Grant County
PUBLIC UTILITY
DISTRICT

Residential Service Workbook

Electric and Fiber Optics for
Permanent
Single - Family
Residential
Services
and
Construction
Temporary
Services

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RESIDENTIAL SERVICE WORKBOOK

Table of Contents

CHAPTER ONE

General Information

Introduction

Welcome to Public Utility District No. 2 of Grant County, hereafter referred to as "District". Note: *Italicized* words are defined in the Glossary.

This workbook, which includes a "Service Connection Agreement", outlines design and construction procedures for new permanent and/or temporary electric service and fiber optic cable for single-family residential structures. It is the customer's responsibility to ensure compliance with the National Electrical Code (*NEC*), Washington Administrative Code (WAC), and any federal, state, or local codes and ordinances that apply to the project. The customer needs to be aware of electrical equipment sizing and provide equipment that will interrupt available fault currents.

The customer, if not knowledgeable in electrical work, should consider using a contractor to install the electrical equipment.

Other workbooks are available with information regarding the installation of electric service/fiber optic cable to permanent multifamily and nonresidential commercial buildings, condominium complexes, apartment buildings, mobile home parks, and irrigation sites. These workbooks are available free of charge from the District's Local Offices and on the internet website: *gcpud.org*.

Contacting Other Utilities or Agencies

New construction typically involves the installation of telephone, cable television and power cables, as well as natural gas, water, and sewer lines. Local providers now offer high-speed internet, television and telephone via fiber optic cable. Contact local provider(s) to see if the construction site is located in a 'fiber ready" area. It is the customer's responsibility to notify each utility or service provider for intended or needed service(s). Obtain a name and phone number for each utility and/or service provider then share this information with each utility. Check the local phone book or the Appendix of this workbook for applicable phone numbers.

Residential Electric Service Availability

The District offers the following services for single-family residential structures and outbuildings.

Voltage	Amp Rating	Wire Size	Typical Use
120/240	200 Amps	4/0* AWG	Most common size service
120/240	400 Amps	350* kcmil	Large Service
120/240	Over 400 Amps	**	Very Large Service

Table 1. Voltage Ratings

**Engineering Technician* to compute voltage drop calculations for service lengths over 300 feet.
***Engineering Technician* to specify service conductor size. Requires accurate site drawings.

Getting Started

Complete a "Service Connection Agreement" found on page 4 of this workbook or obtain a copy from the *Service Expediter.* The "Service Connection Agreement" will need to be completed for all new service requests. Upon completing the "Service Connection Agreement", the *Service Expediter* will assist and coordinate your service requirements with the appropriate District personnel.

Service Connection Agreement – Required Information

The customer will need to have available the following information in order to complete a "Service Connection Agreement". **NOTE:** <u>All service connections are subject to the District's Customer Service Policies as they are written or as they are amended by the District's Board of Commissioners.</u>

Completing the Service Connection Agreement

The *Service Connection Agreement* is comprised of six areas:

- Customer Information
- Service Location
- Load Information
- Rights and Obligations
- Site Sketch
- Signature of Legal Land Owner

When completing the Service Connection Agreement, please type or print legibly with a

pen. The information on the Service Connection Agreement will be used to generate a work request and establish account information which includes rate class, deposit requirements, line extension costs, etc. It is very important that all requested information is provided or the request may be delayed or returned.

Customer Information

Include the customer's full name, current mailing address, and appropriate phone numbers. Also include employer name and spouse's name and employer, if applicable.

Check the appropriate box if anyone connected to this new service will be on a life support system(s). If the answer is "yes" list the type of support system; i.e. oxygen, kidney dialysis, etc. **If the life support system is critical to an individual's well-being, then the customer may need to provide back-up power in case of scheduled and non-scheduled power outages. (NOTE: Customer-owned emergency generation equipment interconnected with the District's electrical system must be inspected by Department of Labor and Industries. The customer shall notify the District to assure generators are connected by methods acceptable to the District.)** The life support information will be included in the customer's account file and will be beneficial when scheduling power outages. However, the District may not notify the customer for either a scheduled or non-scheduled power outage.

Check the "Yes" box if the customer has had prior service with the District and provide the name(s) the service was listed under.

Are there pets (especially dogs) that would interfere with construction, maintenance, or on-going meter reading? If so, list whether the pet(s) are confined, number of pet(s), type, and name of pet(s), such as "1 German Shepherd named Ralph chained up". This information is helpful to District personnel when reading meters and maintaining the service.

List any contact person, other than the customer, who is authorized to represent the customer and coordinate construction activities. Include his or her name and telephone number on the appropriate line.

Service Location

The Service Address is where the new or altered service(s) will be constructed. Complete the service address information; i.e. a street address, a plat lot, a block, and division, for Residential and Commercial Services. Include the farm unit and block, or Section, Township, Range information for all Irrigation services.

List the legal owner of record along with his or her mailing address. Include the "Tax Parcel Number(s)" for the property where the service will be constructed. The tax parcel number(s) can be found on the Grant County tax statement or property closing documents (if newly purchased). The tax parcel number is a nine-digit number that is formatted like 00-0000-000. The tax parcel number(s) will be used to determine necessary rights-of-way required for construction of the service connection.

Load Information

The Load Information section of the "Service Connection Agreement" should be completed with accurate information. Include any future or additional loads such as hot tubs, swimming pools, outbuildings, etc. This information will allow the District to adequately size the electrical equipment and provide a cost estimate for the service. Inaccurate information may lead to over-sizing the service, thus increasing installation costs, or under-sizing the service and causing power disturbances at a later date.

For residential service, check the box indicating "Single-Phase 120/240". This is a normal residential service. Normally, three-phase services are for irrigation or commercial applications.

For Commercial and/or Irrigation services, the "Three-Phase 120/208 or 277/480" box may be more appropriate.

Depending on the on-site facilities, the District has the option of constructing the new service either overhead or underground. Check with the local governing body (normally the planning department) to see if an ordinance allows either type of construction. Then check the appropriate box giving the preference of construction. Please refer to the Overhead

and/or underground chapters for more information. See Figure 1: "Typical Overhead Construction," and Figure 2: "Typical Underground Construction" to identify overhead and/or underground construction.

Construction Temporary Service

If a temporary service is required, check which type the customer will provide, "metered" or "non-metered" temporary service. Cost for service will be calculated accordingly. For more information on *temporary services* please refer to Chapter Five: *Construction Temporary Services*.

Residential Service

Complete the "Residential Load" information section. Indicate the square footage for the home and shop (if applicable) along with the Heating, Ventilation, and Air Condition (*HVAC*) load in KW.

Fill in the service entrance size in amps. Normally this is either 200 amps or 400 amps. If the service is going to be over 400amps, this will require CT metering. Please refer to Commercial Services.

Next list the type of structure; i.e. stick-built home, modular home, mobile home, shop, pool, etc.

Include any anticipated future electrical needs or construction projects that would require additional capacity. This will allow the District to better size the service connection.

Rights and Obligations

Please read this section carefully. When the legal land owner signs the "Service Connection Agreement", permission is being granted to the District to construct and maintain the requested facilities. For additional information regarding permits and easements, refer to Chapter Six, "Right-of-Way".

Site Sketch

In this section, draw a site plan of the construction project. Here are items to follow in preparing the site plan:

- Draw the site plan indicating which direction is north with an arrow in the upper right hand corner.
- Identify at least two bordering roads.
- Identify any *foreign easement* areas; i.e. irrigation ditch crossing, telephone line, etc. If the service will cross another person's property, identify this easement area and to whom the property belongs.
- Identify any buildings, septic tanks, drain field, sewer lines, water lines, cable TV, etc. that exist on the property.
- Identify existing District facilities on the property such as a pole, transformer, *secondary handhole*, or *secondary pedestal*. Show transformer stencil Number "T-XXXXX" if applicable. See page 6 for transformer number location.
- Mark the proposed *meter base* location and proposed transformer location.
- Show route of the underground service and footage.

Simple Service Fee

The fee for an underground or overhead *simple service* is $300 (Three Hundred Dollars) and will be billed to the customer's account.

Summary

The customer completes the Service Connection Agreement and mails, faxes, or delivers it to the *Service Expediter*.

Upon receipt of the "Service Connection Agreement", the *Service Expediter* will determine if the work is a *simple* or *complex service request*.

If the job is a *complex service request*, the *Service Expediter* will notify an *Engineering Technician* to work with the customer and complete a design for the new service. The customer may request a need-date that should be realistic and allow time for design, obtaining necessary easements and permits, inspections, construction, and connecting the service. The District's lead time will vary due to construction activity within the local areas and the type of permits required for rights-of-way.

Quoted Costs

Quoted cost estimates to extend District facilities for a new service are valid for ninety (90) days.

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SERVICE CONNECTION AGREEMENT

PUBLIC UTILITY DISTRICT OF GRANT COUNTY
PO Box 878 Ephrata WA 98823

(All conditions of service are subject to the District Customer Service Policies)
SERVICE EXPEDITER: Telephone 509-766-2501 Fax 509-754-6658 email serviceexpediter@gcpud.org

1) CUSTOMER INFORMATION:

NAME		DATE
MAILING ADDRESS		
PHONE	Primary:	Secondary:
EMPLOYER		
SPOUSE NAME		SPOUSE EMPLOYER:
NEED LIFE SUPPORT?	□ YES □ NO if yes, what type?	
PRIOR GRANT PUD SERVICE	□ YES □ NO List name(s) service was listed under:	
Description of animals at residence		
Contact Person if other than owner	Name:	Phone:

2) SERVICE LOCATION:

Residential or Commercial

Address:	
City:	
Plat Addition:	
Lot:	Block:
Parcel Number:	

Irrigation Only

Farm Unit:		Block:
Twp:	Rng:	Sec:
Legal Owner:		
Mailing Address:		
Parcel Number:		

3) LOAD INFORMATION:

□ Single Phase 120/240 (recommended residential)		
□ Three Phase 120/240 (OH only)	□ Three Phase 120/208	□ Three Phase 277/480
□ Underground □ Overhead		

Construction Temporary

□ Non Metered	□ Metered

Residential:

House size (Sq Ft)		Anticipated KW Usage (including HVAC)	
Shop size (Sq Ft)		Anticipated KW Usage (including HVAC)	
Meter Base Size in Amps	□ 200 □ 400 (320 continuous)		□ Over 400 (CT Meter)
Building Type	□ Stick Built □ Manufactured Home	Other:	
Future or Additional Load			

Commercial/Non-Residential:

Type of Business or Facility		
Service Size in Amps		General Load HP/KW:
Motors in HP		Other:

Irrigation:

Service Size in Amps		Individual Pump(s) – HP:
Number of Drive motors(HP)		
End Gun Pump(HP)		Other Pumps or Motors:
TOTAL HP LOAD		Future Load:

***Please be sure to sign the agreement on page 2 of 2**

RIGHTS AND OBLIGATIONS

Public Utility District No. 2 of Grant County (Grant County PUD) will construct electrical facilities on customer's property, if necessary. In exchange for part of this value received, Customer grants Grant County PUD the right to construct, operate, patrol, maintain and remove overhead and/or underground electrical distribution lines and associated appurtenances. Customer grants Grant County PUD the right to clear the area where the distribution equipment and facilities are located on the customer's property and keep the same clear of brush, trees, timber, structures, improvements and all fire hazards. Customer also grants to Grant County PUD the right of ingress and egress to and from Grant County PUD distribution electrical facilities. Customer agrees not to place, construct or maintain any building, structures or other improvements within a 10 foot area of Grant County PUD electrical facilities. Customer agrees not to reduce or enlarge the clearances between the ground and any distribution lines within a 10 foot area of Grant County PUD electrical facilities. Grant County PUD may seek and enforce specific performance of any activities required of the customer by this section.

