measured from the nearest metal portion of the transformer to the structure or any overhang. The clearance from a building is 10 feet if the building has combustible walls (including stucco), and 3 feet if the building has non-combustible walls (brick, concrete, steel, or stone) as shown in ***Figure 16***. ***Table 5*** provides additional safety clearances that apply to any oil-filled electrical equipment.

Figure 16 Residential padmounted transformer minimum safety clearances

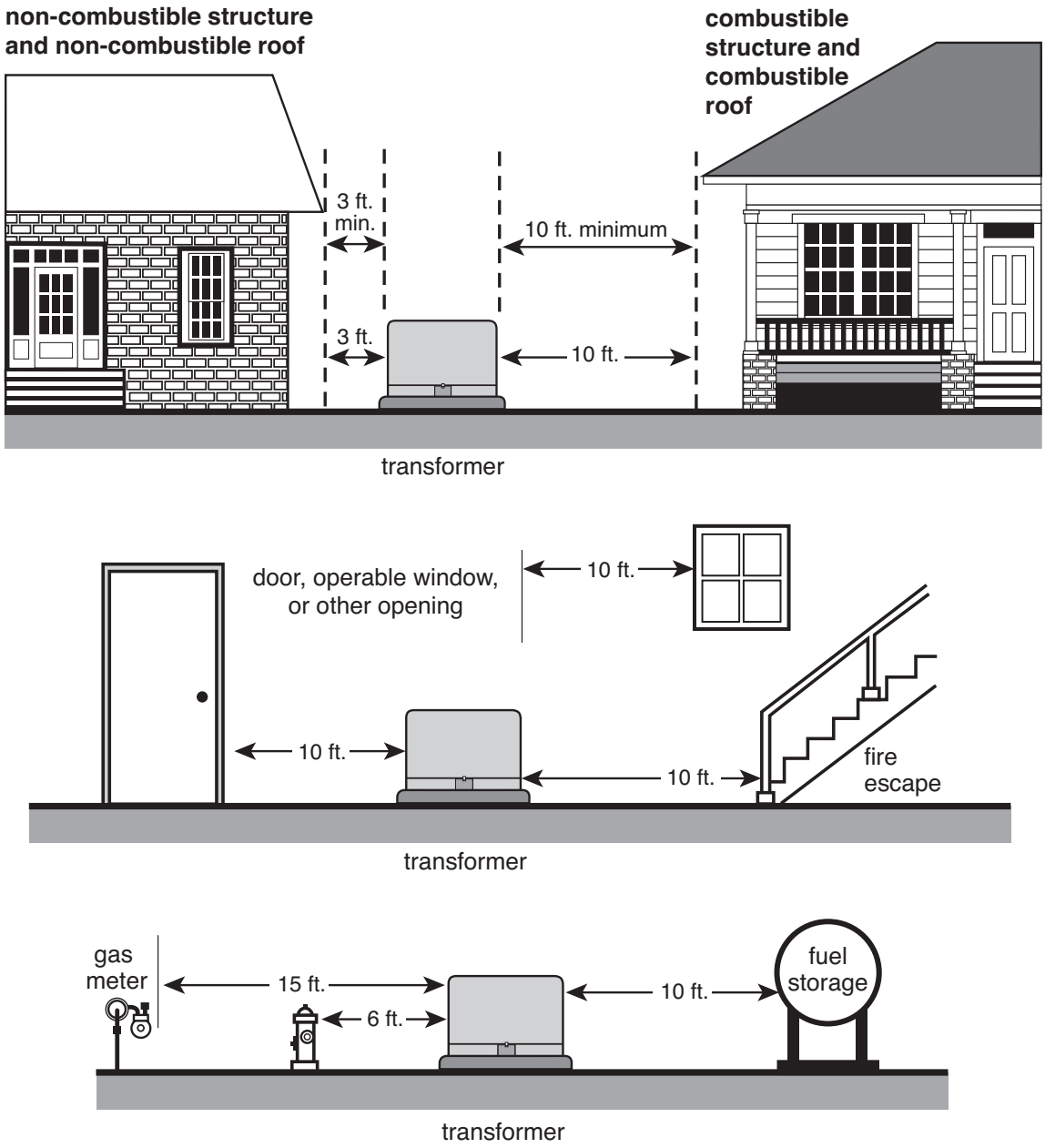


Table 5 Electrical equipment safety clearances

Feature	Clearance distance
Combustible walls or roof	10 feet
Non-combustible walls, (provided the side of the transformer facing the wall does not have doors or windows). Materials that pass UBC standard 2-1 or ASTM E136-79 are considered to be non-combustible	3 feet
Fire sprinkler valves, standpipes and fire hydrants	6 feet
Doors, windows, vents, fire escapes, and other building openings	10 feet
The water's edge of a swimming pool or any body of water	25 feet
Facilities used to store hazardous liquids or gases (e.g. fuel storage tank or fueling points)	10 feet
Gas service meters	15 feet

Guard posts

The installation of ***guard posts*** (bollards) may be required when transformers are exposed to vehicular traffic. It is the customer's responsibility to supply, install and maintain guard posts when required by Clark Public Utilities personnel. See *Figure 17*.

Materials and installation requirements:

- 5-foot by 4-inch galvanized or steel pipe.
- Set each post 24 inches deep.
- Fill posts with concrete.
- Posts set in stable soil are to be surrounded by 6 inches of concrete.
- Unstable soil or sand requires 12 inches of concrete surrounding each post.
- If several guard posts are used, locate them no more than 5 feet apart or as otherwise specified by a Clark Public Utilities' representative.

Hillside barriers

Transformers located on or against sloped terrain may require the use of a hillside barrier to protect the equipment from damage caused by erosion. A Clark Public Utilities' representative will visit the job site and advise when the use of a hillside barrier is required ***(Figure 18)***.

Changes in grade that occur ***after*** the site visit and electrical equipment have been installed may also require a hillside barrier. If the stability of the ground surrounding the transformer is compromised by changes to grade made by the customer, utility personnel will require the installation of a hillside barrier by the customer's approved electrical contractor.

