PLUMBING
WATER SUPPLY

GROUNDWORK

Water service lines are typically copper, polyethylene, or rigid plastic. Care should be taken to avoid damage when laying pipe:

- Bury all water service lines below frost-depth.
- Clear trenches of sharp rocks.
- Provide continuous support (layer of soft dirt or sand) to prevent pipe from sagging or breaking when backfilled.
- Bed PVC water lines in 4 in. of sand or fine dirt.
- Keep the number of joints in trench to a minimum.
- Backfill around pipe with fines until the pipe is submerged 6 in.
- Do not backfill with heavy rock or cinder material that may promote corrosion.

Water service lines may not be laid in the same trench as sewer lines unless they are separated by an elevation of at least 12 in. (some codes permit 10 in.). This means the sewer line will end up at least one foot below frostline. More typically, sewer and water lines are laid at the same depth in separate trenches spaced at least 5 ft. apart (**Figure A**).

Install caution tape: Best practice calls for burying caution tape 12 in. below grade to alert future excavators to the presence of sewer and water service lines. This marking usually is color-coded — blue for water and green for sewer.

For information on subslab layout, see Structural Slabs.

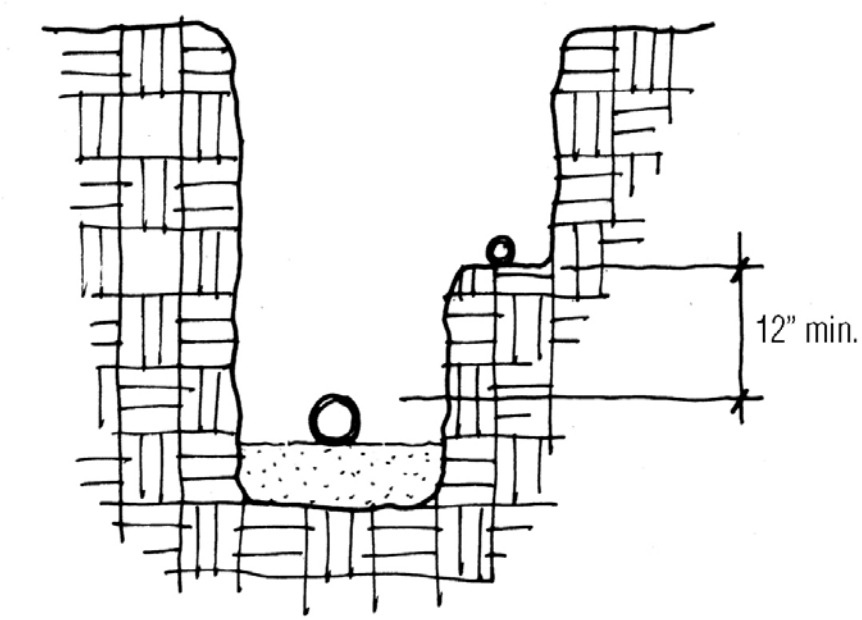
Water service entry. Supply piping passing under a footing must have a clearance of at least 2 in.

Any supply piping passing through a foundation or footing must be sleeved with a pipe two sizes larger than the water line, allowing 1/2-in. clearance around the circumference of the supply line. This provides corrosion protection and prevents the water line from breaking if the foundation settles. Seal the sleeve with flexible foam to keep out the cold. In termite-prone regions, seal the outside with a flexible electrometric compound.