SITE SKETCH

Draw a plan of your site including building, septic, drain field, sewer, cable TV, telephone, gas, driveway, other future structures, property lines, proposed power line route and nearest transformer number if available. Also, identify at least two bordering roads and any other foreign easements areas (i.e., irrigation district, public lands, properties belonging to other individuals, etc.)

Please note the date you will have your proposed transformer/service/meter locations staked. Date:

Site Sketch

North

Be sure to include location of customer's meter socket

FIELD NOTES:

Legal Land Owner of Record Signature

Your signature indicates you have read and agree to Conditions stated in the "Rights and Obligations" section. Customer understands the work requested & authorizes PUD to begin work as listed on the Service Connection Agreement form. Customer agrees to pay all charges associated with Construction.

_____

_____

Official Use:

_____

_____

_____

_____

_____

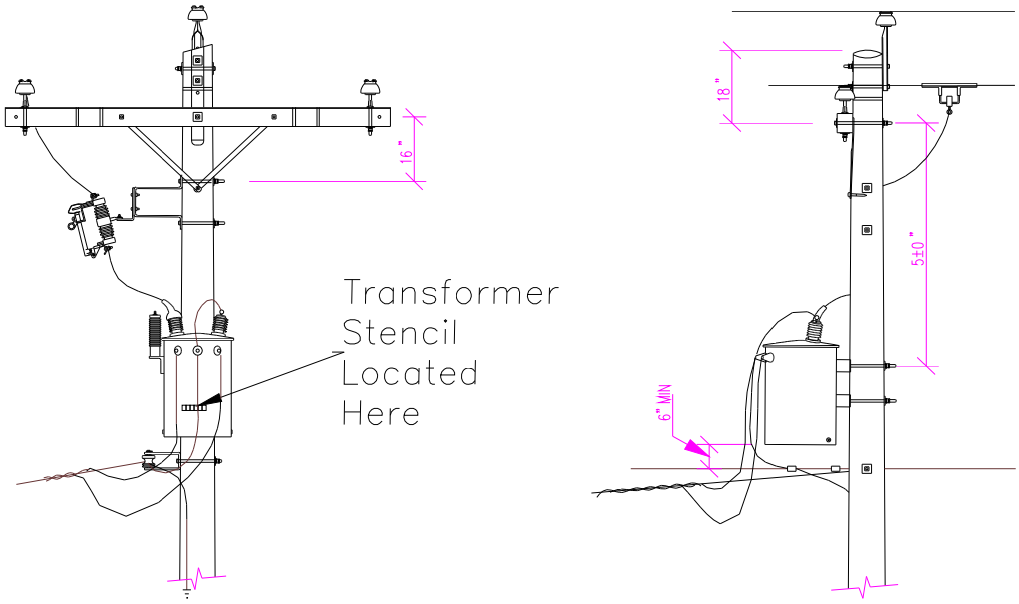


Figure 1. Typical Overhead Construction

Secondary Pedestal (Moped)

Padmount Transformer

Figure 2. Typical Underground Construction

CHAPTER TWO

Overhead Services

General Requirements

This chapter provides the general requirements for an overhead service. The customer shall check with the local planning department to see if an overhead service is permissible. If not, proceed to Chapter Three for an underground service.

The following checklist is provided to assist in the installation of an overhead service.

- Determine an acceptable location for the *meter base* (see Chapter Four ─ Metering in this workbook).
- Determine location of the District's nearest pole. (Verify location with the District's *Service Expediter*)
- Determine the distance between your *meter base* and the base of the pole.
- Provide a clear path and adequate clearance, free from aerial obstructions such as trees, towers, buildings, etc., from the District's pole to the *service mast.*
- Determine if the service conductor will cross someone else's property. If so, it will be necessary to obtain an easement from the legal property owner. (see Chapter Six ─ Right of Way).
- Complete the "Service Connection Agreement" with sketch. (see Chapter One ─ Service Connection Agreement.)
- If necessary, the *Service Expediter* will schedule an on-site visit with an *Engineering Technician.* The *Engineering Technician* will create a design drawing and calculate the construction charges. The customer will be notified of the charges either by phone or mail.
- Acquire an electrical installation permit from Washington State Department of Labor & Industries (L&I).
- Install the electrical service equipment including the *meter base* and *weatherhead*. If there are any questions regarding the installation of the service equipment, the District suggests consulting the *NEC* and WAC, call the *state electrical inspector*, or contact an electrical contractor.
- Install the *service entrance conductors* (leave 18" inches exposed at the *weatherhead*).
- Verify that the *service mast* height requirements have been met.
- Pay the construction charges.
- Verify that all clearances and accessibility for maintenance and operation of the service conductors and meter has been met.
- Have the installation inspected and approved by the *state electrical inspector*. **It is the customer's responsibility to request the inspection.**
- Notify the District's *Service Expediter* that the installation is ready for connection. The *state electrical inspector* will also notify the District when the electrical installation has been approved
- The *Service Expediter* will verify that all fees, construction costs are paid and all permits and easements have been obtained.
- The *Service Expediter* or *Engineering Technician* will then schedule the service installation, including the meter, after verifying the above criteria.

Modifications of Existing Facilities

Additional electrical load requiring modifications to customer and/or District facilities shall be brought up to current *NEC*, WAC, federal, state and regional codes and standards. Normally the District has the right to connect a service modification, prior to a state electrical inspection, if the District deems the installation is safe for connection and the State Electrical Permit is posted at the site. However, if the *state electrical inspector* finds deficiencies in the installation, he will initiate a request for disconnect. The service will be disconnected until such time as the *state electrical inspector* approves the installation.

Demarcation Point

A *demarcation point* will be identified by the District to determine the customer's responsibility for construction and cost. Normally the *demarcation point* will be the point of connection at the weather head. The Service Expeditor or *Engineering Technician* will notify the customer if the *demarcation point* is not at the point of connection or *weatherhead*.

The customer shall provide the *meter base*, *service mast*, *weatherhead*, clamp and insulator, and appropriate mast *guy* (if applicable) and the *service entrance conductors* to 18 inches beyond the *weatherhead*. The *weatherhead* mounted on a pole shall be within 6 inches of the pole top.

Service Mast Requirements

Mast supports are required when the top of the *service mast* is more than 26 inches above the roof. A mast support is typically a *guy* or a brace which is installed to prevent the weight of the *secondary wire* from pulling the *service mast* over. Further information regarding *guying* and bracing *service masts* is available in the National Electrical Code (*NEC)* and Washington Administrative Code

(WAC). See Figure 4: "Typical Overhead Service Installation" for an example of a *service mast guy*.

Clearance Requirements

It is the customer's responsibility to know the required clearances for the District's service conductors and construct the service entrance in order to maintain the clearances over the life of the service connection. Minimum clearance requirements can be found in the latest edition of the *NEC*. Additional height may be required depending upon the location and type of structure or terrain. If an *Engineering Technician* is assigned to the project he can assist in the design and clearance requirements for the service connection.

NOTE: *Secondary conductors* **cannot** pass over hot tubs or swimming pools. A minimum clearance of 15 feet is required for *secondary wires* passing within 25 feet of a swimming area. Figures 5 and 6 illustrate other minimum clearances that must be maintained.

Openings and Gas Meters

A minimum clearance of three feet is required between *secondary wires* and windows, doors, porches, fire escapes, or similar openings.
A minimum horizontal clearance of 3 feet (National Fuel Gas Code 54-5.7.2.3) is required between electric service equipment and natural gas metering equipment (see Figure 3).

Manufactured Homes

The overhead service equipment for a manufactured home may be installed one of two ways:

- The customer mounts the service equipment on a District installed and maintained meter pole.
- The *Meter Base* is mounted on the manufactured home, if both of the following conditions are met:
  a. The manufacturer installed the *meter base* on the manufactured home when it was constructed and,
  b. The service equipment meets the District's *meter base* requirements. See Chapter Four – Metering.

The service equipment must meet all applicable *NEC*, federal, state, and regional codes and be inspected by the *state electrical inspector* prior to connection. The *meter base* shall meet the District requirements listed in Chapter Four – Metering.

PUD Owned Meter Poles

The District will furnish and install a meter pole for a manufactured home. The customer is responsible for mounting the service equipment on the pole and obtaining the necessary inspections. See Figures 7 & 7a for an example of a meter pole installation. The *NEC* requires the meter pole to be installed within 30 feet of the manufactured home. An *Engineering Technician* will need to design and coordinate construction.

Typical Overhead Installations

The following pages are for reference only. Clearances may change with the latest edition of the *NEC*.