Figure 17 Guard post (bollards) installation for residential transformers

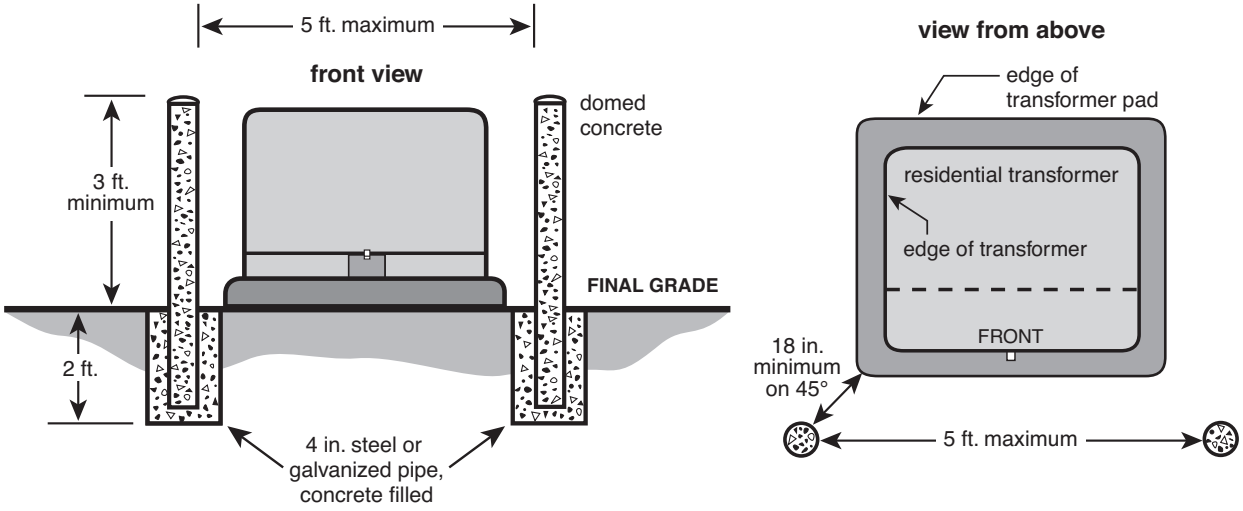