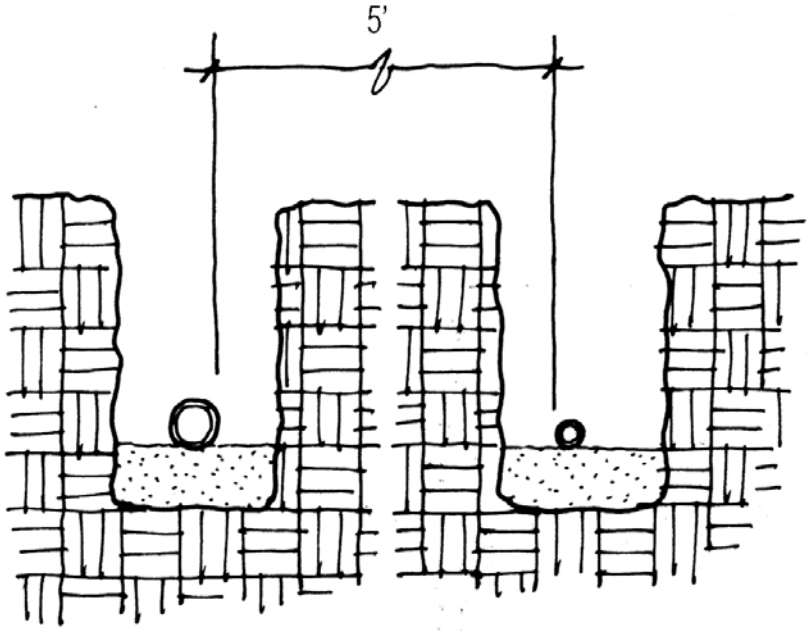
Lawn sprinkler systems that tap off a water service line must be protected by an approved backflow preventer (typically an atmospheric-type anti-siphon vacuum breaker). If water pressure fails, this backflow prevention device will bleed air into the system rather than suck irrigation water back into the supply line.

Turn the sprinkler run to rise 6 in. above grade after branching from the water service, and install a control valve. The backflow preventer must be located on the discharge side of the sprinkler control valve.