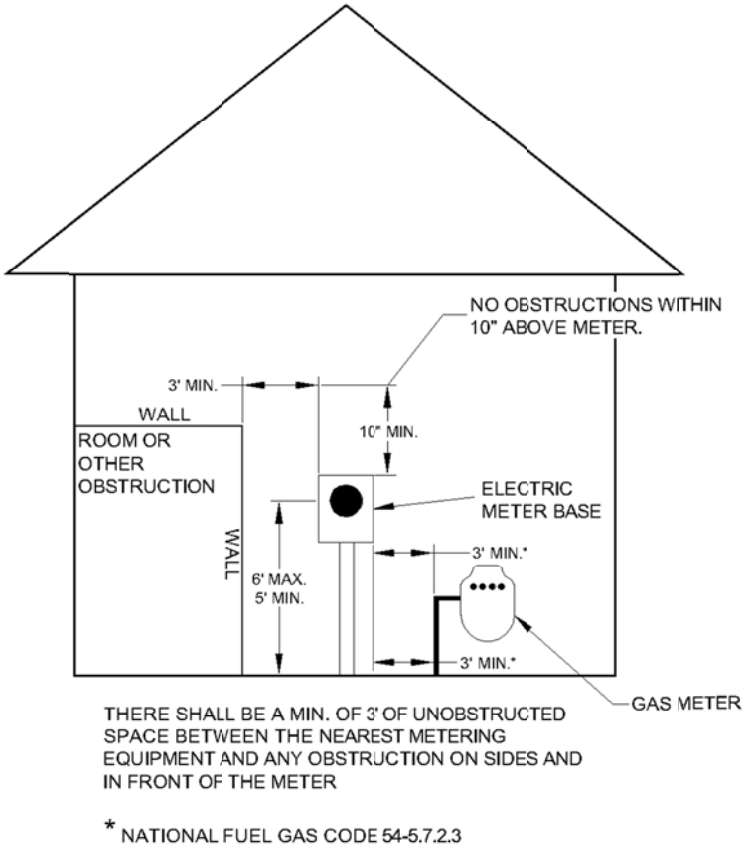


Figure 3. Working Space Requirements

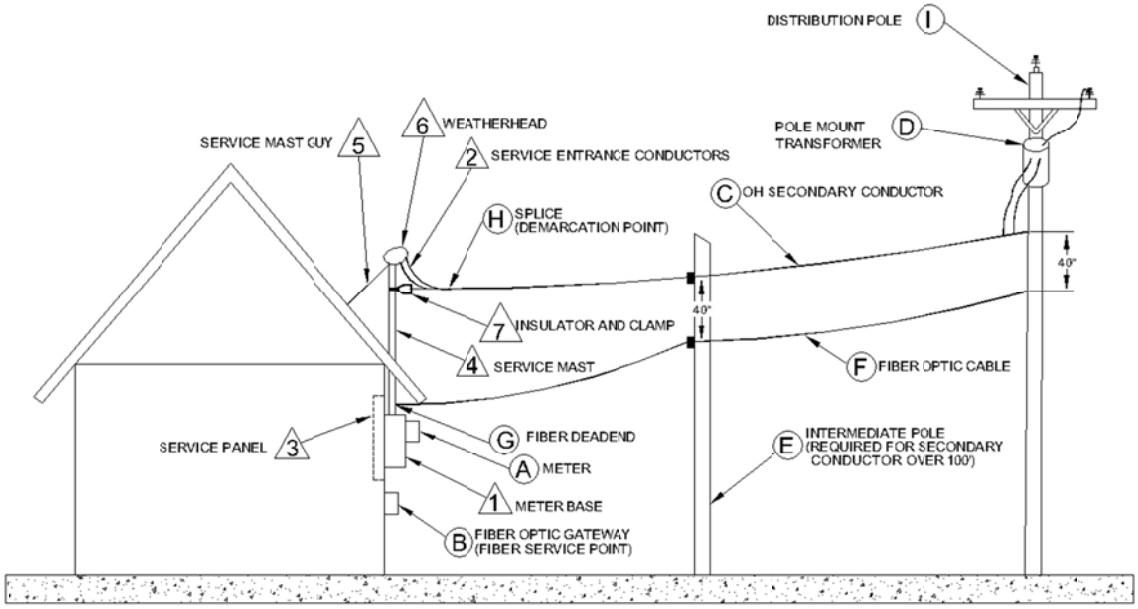


FIGURE 4. TYPICAL OVERHEAD SERVICE INSTALLATION

△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER	○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
1. METER BASE 2. SERVICE ENTRANCE CONDUCTORS 18" WEATHERHEAD - CUSTOMER OWNS 3. SERVICE PANEL 4. SERVICE MAST 5. SERVICE MAST GUY 6. WEATHERHEAD 7. INSULATOR AND CLAMP	A. METER B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT) C. OVERHEAD SECONDARY CONDUCTOR D. POLE MOUNT TRANSFORMER E. INTERMEDIATE POLE F. FIBER OPTIC CABLE G. FIBER OPTIC DEADEND H. SPLICE (DEMARCATION POINT) I. DISTRIBUTION POLE

Figure 4. Typical Overhead Service Installation

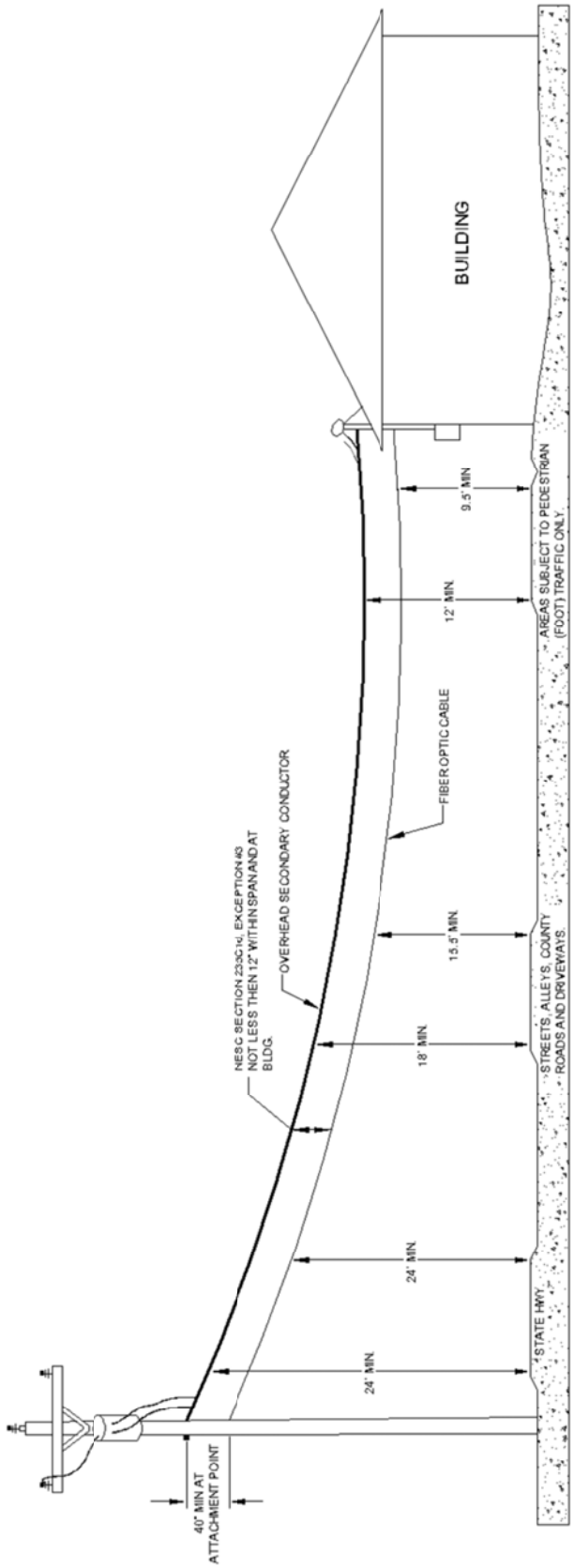


FIGURE 5. MINIMUM VERTICAL CLEARANCE FROM GROUND

Figure 5. Minimum Vertical Clearance From Ground

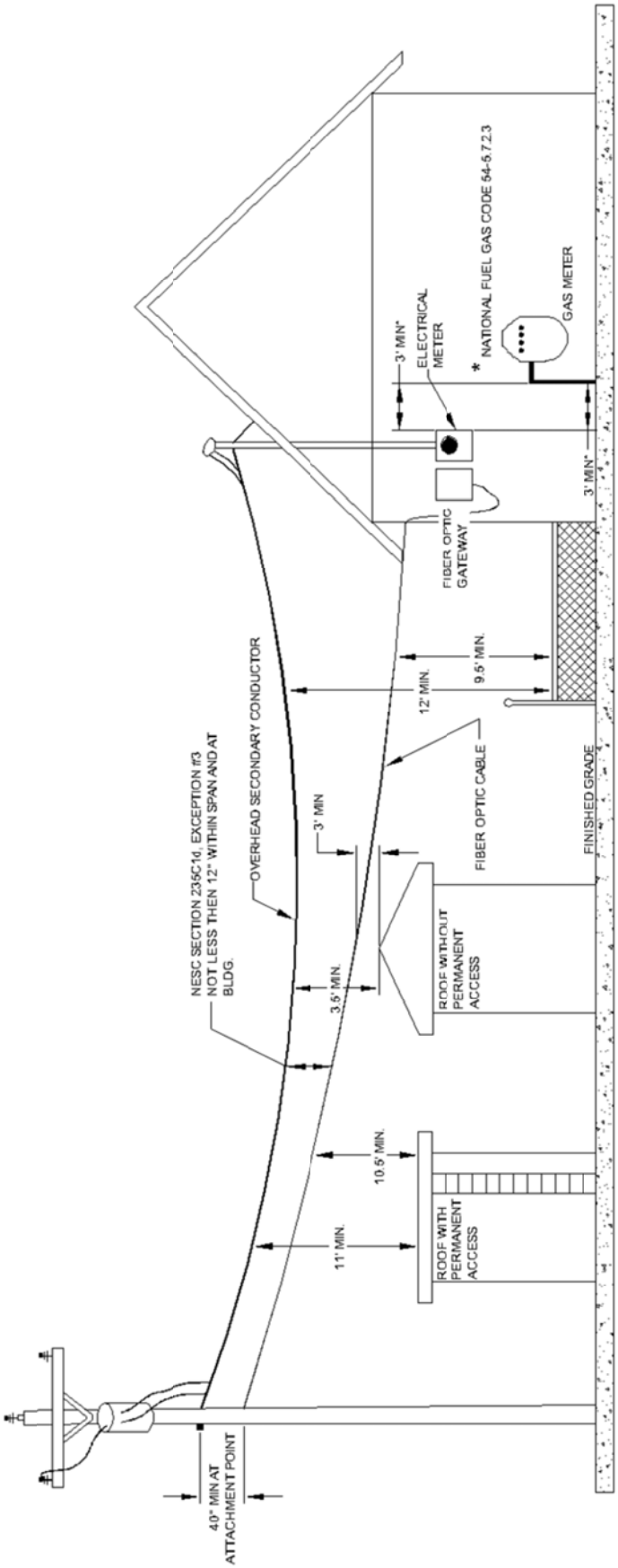


Figure 6. Minimum Clearances Over Other Structures

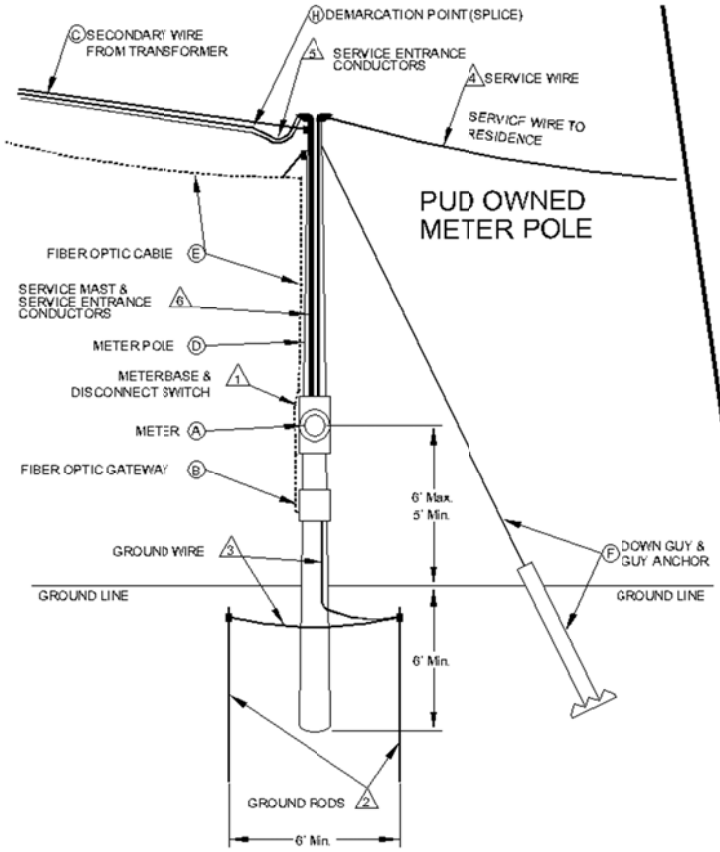


FIGURE 7. PUD OWNED METER POLE

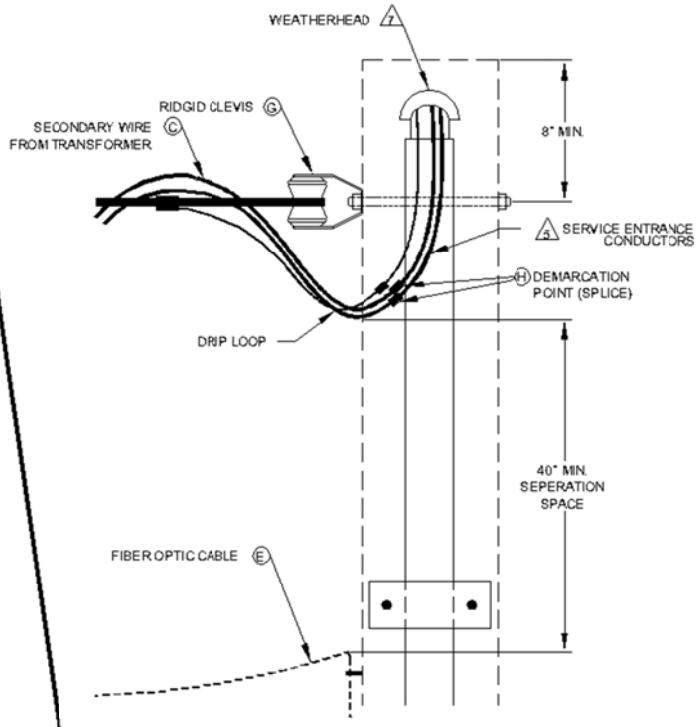


FIGURE 7A DETAIL

△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER

1. METER BASE AND DISCONNECT EQUIPMENT, IF APPLICABLE
2. GROUND RODS (PER NEC AND WAC)
3. GROUND WIRE (PER NEC AND WAC)
4. SERVICE WIRE (CUST. OWN AND MAINTAIN)
5. SERVICE ENTRANCE CONDUCTORS 18 INCHES OUT OF WEATHERHEAD.
6. SERVICE MAST, SERVICE ENTRANCE CONDUCTORS
7. WEATHERHEAD

◯ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD

A. METER
B. RESIDENTIAL GATEWAY
C. SECONDARY WIRE FROM TRANSFORMER
D. METER POLE
E. FIBER OPTIC CABLE
F. DOWN GUY AND ANCHOR (REQUIRED IF SECONDARY WIRE IS MORE THEN 100')
G. RIDGID CLEVIS
H. DEMARCATION POINT (SPLICE)

Figure 7. PUD Owned Meter Pole

and

Figure 7A. Detail

CHAPTER THREE

Underground Services

General Requirements

This chapter provides the general requirements for an underground service. The customer shall check with the local planning department to verify what type of service is permissible (overhead or underground). If an overhead service is desired, refer to Chapter Two ─ Overhead Service.

