



Burial Depths

Residential - Water, Sewer, Electric and Gas Piping



CITY OF WARREN - BUILDING CODE DEPARTMENT
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Underground Water & Sewer Lines

Water lines require a minimum 42 inch depth below grade.

- A. Water-service piping and the building sewer may be placed in the same trench provided: The sewer is constructed of material labeled as DWV approved for underground use within the building. (galvanized steel or galvanized wrought-iron material may not be used).
- B. If the sewer piping is not constructed of materials approved for use underground within the building it must be separated from the water service piping by a minimum horizontal distance of 5 feet, or placed on a solid ledge at least 12 inches above and to one side of the highest point of the sewer line.

Exception

The required separation distance shall not apply where a water service pipe crosses a sewer pipe, provided that the water service pipe is sleeved to at least 5 feet, horizontally from the sewer pipe centerline, on both sides of the crossing with listed pipe materials.

Under Slab Plumbing (and Pressure Test)

Inspection is to be made prior to back-filling and pouring of the concrete floor. Drain-waste vents require a 5 psi air test or a 10 foot water stack test for 15 minutes, and water piping shall be tested underwater pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi.

Underground Electric

Minimum Cover Requirements <small>(More specific requirements on reverse side)</small>	General Burial Depth	Burial Depth at Driveways & Parking Areas
Rigid or intermediate metal conduit	6 inches	18 inches
UF conductors 30 volts or less for irrigation and landscape lighting	6 inches	18 inches
Residential branch circuits 120 volts or less w/GFCI protection	12 inches	12 inches
Non-metallic raceways listed for direct burial	18 inches	18 inches
Direct burial cables or conductors	24 inches	18 inches

Underground Service Conductors that are not encased in concrete and buried 18 inches or more below grade shall be identified by a warning ribbon placed in the trench not less than 12-inches above the conductors.

Direct-Buried network-powered broadband communications cables shall be separated at least 12-inches from conductors of any light, power, non-power limited fire alarm circuit conductors or Class 1 circuit (2008 NEC-830.47(b)).

SE Cable is not listed for underground use including in a conduit.

Underground Gas Pipe

Underground Piping Systems shall be installed to a minimum depth of 12 inches below grade.

Plastic Gas Piping is approved for use outside the building only. Connections between plastic and metallic piping must be by approved transition fittings. An 18 gage yellow insulated copper tracer wire suitable for direct burial must be installed adjacent to plastic piping and terminate above ground at each end. Piping must be pressure tested to 1½ times the working pressure and not less than 3 psi for not less than 10 minutes.

Separation

No required separation between gas, electric, and water. While separation is not required, piping should be separated whenever practical to more easily facilitate future repairs.

**2009 INTERNATIONAL RESIDENTIAL CODE - ELECTRICAL
SECTION E3803 - UNDERGROUND INSTALLATION REQUIREMENTS**

E3803.1 Minimum cover requirements. Direct buried cable or raceways shall be installed in accordance with the minimum cover requirements of Table E3803.1.

**TABLE E3803.1
MINIMUM COVER REQUIREMENTS, BURIAL IN INCHES^{a, b, c, d, e}**

LOCATION OF WIRING METHOD OR CIRCUIT	TYPE OF WIRING METHOD OR CIRCUIT				
	1 Direct burial cables or conductors	2 Rigid metal conduit or intermediate metal conduit	3 Nonmetallic raceways listed for direct burial without concrete encasement or other approved raceways	4 Residential branch circuits rated 120 volts or less with GFCI protection and maximum overcurrent protection of 20 amperes	5 Circuits for control of irrigation and landscape lighting limited to not more than 30 volts and installed with type UF or in other identified cable or raceway
All locations not specified below	24	6	18	12	6
In trench below 2-inch-thick concrete or equivalent	18	6	12	6	6
Under a building	0 (In raceway only)	0	0	0 (In raceway only)	0 (In raceway only)
Under minimum of 4-inch-thick concrete exterior slab with no vehicular traffic and the slab extending not less than 6 inches beyond the underground installation	18	4	4	6 (Direct burial) 4 (In raceway)	6 (Direct burial) 4 (In raceway)
Under streets, highways, roads, alleys, driveways and parking lots	24	24	24	24	24
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	18	18	18	12	18
In solid rock where covered by minimum of 2 inches concrete extending down to rock	2 (In raceway only)	2	2	2 (In raceway only)	2 (In raceway only)

- a. Raceways approved for burial only where encased concrete shall require concrete envelope not less than 2 inches thick.
- b. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
- c. Where one of the wiring method types listed in columns 1 to 3 is combined with one of the circuit types in columns 4 and 5, the shallower depth of burial shall be permitted.
- d. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in metal or nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 2 inches of concrete extending down to the rock.
- e. Cover is defined as the shortest distance in inches (millimeters) measured between a point on the top surface of any direct-buried conductor, cable, conduit or other raceway and the top surface of finished grade, concrete, or similar cover.

E3803.2 Warning ribbon. Underground service conductors that are not encased in concrete and that are buried 18 inches or more below grade shall have their location identified by a warning ribbon that is placed in the trench not less than 12 inches above the underground installation.

E3803.3 Protection from damage. Direct buried conductors and cables emerging from the ground shall be protected by enclosures or raceways extending from the minimum cover distance below grade required by Section E3803.1 to a point at least 8 feet above finished grade. In no case shall the protection be required to exceed 18 inches below finished grade. Conductors entering a building shall be protected to the point of entrance. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, Schedule 80 rigid nonmetallic conduit or the equivalent.

E3803.4 Splices and taps. Direct buried conductors or cables shall be permitted to be spliced or tapped without the use of splice boxes. The splices or taps shall be made by approved methods with materials listed for the application.

E3803.5 Backfill. Backfill containing large rock, paving materials, cinders, large or sharply angular substances, or corrosive material shall not be placed in an excavation where such materials cause damage to raceways, cables or other substructures or prevent adequate compaction of fill or contribute to corrosion of raceways, cables or other substructures. Where necessary to prevent physical damage to the raceway or cable, protection shall be provided in the form of granular or selected material, suitable boards, suitable sleeves or other approved means.

E3803.6 Raceway seals. Conduits or raceways shall be sealed or plugged at either or both ends where moisture will enter and contact live parts.

E3803.7 Bushing. A bushing, or terminal fitting, with an integral bushed opening shall be installed on the end of a conduit or other raceway that terminates underground where the conductors or cables emerge as a direct burial wiring method. A seal incorporating the physical protection characteristics of a bushing shall be considered equivalent to a bushing.

E3803.8 Single conductors. All conductors of the same circuit and, where present, the grounded conductor and all equipment grounding conductors shall be installed in the same raceway or shall be installed in close proximity in the same trench.

Exception: Where conductors are installed in parallel in raceways, each raceway shall contain all conductors of the same circuit including grounding conductors.

E3803.9 Groundmovement. Where direct buried conductors, raceways or cables are subject to movement by settlement or frost, direct buried conductors, raceways or cables shall be arranged to prevent damage to the enclosed conductors or to equipment connected to the raceways.