Installing an Underground Electrical PVC Conduit

for Fiber Optic Cable

You'll Need (please note the items in red are to emphasize a certain type)

Wooden Stakes

Mason's cord or heavy twine

Trenching shovel

1 ½" Schedule 40 electrical conduit PVC

1 ½" PVC conduit couplings

1 ½" PVC 90 degree long **sweep** elbows *

PVC pipe cutter or saw

PVC pipe primer/cleaner

PVC pipe cement

Electrical pull tape (mule tape)

14 gauge copper wire(usually sheathed,bare wire can be used

Electrical tape

(Pictures of PVC conduit, long sweep 90 conduit, regular 90 conduit, mule tape, and 14 gauge wire can be found at the end of these instructions.)

Installing an underground electrical Polyvinyl chloride conduit (PVC) for fiber is different then installing PVC conduit for electrical cable. This is because fiber optic cable has glass tubes inside its casing versus electrical wire. This makes fiber optic cable prone to break or crack inside its sheath. You will need to be very careful not to bend the fiber more than 10 times the diameter of the cable. This means a fiber cable that is 4.5mm thick (typical drop cable) **can only be bent to a 40.5mm radius at any point.** If you install a regular 90 degree PVC elbow you can damage the drop cable and have to have it replaced which can be expensive. That's why, for this project, you should use PVD 90 degree long sweep elbows. Here is a link that does a good job on explaining bend radiuses. https://www.anixter.com/en_us/resources/literature/wire-wisdom/minimum-bend-radius.html

Before starting this project you will need to have had NEK Broadband mark off the utility pole and entrance to the residence. If this distance is over 400 feet you will need to install additional parts to assist the fiber installers to pull the drop cable through. Contact NEK BroadBand for more information on this, or go to: https://nekbroadband.org/underground-policy/

Starting the Project:

Step 1

- Apply for an electrical permit from your municipality's building permits department, if required in your area,before beginning the installation. You must also contact DigSafe (For Utility Locate Requests: **Call 811** or request a Dig Safe ticket online with Exactix.)who will contact telephone, cable, and power utilities to mark out the location of any underground cables, gas lines and water lines. They will send a technician out to mark those locations for you at no cost to you. Do not begin work until you have any local permit you might be required to get, and have contacted Dig Safe and had all your underground utilities flagged. It's a good idea to ask to have this done about 4 days before you start your project. They are tasked to complete this 48 hrs after opening a ticket.

• Step 2

- Layout the route the underground fiber conduit is to follow by driving stakes into the ground at intervals and connect the stakes using Mason's cord or heavy twine.
- Dig a trench along the side of where your cord is (to keep it straight) that is at least 18 inches deep, and 12 inches wide. The National Electrical Code requires that underground PVC conduit be covered by at least 18 inches of dirt when installed on private property (National Electrical Code Table 300-5).
  https://www.electricallicenserenewal.com/Electrical-Continuing-Education-Course

s/NEC-Content.php?sectionID=272.0#:~:text=NEC%20Table%20300.5%20provides%20minimum,the%20requirements%20in%20the%20table.

● Step 3

- Lay the PVC conduit pipes beside the trench and cut the final piece to length using the PVC pipe cutter. If you do not have a cutter any plastic cutting saw will work.
- Place the conduit in the trench. At this time, run your mule tape (pull tape) through the pipe before gluing them together. Later, this tape will be used by the NEK Broadband crew to pull the fiber optic cable through your conduit.The shorter lengths of pipes make it easier to pull tape through then when they are all glued together. Make sure to leave around 14 inches of mule tape hanging out of each end for the fiber company to use.
- Join the PVC pipes together: Apply the ends of the conduits with PVC cleaner/primer and the inside of one coupling with cleaner/primer. While the PVC cleaner/primer is still wet, apply a liberal coating of PVC cement in the same manner. Slip the ends of the conduits into the coupling until they touch in the middle of the coupling. Twist the joint back and forth several times and then let it set for 2 to 3 minutes before moving on to the next joint.

● Step 4

- Join the long sweep 90s (the curve PVC pipe) to both ends of the straight PVC pipe at the ends of the trench using the PVC cleaner/primer and the PVC cement. Attach short lengths of PVC conduit to each long sweep 90 so the PVC pipe conduit will end 4 feet above ground level when the

trench is filled in. Lay your 14 gauge wire in the trench alongside your PVC conduit. This will make it easier for survey companies to locate the fiber in the future.

- ## Step 5

- Before you fill in your trench, call the building department and request the required inspection if you had to get a permit. After the inspector gives your work approval, you can fill in your trench. Make sure to cover the tops of both conduit ends with some electrical tape to keep out any water and critters.

These are simplified installation instructions. If you have any questions about this process please go to this link to receive a more detailed explanation.
https://nekbroadband.org/underground-policy/

Diagrams

Picture 1 PVC conduit

Picture 2 long sweep 90

Picture 3 regular 90

Picture 4 mule tape. This is the kind of tape that can be used to pull through the conduit.

Picture 5
14 gauge wire (any color but MUST BE COPPER) This wire is laid in the trench to help locate your fiber in the future