The following checklist is provided to assist in the installation of an underground service.

- Determine an acceptable location and ampacity for the *meter base* (see Chapter Four ─ Metering in this workbook).
- Determine location of nearest connection point to District underground facilities. Verify location with the *Service Expediter* before proceeding with building plans or project.
- Determine if service will cross someone else's property. If so, it will be necessary to obtain an easement from the legal property owner. (See Chapter Six ─ Right-of-Way).
- Complete the "Service Connection Agreement" with sketch. (see Chapter One).
- Stake your proposed *meter base* location and proposed transformer location for the District's *Engineering Technician.*
- If necessary, an on-site visit will be scheduled with an *Engineering Technician*. The *Engineering Technician* will create a District work order and calculate the construction charges. The customer will be notified of these charges either by phone or mail.
- The *Engineering Technician* or *Service Expediter* will determine the *Demarcation point*.
- Acquire an electrical installation permit from Washington State Department of Labor and Industries (L&I).
- Call the Utilities Underground Location Center One-Call number: **811**
- Dig a trench from the meter location to the District's facilities. Excavate to the center edge of a *padmount transformer*, *secondary handhole,* or a *secondary pedestal.* If trench is to a pole, excavate to the center directly under the overhead transformer. Verify location and routing of trench with the District prior to digging. (See District Specification No. 10.0008 in the Appendix.)
- Contact the *Engineering Technician* or *District Service Expediter* for delivery of District supplied electrical and/or fiber conduit (based on job order design).
- Install District-furnished electrical grade schedule 40 PVC gray conduit. For 200 amp services, 2" conduit and for 400 amp services, 3" conduit is used. Fiber optic conduit will be furnished by the District as required in chapter 7 of this book and per District standards. Conduit is required end-to-end. The conduit size will be determined by the size and number of conductors. White water pipe or sewer pipe is not acceptable.
- A total of 3 – 90 degree elbows or any combination with a total of 270 degrees is allowed per run.
- Install the *meter base* and associated equipment. See Figures 8 & 9 for typical underground installations.
- Pay applicable line extension fees to the District.
- When all the electrical equipment has been installed, call the *state electrical inspector* for an inspection.
- Notify the District's *Service Expediter* when service is approved for connection. The electrical inspector will also notify the District when the service is approved.
- The *Service Expediter* or *Engineering Technician* will check to see if all permits and easements have been obtained and construction charges have been paid.
- The *Service Expediter* will schedule the construction and/or service connection.
- Verify that all clearances to District equipment, including meter, will be adequate for installation, construction, maintenance, and meter reading. NOTE: A conductor failure may be subject to excavation. Make sure the service conductor can be easily reached and excavated.

Access to District Facilities

Only authorized and qualified District personnel can access transformers, *secondary pedestals,* and *secondary*

handholes. Contact the *Service Expediter* when access is necessary to complete the construction.

Service Equipment Installation Requirements

There are four ways this equipment can be installed:

1. Flush-Mounted
2. Surface-Mounted
3. Post-Mounted
4. Meter Pedestal

See Chapter Four ─ Metering for additional information.

Contacting Other Utilities or Agencies

New construction typically involves the installation of telephone, cable television and power cables, as well as natural gas, water, and sewer lines. Local providers now offer high-speed internet, television and telephone via fiber optic cable. Contact a local service provider to see if this service is in a 'fiber ready" area. It is the customer's responsibility to notify each utility for service. Provide the District with a contact and phone number for each utility providing service.

Underground Locates

Forty-eight (48) hours prior to any excavation, it is the excavator's responsibility to call the Utilities Underground Location Center (UULC). The UULC will request a location; the Section, Township, and Range is required in addition to the exact location within the Section. The UULC will ask if the area is staked or marked. There is no charge for this service. A location number will be given to the excavator for their protection and future correspondence with the UULC. To obtain an underground locate, call the UULC One Call at **811**.

In areas that are not covered by the UULC, the excavator shall contact the utilities individually and notify them of the excavation.

A color code for underground locates has been established by the State of Washington.
The color codes are:

Red ..... Electric
Yellow ..... Gas/Oil
Orange ..... Telephone/Cable TV
Blue ..... Water
Green ..... Sewer
White ..... Area to be located

Excavation within twenty-four (24) inches on either side of the location markings shall be done by hand. Damage to underground facilities is subject to penalties up to three times the cost to repair.

Manufactured Home

An underground service to a manufactured home can be installed one of three ways:

- Mobile home pedestal.
- Post-mounted *meter base*
- *Meter Base* mounted on the manufactured home, if both of the following conditions are met:
  a. The manufacturer installed the *meter base* on the manufactured home when it was constructed.
  b. The service equipment meets the District's *meter base* requirements. (See Chapter Four ─ Metering.)

The service equipment must meet all applicable *NEC*, federal, state, and regional codes and be inspected by the *state electrical inspector* prior to connection. The *meter base* shall meet the District requirements listed in Chapter Four ─ Metering.

Modifications of Existing Facilities

Additional electrical load requiring modifications to customer and/or District facilities shall be brought up to current *NEC*, WAC, federal, state and regional codes and standards. Normally the District has the right to connect a service modification, prior to a state electrical inspection, if the District deems the installation is safe for connection and the state electrical permit is posted at the site. However, if the *state electrical inspector* finds deficiencies in the installation, he will initiate a request to disconnect service. The service will be disconnected until such time as the *state electrical inspector* approves the installation.

A *demarcation point* will be identified to determine the customer's responsibility for construction and cost of the system upgrade to facilities.

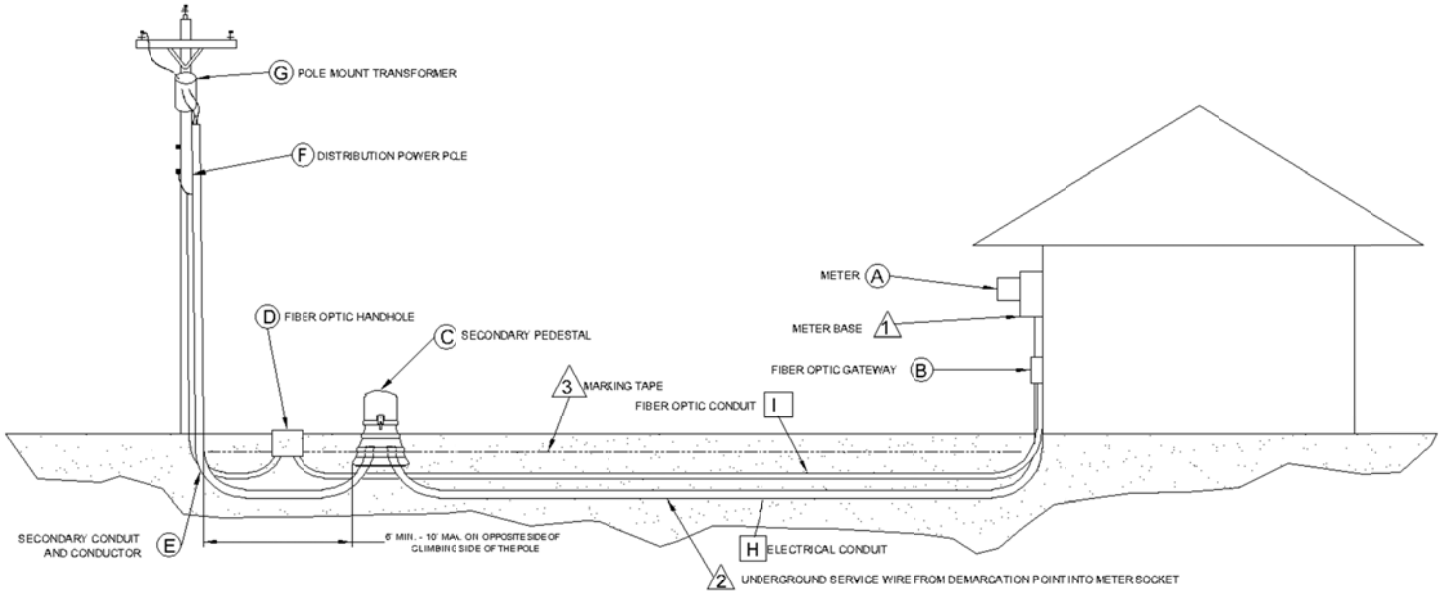


FIGURE 8. UNDERGROUND SERVICE FROM OVERHEAD LINE AND POLE MOUNT TRANSFORMER

△
ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER
1. METER BASE
2. UNDERGROUND SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT OWNS CONDUCTOR AFTER SERVICE IS ESTABLISHED)
3. MARKING TAPE

○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
A. METER
B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)
C. SECONDARY PEDESTAL
D. FIBER OPTIC HANDHOLE
E. UNDERGROUND SECONDARY CONDUIT AND CONDUCTOR
F. DISTRIBUTION POWER POLE
G. POLE MOUNT TRANSFORMER

□
ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER
H. ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED)
I. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)

Figure 8. Underground Service From Overhead Line and Pole Mount Transformer

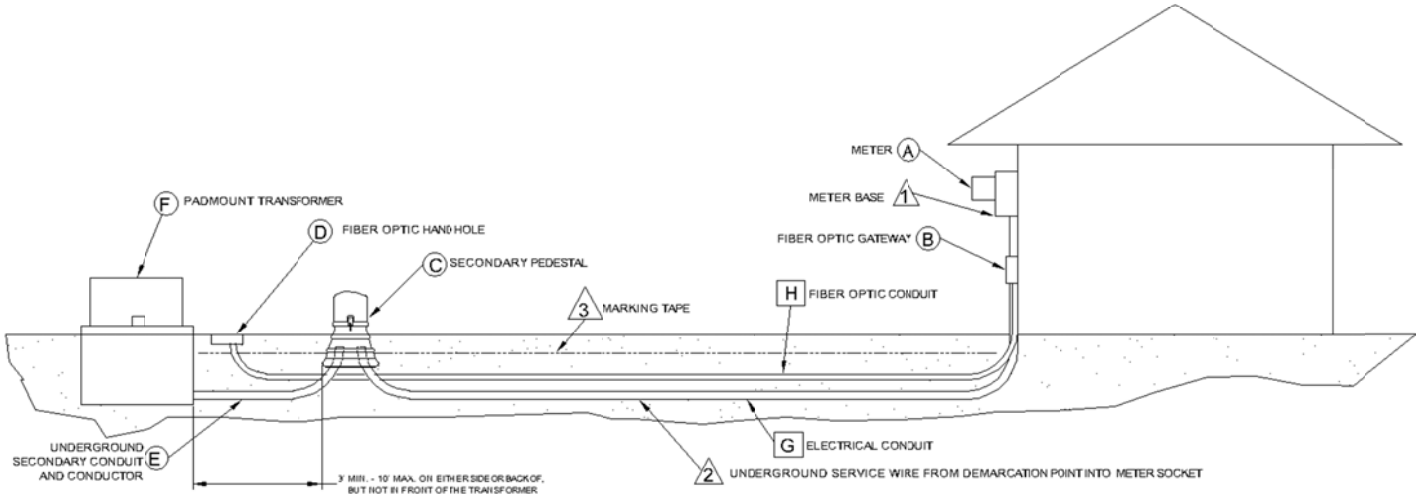


FIGURE 9. UNDERGROUND SERVICE FROM PADMOUNT TRANSFORMER

△

ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER
1. METER BASE
2. UNDERGROUND SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT OWNS CONDUCTOR AFTER SERVICE IS ESTABLISHED)
3. MARKING TAPE