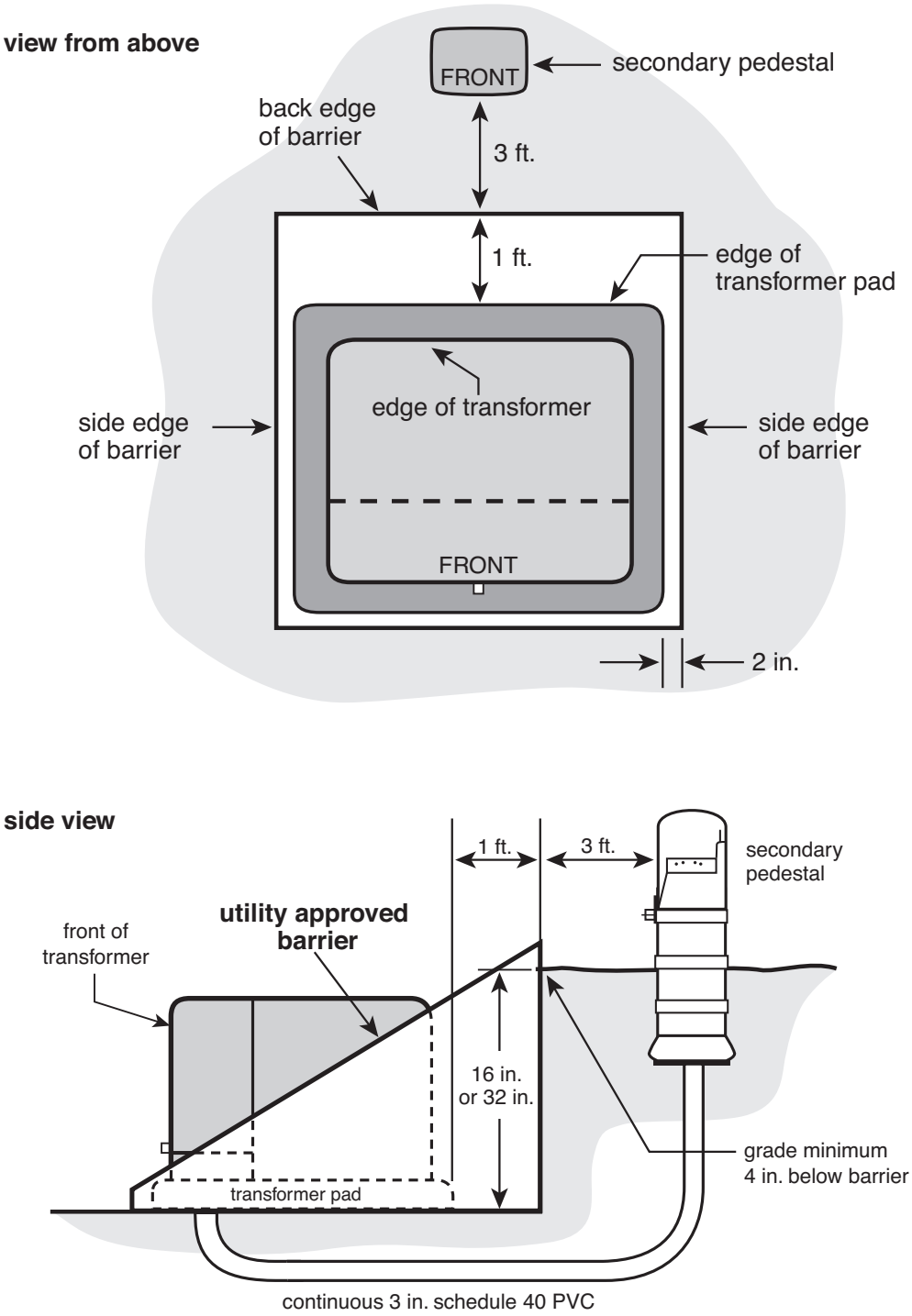


Figure 18 Typical hillside barrier installation



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