FIGURE A: WATER SERVICE INSTALLATION



Service Lines in Same Trench



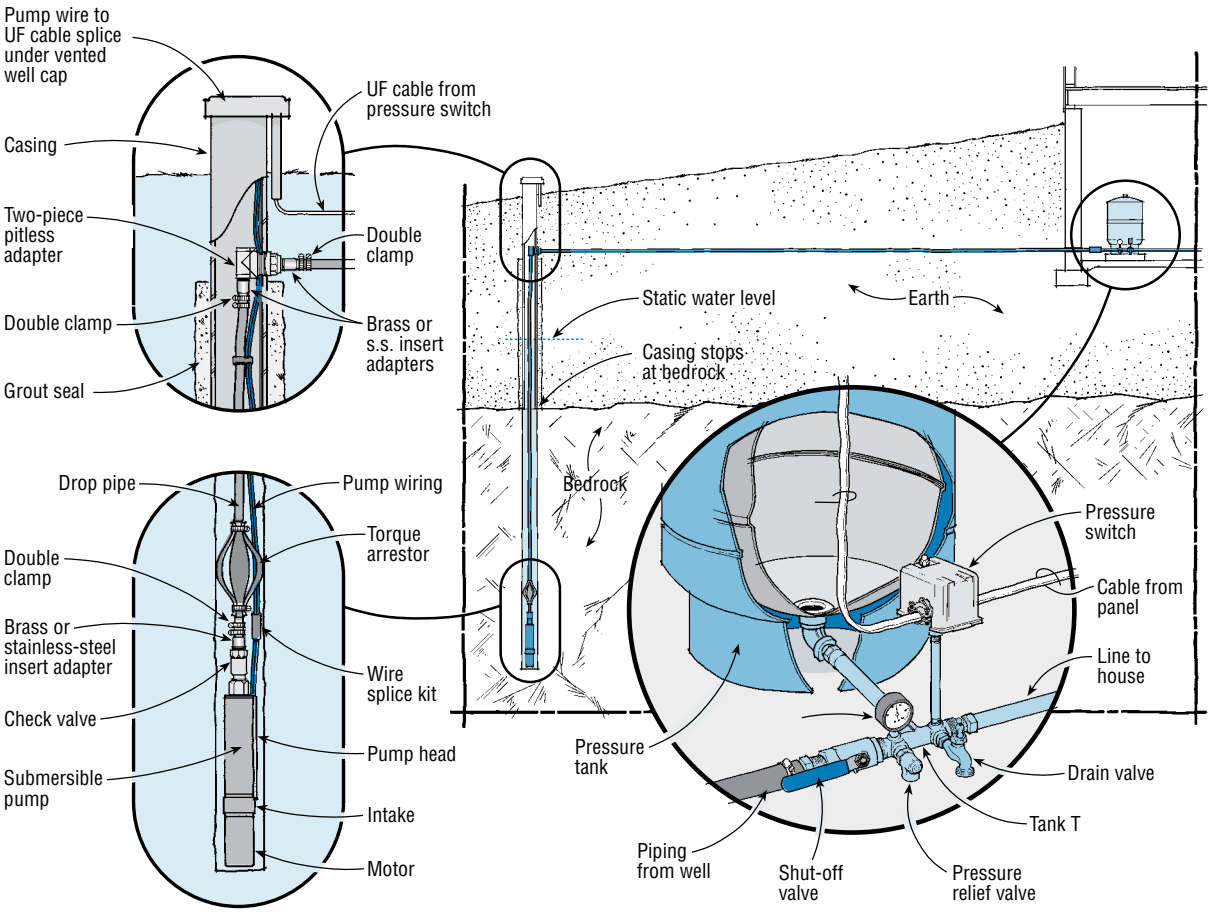
Service Lines in Separate Trenches

The bottom of water service lines must be at least 12 in. above sewer lines in the same trench (top) or in separate trenches spaced 5 ft. from sewer lines, septic tanks, or drain fields (bottom). Check local code for specific separation distances.

WATER WELLS

Rural houses often rely on a well. This type of water system contains a submersible pump in the well that feeds a pressure tank in the house (**Figure B**).

FIGURE B: ANATOMY OF A WELL SYSTEM



Pressure System Parts

Tank. An old pressure tank may not have a bladder as new tanks do. The bladder contains water, which prevents the air from dissolving into the water over time.

Shutoff valve. The main valve must be a full-flow valve, which allows water to flow unrestricted. Use a heavy-duty ball valve. Never use gate valves: They cause too many problems, as do cheap ball valves.

Pressure switches come set up for 20/40, 30/50, and 40/60. The lower figure is the cut-in pressure, and the higher figure is the cut-out pressure. But you can adjust to almost any pressure combination. Inside the pressure switch housing are two adjustment screws. Turning the nut on the tall screw shaft clockwise will increase the overall pressure at both the top end and the bottom end of the cycle.

Pipe to the pressure switch. Use a 1/4-in. ID (inside-diameter) pipe that takes the water from the big brass T and sends it to the pressure switch. Because this pipe has a small diameter, it can easily rust. Always use a 1/4x4-in. brass nipple for the connection; brass won't corrode like galvanized pipe.

Water pressure gauge. Buy the best available. Inexpensive gauges have short life spans.

Tank T. This is a specialty manifold for the many connections just before the tank. It includes ports for the pressure gauge, the pressure switch, a drain valve, and a pressure relief valve.

Well Piping

For wells less than 500 ft. deep, the best pipe to use is 1-in.-diameter polyethylene (black rolled plastic). The pipe should be rated for 160-pound pressure and must have "water service pipe" printed on it. For deep wells (at or around 500 ft.), use 200-pound rated pipe.

Pipe clamps must be stainless-steel marine clamps, not hose clamps. Beware: Some clamps that claim to be all stainless have only a stainless band; the screw housing may not be stainless.

Well Pump

A submersible pump has two main parts. The top part is the pumping mechanism, called the pump head. The bottom part is the motor. Water is drawn in between the two.

Pump capacity. A submersible pump head is no more than a bunch of little stacked impeller stages. The water gets whirled around in one and thrown to the next. Each little impeller raises the water pressure a small amount. The deeper the well, the more impellers needed to get the water out. However, the more impellers needed, the greater the "drag," which requires increasing the horsepower of the pump motor.

Typically, a 1/2-hp pump can pull water out of a well as deep as 140 ft., measured from the uppermost point in the system to the pump. The pump is normally placed 20 ft. off the bottom to allow for sediment to settle out.

The most common pumps are rated at 7 to 10 gallons per minute. A faster pump is unnecessary unless the well has a very fast recharge rate. When installing a higher-rated pump, make sure it's matched with a larger pressure tank or install a series of tanks.

Wiring a pump. A two-wire system is less expensive (there's less wire) and simpler to install than a three-wire system. Three-wire systems require switching both the run and start wires.

Use special submersible pump wire from the pump to the top of the wellhead; it is listed just for this purpose. However, from the wellhead to the house (all the way to the pressure switch), you must use UF wire.

The splice between the submersible pump wire and the submersible pump must work under water. To do this, use a submersible splice kit, crimping the wires together and applying a heat-shrink sleeve over it to make the connection watertight.