○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
A. METER
B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)
C. SECONDARY PEDESTAL
D. FIBER OPTIC HANDHOLE
E. UNDERGROUND SECONDARY CONDUIT AND CONDUCTOR
F. PADMOUNT MOUNT TRANSFORMER

□

ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER
G. ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED)
H. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)

Figure 9. Underground Service From Padmount Transformer

CHAPTER FOUR

Metering

General Information

This chapter covers the District's requirements for metering equipment that is provided by the customer. Additional questions should be directed to the District's *Service Expediter.*

Service Equipment Ampacity Ratings

The District's metering requirements for single-family residential structures (not apartments or condominiums) are based upon the following single-phase service ratings:

Voltage	Ampere Rating
120/240	200 Amp
120/240	400 Amp
120/240	over 400 Amps*

*Single phase services rated over 400 Amps and three phase services are not covered in this workbook. Contact the *Service Expediter* for more information on these types of services.

Table 1. Voltage/Amps of Service Options

It is the customers' responsibility to determine the electrical requirements for the service entrance, then notify the District.

General Requirements

Meter bases can be mounted as follows:

1. 200 Amp or 400 Amp: flush-mounted, surface-mounted, and/or post-mounted.
2. 200 Amp mobile home pedestal.

Select the method appropriate for the project.

Meter Location

The *meter base* shall be installed outside and in a place that is accessible to the District for installation, maintenance, emergency response, and meter reading. The *meter base* shall be mounted on a customer-owned structure. All meter locations are subject to District approval.

A post-mounted meter or a mobile home pedestal shall be located facing the road for meter access.

The center of the meter shall be between 5 and 6 feet above finished grade (except mobile home pedestals).

For convenience purposes, it is recommended that the *meter base* be placed as close to existing District facilities, nearest property corner, or boundary as possible.

Placing the *meter base* at the property corner or boundary has several advantages:

- District personnel can maintain their facilities without needing access to the customer's property.
- Meter location will not interfere with any future construction projects such as remodeling, adding on, landscaping, etc.
- Ability to disconnect service in case of emergencies (i.e. fire). NOTE: It is beneficial to the customer to have a separate circuit from the *meter base* to their well in case of fire.

Clearance Requirements

The following clearances are required around all meter installations. It is the customer's responsibility to provide and maintain adequate clearances.

- A working space of 36 inches wide by 36 inches deep is required around the meter (see Figure 3). This working space is to be kept clear of any obstructions, including landscaping.
- There shall be a minimum horizontal clearance of 10 inches between the center of the electrical meter and any obstruction including gas meters (see Figure 3).
- If a flush-mounted *meter base* is installed, a clearance of 10 inches is required from the center of the meter to the closest portion of the wall (see Figure 3).
- If a flush-mounted *meter base* is installed, the siding or finished surface of the structure shall not overlap the cover of the *meter base*.

Residential Meter Base Requirements

The installed *meter base* shall meet the following District's requirements*:*

- District approved 200 or 400 ampere *meter bases* are shown in Table 2. Approved Residential Meter Base (Sockets).
- All unused openings shall be tightly sealed from the inside of the *meter base*.
- The *meter base* shall be plumb and securely fastened to the supporting structure.
- The *meter base* shall have a suitable device for sealing.
- Lever by-passes and/or lever releases are unacceptable.

Grounding Requirements

All *meter bases*, enclosures, and conduit shall be bonded and grounded in accordance with the *NEC* and WAC.

Removing and Installing Meters

To avoid a hazardous situation and a possible monetary fine, only authorized District personnel are allowed to install and remove meters and access *meter base*s. Under emergency conditions, exceptions may be granted to qualified electricians by contacting the District's Local Office or, after hours, the District's distribution dispatcher. When this occurs, the party shall accept full liability for damage or alteration to equipment, injury to persons or property, and loss of revenue to the District from the time the seal is removed until 72 hours after the District has been notified that the equipment is ready to be resealed. The customer or contractor shall promptly notify the District when repairs or modifications have been completed. Extreme caution shall be used when meters are removed or installed. Depending upon the type of service or *meter base*, removal of the meter **does not** necessarily de-energize the customer's service.

Self Contained 400 Amp Meter Base

The *meter base* required for a 120/240 volt, self-contained 400 Amp service is called a "Class 320" *meter base*. This *self-contained meter base* does not require current transformers. It can be installed where the continuous current rating is 320 Amps or less. The continuous current rating is defined as the maximum coincidental current flow at any one time and is not to be confused with the total connected load. If the service exceeds 320 continuous amps then a current transformer (CT) is required. For more information on CT services, refer to the Commercial Services Workbook.

Meter Pedestals

A meter pedestal is a structure that supports the service equipment, normally a *meter base* and a disconnect switch. The customer is required to furnish the meter pedestal if required for the service connection.

There are two meter pedestal options:

1. Post-mounted
2. Factory-built

A post-mounted pedestal consists of a short pole with the *meter base* and disconnect switch mounted on the pole. The factory-built pedestal comes complete with *meter base* and disconnect switch. The requirements for each are shown in Figures 10 and 11.

Cooper Beeline (Circle AW)			Milbank			Landis & Gyr		
Model #	Service Type		Model #	Service Type		Model #	Service Type	
204 or 204 F	Overhead		U4517	Overhead		UAT 327	Overhead	
UG204 or UG204 F	Underground		U4518	Underground		UAT 427	Overhead or Underground	
U264 or 264 F	Overhead or Underground	MCC	U7018 - XL - TG	Overhead or Underground				
			U3514	Overhead or Underground	MCC			

1 Ø 200 Amp Meter Sockets with Mains and/or Branch Breakers but without Bypass

EATON (Cutler Hammer)			GE			Midwest		
Model #	Service Type	Main Breaker	Model #	Service Type	Main Breaker	Model #	Service Type	Main Breaker
CMBE**B200BTS	Overhead or Underground	1 - 200 Amp	TSMF82000CSFL	Underground	1 - 200 Amp	M282CB1	Overhead or Underground	1 - 200 Amp
MBE**/**B200BTS	Overhead or Underground	1 - 200 Amp						
** indicates branch circuit capacity.								

Siemens			SQ - D		
Model #	Service Type		Model #	Service Type	
MC**/**B1200C	Overhead or Underground	1 - 200 Amp	URTRS213B	Overhead or Underground	
MC**/**B1200CT	Overhead or Underground	1 - 200 Amp			
** indicates branch circuit capacity.					

1 Ø 400 Amp Meter Sockets with or without Mains and/or Branch Breakers with Bypass

Lever by pass is not acceptable

Cooper Beeline (Circle AW)			GE			Landis & Gyr		
Model #	Service Type	Main Breakers	Model #	Service Type	Main Breaker	Model #	Service Type	
324 N	Overhead	None	MC**/**B1400SCS	Overhead or Underground	1 - 400 Amp	MS44UTB	Overhead	
324 C	Underground	None	MC **/**B1400SDA-SRSS	Underground	1 - 400 Amp	UAT 427	Overhead or Underground	
U404MCC	Underground	1 - 400 Amp						
U4042MCC	Underground	2 - 200 Amp	** indicates branch circuit capacity.					

Milbank			SQ - D		
Model #	Service Type		Model #	Service Type	Main Breaker
U3548	Overhead or Underground		CU12L400CB	Underground	2 - 200 Amp

1 Ø 200 Amp Meter Sockets for Mobile Homes and Mobile Parks

Lever by pass is not acceptable

EATON (Cutler Hammer)			Midwest		
Model #	Service Type		Model #	Service Type	Main Breaker
MBT**B200**	Underground		M281C1P6H***	Underground	1 - 200 Amp
** indicates branch circuit capacity.			*** indicates outlet addition when listed as 010.		

Table 2. Approved Residential Meter Base (Sockets).

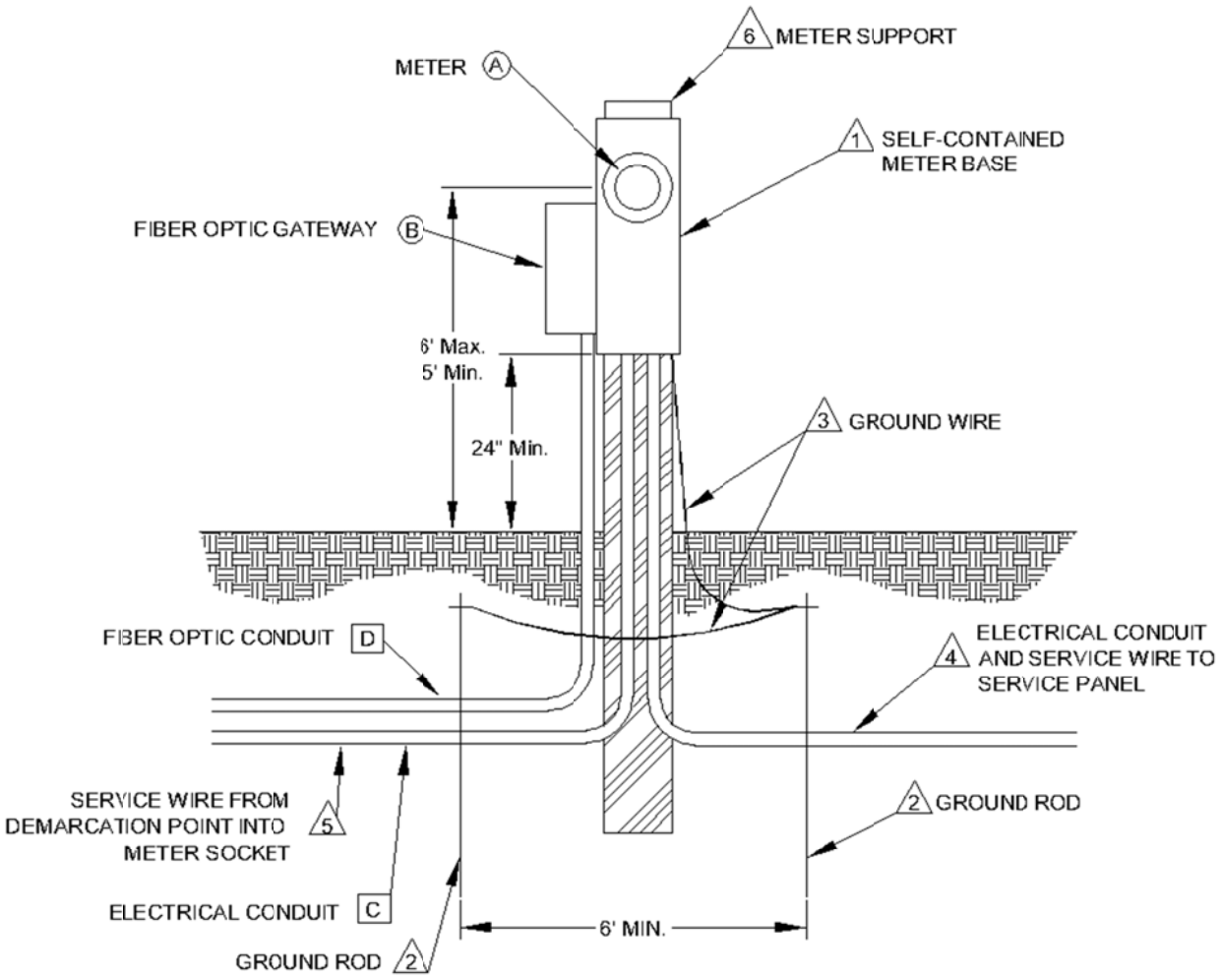


FIGURE 10. POST MOUNTED METER INSTALLATION

△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER

1. SELF-CONTAINED METER BASE
2. GROUND RODS (IN ACCORDANCE WITH NEC AND WAC RULES, TWO REQUIRED.)
3. GROUND WIRE (IN ACCORDANCE WITH NES AND WAC RULES)
4. ELECTRICAL CONDUIT AND SERVICE WIRE TO SERVICE PANEL
5. SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT OWNS AFTER SERVICE IS ESTABLISHED.)
6. METER SUPPORT, 6" x 6" x 10' MIN. LENGTH FULLY PRESSURE-TREATED POST OR METAL SUPPORT BURIED A MIN. OF 3' DEEP. WHEN ANGLE IRON, CHANNEL IRON OR RIGID PIPE IS USED, IT MUST BE SET IN 6" x 24" x 24" CONCRETE FOOTING.

○

ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD

A. METER
B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)

□

ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER

C. ELECTRICAL CONDUIT - (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED)
D. FIBER OPTIC CONDUIT - (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)

Figure 10. Post Mounted Meter Installation

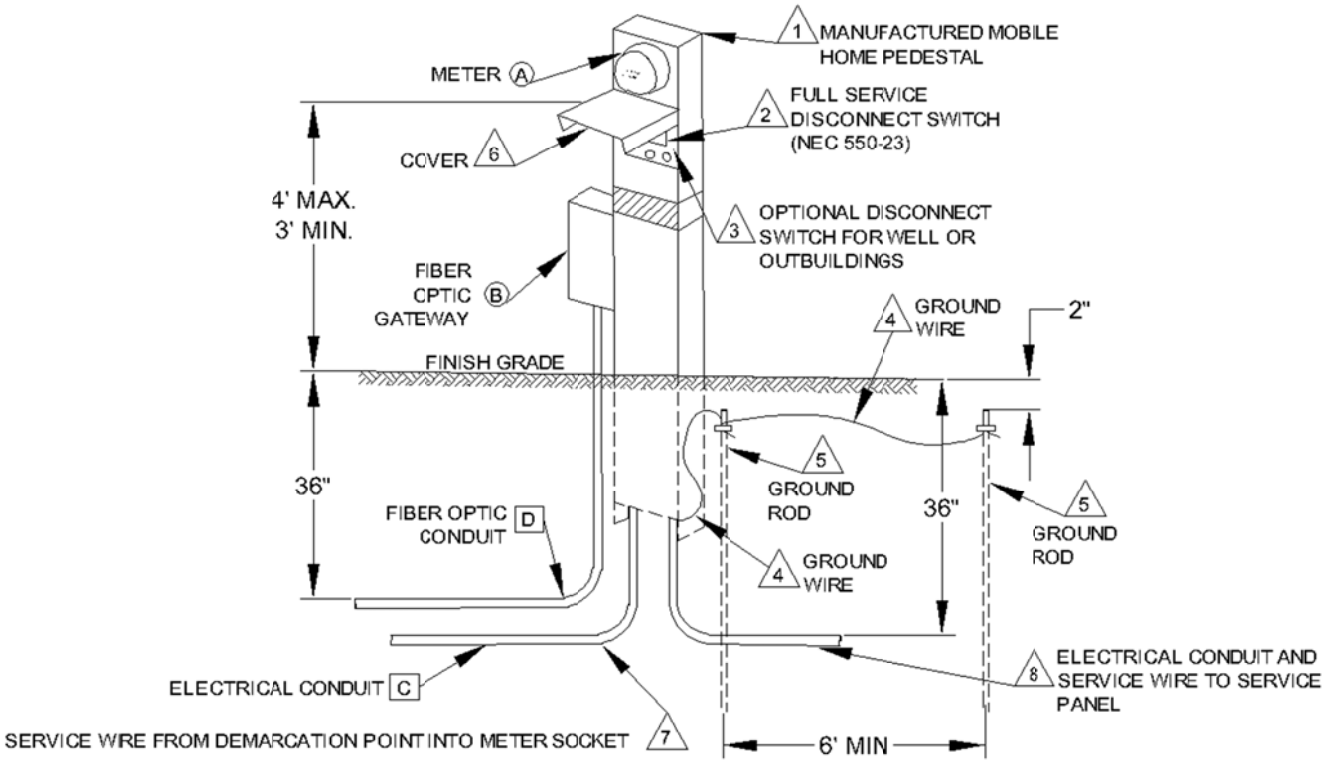


FIGURE 11. MANUFACTURED MOBILE HOME PEDESTAL WITH METER BASE INSTALLATION

△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER

1. MANUFACTURED MOBILE HOME PEDESTAL.
2. FULL SERVICE DISCONNECT SWITCH (NEC 550-23)
3. OPTIONAL DISCONNECT SWITCH FOR WELL OR OUTBUILDING
4. GROUND WIRE (IN ACCORDANCE WITH NEC AND WAC RULES)
5. GROUND RODS (IN ACCORDANCE WITH NEC AND WAC RULES)
6. COVER
7. SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT OWNS AFTER SERVICE IS ESTABLISHED)
8. ELECTRICAL CONDUIT AND SERVICE WIRES TO SERVICE PANEL

○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD

A. METER
B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)

□ ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER

C. ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED)
D. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)

Figure 11. Mobile Home Pedestal Installation

CHAPTER FIVE

Construction Temporary Services

General Information

A *Construction temporary service* is an electrical service used for construction purposes. It is only available where single phase, 120/240 volt power, is adjacent and accessible to the customer installed temporary service panel.

If construction temporary service is unavailable, contact the District *Service Expediter* for more information. The customer may need to apply for a permanent service.

There are metered and *non-metered temporary service*s.

1. Temporary Metered Connection Fee– The customer completes a "Service Connection Agreement" and submits it to the District *Service Expediter*. The customer installs a meter panel adjacent to District facilities and obtains an electrical permit from Washington State Department of Labor and Industries (L&I). When installation is approved by the L&I, contact the District's Service Expediter to schedule the connection. The **metered temporary connection fee is $10 (Ten Dollars)** and will be billed at the appropriate rate schedule up to one-year. At the end of one year the District will either remove the service or charge the customer the simple service connection fee and consider the service permanent.

2. Temporary Non-metered Connection Fee— Customer completes a "Service Connection Agreement" and submits it to the District *Service Expediter*. The customer installs a temporary service panel (limited to 60 amp; see Figure 12) adjacent to District facilities and obtains an electrical permit from L&I. When installation is approved by L&I, contact the District's Service Expeditor to schedule a connection. The **non-metered connection fee is $60 (Sixty Dollars)** for a six month period. The District will allow one six-month extension for another **$60 (Sixty Dollars)**

There are underground and/or overhead connected temporary services. Please refer to the section in this chapter for the type of service being requested. Please contact the District's *Service Expediter* for additional information or to answer any questions.

Temporary Overhead Service

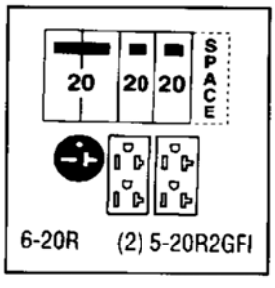
Temporary overhead service is available in the District's service area where the existing electrical system is overhead construction.

A temporary overhead service may be placed within 50 feet of District facilities, provided adequate clearances can be maintained.

If the District's facilities are underground, refer to the temporary underground service section of this chapter.

Temporary Underground Service

Temporary underground service is available in the District's service area where existing power facilities are installed underground. Underground temporary services need to be installed within 10 feet of a *padmount transformer*, *secondary handhole* or pedestal. The customer provides the trench, conduit, and wire from District's facilities to the temporary service. Allow three (3) feet of wire for makeup to a *secondary handhole* or pedestal and ten (10) feet if run to a *padmount transformer*.



Wiring Diagram

Figure 12. Non-metered Temporary Service Panel

CHAPTER SIX

Right of Way

General Information

This chapter covers the District's requirements and the Customer's responsibilities for land use requirements, rights-of-way and permits.

An *Engineering Technician* will be assigned to any "complex project" that requires additional rights-of-way and/or permits.

Land Use Requirements

The customer shall comply with the following land use requirements for both the electric system and the fiber optic system.

- **Compliance with other Agencies:** The Customer will be required to comply with all applicable jurisdictional agencies, state, county, and local statutes. These shall include, but not necessarily be limited to, the County Unified Development Code, Uniform Building Code, Urban Growth Management Area development standards, and regulations requiring certain minimum improvements.
- **Provide Copies to District:** The customer shall provide the District with executed copies of any and all required agency developmental approvals, i.e. approved building site plan.
- **Property Corners:** Property corners that are disturbed shall be replaced by the owner. Property corners shall not be driven deeper than 18 inches below final grade in order to protect buried facilities.

Easements for Rights-of-Way

The customer shall complete the "Service Connection Agreement" with the names of legal land owners, property description(s), and sketch showing all property boundaries that the service connection will affect.

The customer is required to obtain the property owner's signature on the "Service Connection Agreement" in order for the District to install facilities on the property.

The District will determine if additional easements for rights-of-way are required. The District will prepare all easements on District easement templates and the Customer shall obtain all property owners' signatures. The District's cost for preparing the easement(s) for rights-of- way will be a flat "fee" per easement. The assigned *Engineering Technician* will advise the customer of the required fees.

Once the easement(s) for rights-of-way are signed by the property owner(s) and notarized in the presence of a Notary Public, return them to the District: Attention; Lands Department – Distribution Right-of-Way. The District will record the easement (s) at the respective Auditor's Office of the appropriate county, i.e. Grant, Lincoln, Adams, Douglas, etc.

Public Agency Permits/Licenses for Rights-of-Way

The District will obtain the required permits/licenses from public agencies or entities (DOT, USBR, BLM, DNR, Railroads, Cities, etc.) and coordinate any professional land survey(s), if required, for these permits.

The customer shall pay for any or all permits/licenses, including but not limited to, Washington State Department of Transportation, United States Bureau of Reclamation, Bureau of Land Management, Department of Natural Resources, Railroad, and other permits/licenses as may be required along with any required professional surveys.

Columbia Basin Irrigation District Permits are required if the District's *primary* or *secondary wires* cross an irrigation district waterway. These permits will be obtained by the District from the appropriate irrigation district (i.e. South Columbia Basin Irrigation District, Quincy Columbia Basin Irrigation District, or East Columbia Basin Irrigation District.) A minimum of three weeks is required to obtain permit(s).

Public Agency Permits/Licenses for Rights-of-Way (cont'd)

Grant County Road Permits are required if the District's *primary* or *secondary wires* cross under a county road. A permit is not required for an overhead line crossing. A minimum of two weeks is required to obtain permit(s).

Lincoln County Road Permits are required if the District's *primary* or *secondary wires* cross a county road. The cost varies from $75 to $150, and is subject to change. A minimum of three weeks is required to obtain the permit(s).

Washington State Department of Transportation (WSDOT) Permits are required if the District's *primary* or *secondary wires* cross a state highway or parallel a state highway within their right-of-way and easement. There is a fee for this permit, usually ranging in cost from $150 to $500. A minimum of four to six months is required to obtain the permit(s).

City Permits may be required if the District's underground *primary* or *secondary wires* are constructed within city limits. A minimum of two weeks is required to obtain permit(s).

Bonneville Power Administration (BPA) Permits are required if the District's p*rimary* or *secondary wires* cross under a BPA power line or are located in the BPA easement area. A minimum of three months is required to obtain permit(s).

United States Bureau of Reclamation (USBR) Licenses are required if the District's *primary* or *secondary wires* cross USBR property. The USBR charges $200 (subject to change) and a percentage of Fair Market Value for this license. A minimum of six months is required to obtain license(s).

Department of Natural Resources (DNR) Easements are required if the District's *primary* or *secondary wires* cross DNR property. To obtain this permit a professional survey is required. The District will obtain the survey and the permit. The DNR charges $2,500 (subject to change) for the costs of the permit. Upon completion of the survey, the survey and application fee will be submitted to DNR for processing and approval. A minimum of three to four months is required to obtain permit(s).

DNR tenants will not be required to obtain a permit; however, DNR must approve and sign the tenant's Service Connection Agreement.

Bureau of Land Management (BLM) Easements are required if the District's *primary* or *secondary wires* cross BLM property. To obtain this permit, an application and permit fee must be submitted to BLM. The permit fee ranges from $175 to $1,125. A minimum of three months is required to obtain easement(s).

Railroad Permits are required if the District's *primary* or *secondary wires* cross over or under a railroad track. The cost for a permit from Burlington Northern Santa Fe Railroad is $3,000 and the cost for a permit from Washington Central Railroad is $3,000 (either fee is subject to change). A minimum of six weeks is required to obtain permit(s).

Professional Surveys are provided by a licensed land surveyor and are obtained by the District. All survey fees and costs are the customer's responsibility.

The customer has the option to provide the District with a "Record of Survey" that will be acceptable to the permitting agencies. The customer shall be familiar with the permitting agencies requirements if supplying the "Record of Survey".

CHAPTER SEVEN

Fiber Optic Cable

Underground Fiber Optic Cable

The District will furnish and install fiber optic cable in accordance to the District's "Fiber Optic Customer Service Policies" and build-out schedule, or as amended by the District. The District will supply 1" or 2" orange PVC conduit in fiber-optic-ready areas for the customer to install.

The fiber optic conduit shall be installed, in the customer's supplied trench, from the *demarcation point* to a location near the electrical meter. The District's *Service Expediter* will identify the *demarcation point* for the customer. Normally, the fiber optic conduit will parallel the electrical service conduit.

If fiber optic cable is available, the District will provide and install fiber optic cable in the customer installed conduit to the District's supplied residential fiber gateway box (generally located next to *meter base*). **NOTE: District supplied fiber optic conduit is for fiber optic cable only. Other companies including telephone and cable TV will not be authorized to utilize the Districts supplied fiber optic conduit.**

Overhead Fiber Optic Cable

If fiber optic cable is available, the District will provide and install fiber optic cable to the District's residential fiber gateway box (generally located next to *meter base*).

Contacting Other Utilities or Agencies

For fiber optic service, the customer needs to contact a "Local Provider". Local providers offer high-speed internet, television, and telephone via the fiber optic cable connection. It is the customer's responsibility to notify a local provider and request service. Local providers are listed in the phone directory under the type of service provided.

Conduit Size

Trenches over 100 feet in length require two (2) inch orange conduit.

Glossary

Complex Service Request - A request for electrical service that requires engineering and/or right of way.

Demarcation Point - A location established for the purpose of construction to define where the District's construction stops and the customer's construction starts. For an overhead system, the *demarcation point* is the *service point* just outside the customer's *service mast* or a temporary *meter base*. For underground service, the *demarcation point* is the first secondary connection on the customer's property either at a *padmount transformer*, *secondary handhole*, *secondary pedestal* or a *meter base*. Demarcation only applies to construction. Once a service is activated, a *service point* is established which defines control.

Engineering Technician - A District employee that designs construction projects and coordinates construction activities.

Guy or Guying - Cables or braces used to relieve the strain of overhead conductors on masts and poles.

HVAC - Heating, Ventilation and Air Conditioning.

Meter Base - The mounting device consisting of meter jaws, connectors, and enclosure for accommodating socket-type meters.

Metered Temporary Service – A metered service panel provided and installed by the customer or his contractor for the purpose of providing power during construction of a premise. Metered temporary service fee is $10 (Ten Dollars) plus billed at the appropriate rate schedule.

Moped – A plastic rounded top above ground secondary junction box which contains electrical equipment or splices.

NEC - National Electric Code

NESC – National Electric Safety Code

Padmount Transformer - An electrical device which is mounted on a base used to change the voltage to a level appropriate to serve customers.

Primary Wire - Electrical high voltage conductor.

Rigid Clevis - A porcelain insulator with mounting bracket used to terminate overhead services.

Secondary Handhole - A box that is flush mounted in the ground which contains electrical equipment or *splices*.

Secondary Pedestal - A box that is mounted above ground level which contains electrical equipment or *splices*.

Secondary Wire - The conductors from The District's system to the customer's *demarcation point* which can be overhead or underground.

Self-Contained - In reference to *meter bases*: a device designed and rated to continuously carry the entire capacity of the service entrance equipment. The maximum *self-contained meter base* current rating approved by The District is 400 Amps (also called a single-phase Class 320 A meter).

Service Entrance Conductors - The electrical conductors in an overhead service that extend from the *meter base* up through the service mast to the *demarcation point*. Weather head Conductors are provided by the customer.

Service Expediter - A District employee that is the initial contact person on construction projects.

Service Mast - The conduit above the meter used to provide mechanical protection for the service conductors and to support the service drop from The District's system.

Service Point – Is the point of connection where the customer's electrical or telecommunications system connects to the District's systems. This point will be the load lugs on the customer owned but District controlled *meter base*. The fiber *service point* is the CAT5 RJ45 cable connectors in the Gateway enclosure.

Service Wires - The electrical wires that connect the customer's *meter base* to The District's *demarcation point*. Service conductors are provided by the customer.

Simple Service Request - A request for electrical service at a site where The District facilities already exist on a customer's property and does not require right of way.

Splice - A junction point between two conductors.

State Electrical Inspector - The qualified representative of the State of Washington Department of Labor and Industries, who has been authorized to inspect electrical service installations.

Non-metered Temporary Service - A non-metered, up to 60 amp capacity, 120/240 volt single phase electrical service installed by the customer or his contractor to provide construction power to a job site for six months or less. The non-metered connection fee is $60 (Sixty Dollars).

Utility System – The electrical equipment owned or under the control of the District. "Under the control" means restricted public access by means of lock or seal. This includes the customer owned service entrance and *meter base*.

Weatherhead - A device installed at the top of the service entrance conduit that prevents water from entering the conduit, while allowing access for the service conductor.

Telephone Numbers

Grant County PUD

Service Expediter	766-2501
Service Expediter Fax	754-6658
Ephrata Local Office - 30 C Street S.W., Ephrata	754-0500
Grand Coulee Local Office - 555 Grand Coulee West, Grand Coulee	633-2522
Moses Lake Local Office - 312-3rd Avenue West, Moses Lake	766-2505
Quincy Local Office - 27 B Street S.W., Quincy	787-3565
Royal City Local Office - 505 Royal Road, Royal City	346-2228
Royal City Local Office - Mattawa Exchange	932-4299
Customer Service Call Center	766-2505
Grant County PUD Toll Free Number	1-800-422-3199
Zipp Customer Care Team	754-6632 or Toll Free 1-888-254-1899

State & County Government

Department of Labor and Industries- 3001 W. Broadway, Moses Lake	764-6900
Department of Labor and Industries Electrical Inspection (24 hour) Line	764-6966
Building Department - 332 Division West, Ephrata	754-2011
Health District - 35 C Street N.W., Ephrata	754-6060
Health District - 903 W 3rd Avenue, Moses Lake	766-7960

City and Town Government

Town of Coulee City - 501 Main Street West	632-5331
Town of Electric City - 10 Western Avenue	633-1510
City of Ephrata - 121 Alder S.W.	754-4601
City of George - 102 Richmond Avenue	785-5081
City of Grand Coulee - 306 Midway Avenue	633-1105
Town of Hartline - Main Street North	639-2606
Town of Krupp (Marlin) - 293 Urquhart Avenue North	345-2531
City of Mattawa - East 521 Government Road	932-4037
City of Moses Lake - 321 Balsam Street- Existing Service	766-9214
City of Moses Lake - 321 Balsam Street - New Service	766-9235
City of Quincy - 104 B Southwest	787-3523
City of Royal City - 697 Camelia Street	346-2263
City of Warden - 201 Ash Street	349-2326
City of Wilson Creek- 204 4th North	345-2531

Utilities Underground Location Center (UULC) 811

APPENDIX (Standard 10.0008 Trench Construction – PVC Conduit)

Page 1 of 6

Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

1. SCOPE:

This specification covers trenching, trenching location in reference to other utilities, conduit location within the trench, backfill and compaction of backfill.

2. STANDARDS:

This specification includes reference to the following "*The American Society for Testing and Materials International*" (ASTM International) standards.

2.1. Soil Compaction:
ASTM D 698.00a Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft.-lb/ft cubed.

2.2 Soil Classifications for Backfill:
ASTM D 2487-00 Standard Practice for Classifications of Soils for Engineering Purposes. (Unified Soil Classification System)
ASTM D 2488-00 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

3. TERMINOLOGY:

3.1. Trench: Excavation for placement of individual conduits or duct systems for electrical and/or communication services.

3.2. Backfill Area: Area of trench backfilled in three zones- 1) Foundation 2) Embedment 3) Final Backfill Zone.

3.2.1. Foundation: Used only where the trench bottom is unstable or a material that does not compact. Additional compacted material may be added to make a secure base.

3.2.2. Embedment: Compacted material placed below, around and above the conduit/duct system to provide support and protection for the conduit/duct system..

3.2.2.a. Bedding: Material placed on the trench bottom or on foundation to provide uniform support and protection for the conduit(s)

2.2.2.b.Conduit Zone: Material placed on either side of the conduit and/or between ducts. This material prevents lateral displacement of the conduit/duct due to live loads or water infiltration.

3.2.2.c.Spring Line Cover: Six inches of material placed above the top of the

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON				
CONSTRUCTION STANDARDS				
STANDARDS COMMITTEE APPROVAL DATE:	11/07/2002	Title: 10.0008 TRENCH CONSTRUCT PVC, CONDUIT		10.0008
DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV.	07/16/2005	Page 1 of 6

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conduit/duct system. This material provides protection for the conduit duct system from final backfill and/or live loads imposed on the trench.

3.2.3. Final Backfill: Trench area that extends from the top of the 6 inch cover to the top of the trench. Material here is native soil, unless the material contains cobbles or boulders over 4 inches in diameter.

3.3. Spring Line: The top of a single conduit or highest duct in the trench with more than one conduit.

3.4. PVC Conduit: Polyvinylchloride (PVC) conduit used for single conduit runs or duct systems. PVC conduit for electric systems will be grey. PVC conduit for fiber optic system shall be orange.

3.5. Definitions: This standard includes the definitions in ASTM 2487 and 2488, Section 3 "Terminology."

4. BACKFILL MATERIALS:

General: All backfill materials are defined in ASTM 2487 & 2488, Section 3 'Terminology.' All backfill used in any trench shall be organic-free material. This includes organic particles and larger organic debris.

4.1. Foundation Materials:
This material shall be compactible material such as gravel, sand, silt or clay or a mixture of those materials. Nothing larger than 1 inch minus gravel/aggregate shall be used. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.2 "Gravel" (subsection "fine")

4.2. Embedment Zone Materials:
Material in all three areas, bedding, conduit zone and cover, shall be sand, silt or clay material. Material shall pass a number 40 sieve but does not have to pass a number 200 sieve. Clay or Silt materials are defined as *fine grained top soil or soil free of any gravel, rock or rock chips*. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.1 "Clay" & 3.1.7 "Silt."
Sand is defined as *fine particles of rock, common reference "blow sand"*. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.6 "Sand" (subsection "fine")

4.3. Final Backfill Zone Materials
This material can in most cases be native soil/rock excavated from the trench. However if this material contains cobble/boulders larger than 4 inches in diameter it shall not be used.

5. CONSTRUCTION LOCATION/DIMENSIONS:

5.1. Location: The trench shall be within the easement granted to the District. The trench shall not be closer to other utilities than described below.

Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

5.1.1. Water Lines: The electric trench shall be a minimum of 18 inches horizontally from any water line at any elevation.

5.1.2. Gas Lines: The electric trench shall be a minimum of 10 feet horizontally from any gas transmission line and 18 inches horizontally from any gas service line.

5.1.3. Sewer Lines: Where the sewer line is at or above the electric line elevation the horizontal separation shall be a minimum of 24 inches. If the sewer line is at a lower elevation than the electric line the trench shall be a minimum of 36 inches horizontally from the sewer line trench.

5.1.4. Communications: Communication lines, other than the District's fiber optic cable, shall be located no closer to the primary or secondary electric lines than 12 inches. This is a radial measurement of 360 degrees.

5.2. Width:

The minimum width of an electrical trench shall be 24 inches for a single conduit up to 4 inches in diameter. (See Figure # 1 in Section 7 under 7.1 Cross Section Dimension on page 5 of 6.} Trenches for conduit larger than 4 inches in diameter or with more than one conduit shall be determined by the conduit(s) placement in the trench. Minimum trench width shall be 5 times the diameter of a single conduit or 24 inches. (Which ever is larger).

5.3. Depth:

The minimum depth of an electrical service trench shall be 36 inches for primary power, 30 inches for secondary power, and 36 inches for fiber optic cable. This depth shall be measured from the top of the conduit (Conduit Spring Line). The trench must be deep enough to place the foundation (if required) and bedding so the entire diameter of the conduit is below minimum grade. (Exceptions to this must have prior District approval and be installed as shown in this Standard. See Figure # 2 in Section 7 under 7.2 Concrete Encased Conduit on page 6 of 6.)

5.4 Backfill:

5.4.1 Foundation: Foundation where required shall be a minimum of 2 inches of compacted material. Foundation backfill does not need to be continuous provided compaction & cable protection is achieved.

5.4.2 Bedding: Bedding shall be a minimum of 2 inches continuous compacted material and shall be constructed so the conduit is in contact with the bedding at all times.

5.4.3 Conduit Zone: Conduit Zone depth shall be determined by the diameter of the conduit. The conduit zone shall be from the bedding to the spring line of the conduit and shall consist of material compacted along each side of the conduit. The material shall be

installed so there are no voids along the bottom sides of the conduit. Filling these voids shall be accomplished by shovel slicing, water compaction or other standard method.

5.4.4. Six Inch Cover: Cover zone shall be a minimum of 6 inches of compacted material.

5.4.5. Final Back Fill Zone: The final back fill zone shall restore the trenched area to the original contours with compacted native or barrow fill.

6. COMPACTION:

6.1. General Compaction:
All trench materials shall be compacted to 95% compaction. Compaction can be achieved by water, vibration or mechanical means. All material shall be compacted in 6 inch layers or as per ASTM D 698.
See ASTM D 698 for full requirements.

6.2. Zone Required Compaction:

6.2.1. Trench Bottom/Foundation: The trench base shall be compacted if excavated with a back hoe. All rake ridges shall be compacted or removed to undisturbed soil. If full or partial foundation is required it shall be added in minimal lifts and compacted to 95% compaction.

6.2.2. Bedding: The compacted (95%) two inches of bedding shall form a smooth pipe bed for uniform support of the conduit.

6.2.3. Conduit Zone: The compaction of the conduit zone shall be done in a manner that shall not damage or compress the conduit. Compaction shall be a minimum of 95%, as required.

6.2.4. Six Inch Cover: The conduit cover zone shall be in one lift and compacted to 6 inches @ 95% compaction.

6.2.5. Final Backfill: Final backfill requirements shall be determined by the material used and the land use over the trenched area. Compaction shall be a minimum of 95% with lifts that shall not exceed 8 inches regardless of the material employed as backfill.

6.2.5.1. Landscaped Areas: Any landscaped area shall be restored with acceptable top soil or native fill.

6.2.5.2. Parking Lot/Street: Any material and compaction under lots and/or streets shall be determined by the governing agency/owner.

6.2.5.3. Sidewalks/Curbs/Retaining Walls: Native fill shall be replaced with either 5/8 or 3/4 inch minus material that is compacted to full density.

Section Number 10.0008

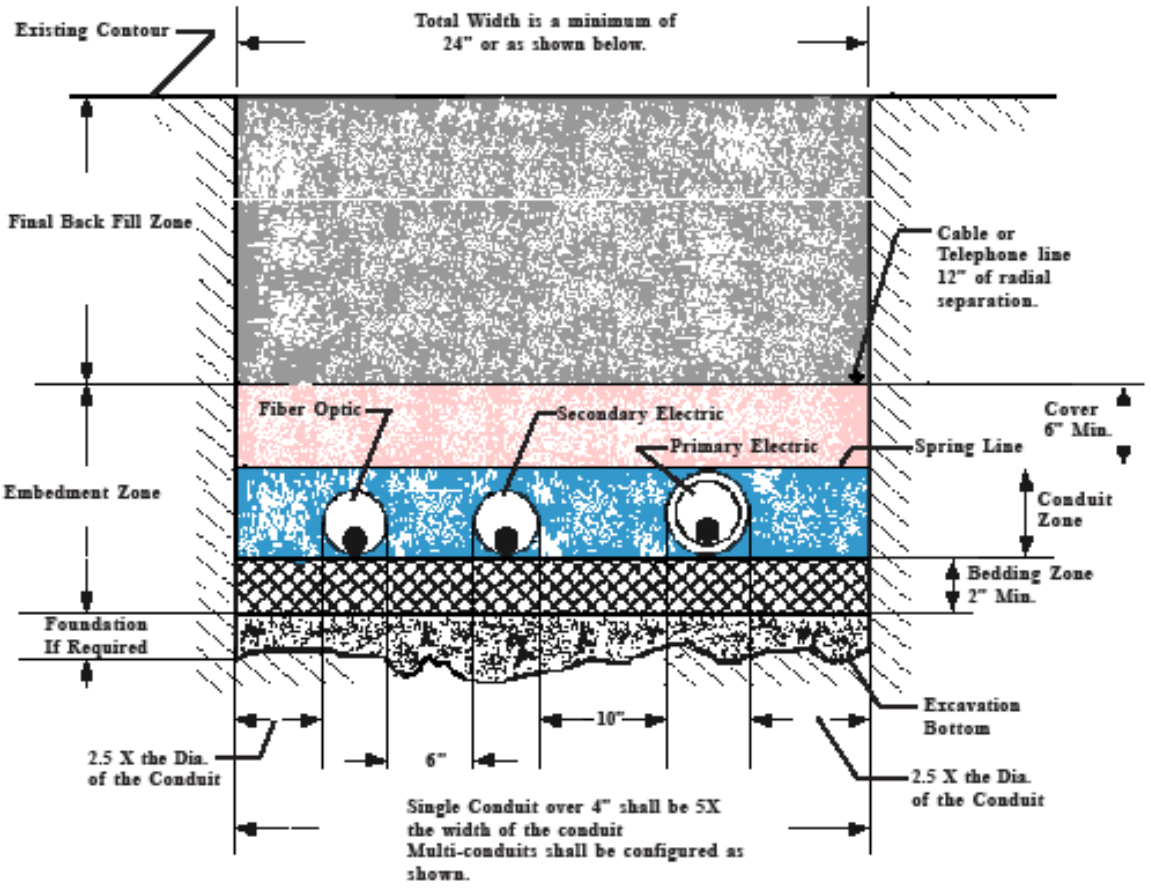
TRENCH CONSTRUCTION, PVC CONDUIT

7. DRAWINGS/DIAGRAMS/ILLUSTRATIONS

Figure #1 below is a typical trench layout cross sectional view showing the various zones and minimum reguired dimensions.

Figure #2 on page 6 of 6 is a cross section view of a concrete encased conduit. This method of reduced clearances is acceptable only with approval of District Staff.

7.1 Figure # 1 Cross Section Dimension:



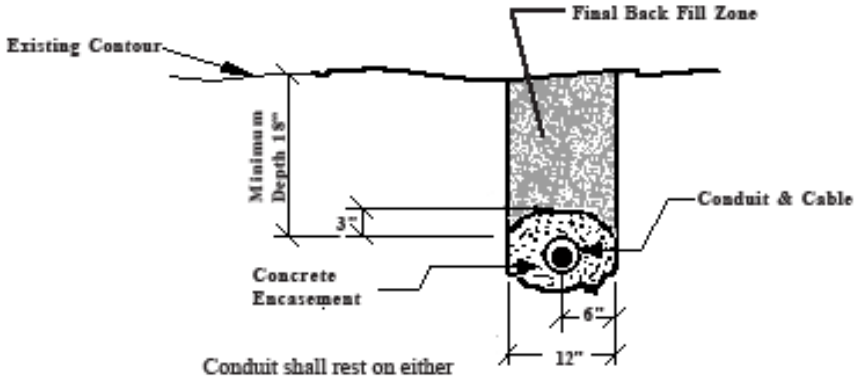
PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON				
CONSTRUCTION STANDARDS				
STANDARDS COMMITTEE APPROVAL DATE:	11/07/2002	Title: 10.0008 TRENCH CONSTRUCT PVC, CONDUIT		10.0008
DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV.	07/16/2005	Page 5 of 6

Q:\Data\Standard\Construction Standards\Reviewed-Std\10.0008 TRENCH CONSTRUCTION, PVC PDF.pmd

Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

7.2 Figure #2 Concrete Encased Conduit



Conduit shall rest on either concrete or suitable foundation.
Concrete encasement shall be a 4 sack cement mix.

Notes:

1. Gas Transmission Lines require 10 feet of separation.
2. Horizontal Separation: Water/Gas Service lines must be a minimum of 18 inches from electric primary and secondary conductors.
   Secondary conductors must be a minimum of 6 inches from primary conductors
   Sewer shall be separated as per instruction in Section 5.1.3 of this document.
3. Radial Separation TV/Tele-Cable must be a minimum of 12 inches from primary and secondary conductors.
4. The District fiber optic conduit must be a minimum of 6 inches from the electric primary and secondary coductors and have a minimum radial seperation of 12 inches from foreign cable/telephone utilities.

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON				
CONSTRUCTION STANDARDS				
STANDARDS COMMITTEE APPROVAL DATE:	11/07/2002	Title: 10.0008 TRENCH CONSTRUCT PVC, CONDUIT		10.0008
DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV.	07/16/2005	Page 6 of 6

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