

CITY OF LONGMONT
SECTION 700 – LONGMONT POWER AND COMMUNICATIONS (LPC)
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700.00 MINIMUM DESIGN CRITERIA

700.01 ABBREVIATIONS

Whenever the following terms or words are used in this chapter, they shall have the following meanings ascribed to them. For abbreviations not defined below, reference the Abbreviations Section 101 of these City Standards:

ANSI – American National Standards Institute.

ASCE – American Society of Civil Engineers

ACI – Association of Construction Inspectors

CT – Current Transformer

CIC – Cable in Conduit

ECIF – Electric Community Investment Fee

FNQ-R – type of Advanced Protection Class CC current-limiting, time-delay fuse

IBC – International Building Code

IEC – International Electrotechnical Commission

IEEE – Institute of Electrical and Electronics Engineers

KVA – kilo-volt-ampere

KW – kilowatt

KWh – kilowatt-hour

LPC – Longmont Power & Communications

NEMA – National Electrical Manufacturers Association

NEC – National Electrical Code

NESC – National Electrical Safety Code

PT – Potential Transformer

TIA – Telecommunications Industry Association

UL – Underwriters Laboratory

700.02 DEFINITIONS

Whenever the following terms or words are used in this chapter, they shall have the following meanings ascribed to them. For definitions not defined below, reference the Definitions Section 101 of these City Standards:

CUSTOMER - means the developer/owner or builder/contractor where appropriate.

ELECTRICAL CONNECTION FEE - means meter and connection fee/charge.

GOVERNING AGENCY - means that governmental agency, including the City of Longmont or Counties of Boulder or Weld, with authority to inspect and approve an electrical installation.

700.03 GENERAL

- A. Longmont Power & Communications (LPC) is responsible for standards, electrical engineering and design associated with City owned and maintained LPC utility distribution systems. The following sections will outline requirements, charges, and fees to initiate a request for electric utility service through the final installation of electric distribution facilities into new developments.
- B. City Standards provide direction for LPC distribution facilities installed in previously constructed developments.
- C. All LPC distribution systems will comply with the requirements outlined in the City Standards for electric and communication distribution systems and service line construction, and as referenced in Chapter 14.32, City Code. Additional criteria may be outlined by LPC during the development plan review.
- D. As outlined in Chapter 14.32, City Code, the City will own and maintain LPC utility distribution systems including: primary voltage systems switchgear, circuit vaults, transformers, rights-of-way lighting, etc.
- E. Street lighting design and installation shall be the responsibility of LPC and follow standard design guidelines as outlined in Chapter 13.18, City Code. Detail 700-13 “Street Light Poles” and 700-14 “Street Light Base” are included in the Section 700 Details for reference.
- F. Any deviations to the following guidelines must be approved by LPC and, if necessary, Public Works.
- G. The following represents Longmont Power & Communications general design standards. If the applicant is pursuing an Urban Neighborhood design, refer to Urban Neighborhood Design Section 800 Text and Details.

700.04 EASEMENTS

- A. The customer and/or developer shall provide easements for the purpose of surveying, locating, installing, constructing, using, operating, maintaining, inspecting, repairing, altering, removing, and replacing cable, conduit, and equipment in whole or in part, and all necessary subsurface and surface appurtenances, as well as the right of ingress and egress over and on the easement area that is necessary and appropriate.
- B. Identify the width and label all electrical easements as LPC easements.
- C. Identify the width and label all combined electrical and water easements as LPC/Water Easement.
- D. Architectural features such as porches, overhangs, cantilevers, and window wells are not permitted in easements.
- E. Fences, landscaping with plant shrubs, woody plants, nursery stock, or other crops may be located within these easements provided they do not interfere with the use of, obstruct the operation of, or prevent access to said easement. Any fence, landscaping, or other improvement that obstructs the operation of, or access to, easements may be removed by grantee without liability for damages arising therefrom.
- F. LPC Easements are for the purpose of surveying, locating, installing, constructing, using, operating, maintaining, inspecting, repairing, altering, removing, and replacing cable, conduit, equipment, and all necessary subsurface and surface appurtenances or other uses approved by LPC. Together with a

perpetual right of ingress and egress for installation, operation, maintenance, repair, and/or replacement of such.

- G. LPC/Water Easements are located on private property immediately adjacent to the rights-of-way. These easements are for the purpose of surveying, locating, installing, constructing, using, operating, maintaining, inspecting, repairing, altering, removing, and replacing cable, conduit, equipment, valves, water meters, fire hydrants, and all necessary subsurface and surface appurtenances or other uses approved by the City of Longmont. Together with a perpetual right of ingress and egress for installation, operation, maintenance, repair, and/or replacement of such.
- H. Utility Easements (UE) are for the purpose of utilities and drainage facilities including but not limited to irrigation lines, electric lines, communication lines, gas lines, and cable T.V.; together with a perpetual right of ingress and egress for installation, operation maintenance, repair, and replacement of such lines. Said easements and rights are to be utilized in a responsible and prudent manner.
- I. Single Family Residential shall include a corridor seven (7) feet in width adjacent to the right-of-way. The use of the specific easement will be shared with Water/Wastewater and labeled as “7’ LPC/Water Easement”.
 - (1) A 12-foot-wide easement will be required along any main feeder network path. Any deviations to this must be approved by LPC.
 - (2) Switchgear will require a 15’ X 15’ pocket easement.
- J. Multi-family Residential:
 - (1) Shall have a minimum five (5) foot wide easement throughout the site with:
 - a. 10-foot pocket easements around each single-phase transformer
 - b. 12-1/2-foot pocket easements around each three-phase transformer.
 - (2) A 12-foot-wide easement shall be required along any main feeder network path. Any deviations to this must be approved by LPC.
 - (3) Once the electrical design has been completed, this easement may be provided by choosing one of the following options:
 - a. Provide a specific easement on the Final Plat; or
 - b. Provide an easement over the entire lot or out-lot, exclusive of buildings, for LPC on the Final Plat; or
 - c. If a Re-plat or Final Plat is not available, then provide an easement by separate document. This option must be completed before Final Approval.
- K. COMMERCIAL:
 - (1) Shall have a minimum five (5) foot wide easement throughout the site with:
 - a. 10-foot pocket easements around each single-phase transformer
 - b. 12-1/2-foot pocket easements around each three-phase transformer or other LPC equipment as necessary
 - (2) A 12-foot-wide easement will be required along any main feeder network path. Any deviations to this must be approved by LPC.
 - (3) Once the electrical design has been completed, this easement may be provided by choosing one of the following options:
 - a. Provide a specific easement on the Final Plat; or
 - b. Provide an easement over the entire lot or out-lot, exclusive of buildings, for LPC on the Final Plat; or

- c. If a Re-plat or Final Plat is not available, then provide an easement by separate document. This option must be completed before Final Approval.

L. STREET LIGHTING

- (1) As a part of the developer's infrastructure costs, LPC will design, procure, and install all street lighting within and adjacent to the site along the right-of-way only. LPC will then own and maintain the street lighting once final acceptance has been granted. All private and supplemental lighting needs are the developer's responsibility.
- (2) Additional easements may be required for lighting in areas where primary electric facilities are not installed adjacent to the rights-of-way.

- M. Vacation of rights of way or easements: Draw and label existing LPC utility facilities that are located within the easement/s or rights-of-way that are being requested to be vacated or relocated. It is solely up to LPC's discretion to relocate existing equipment when vacation of rights of way or easements is requested. LPC will bill the customer for any and all relocation of existing equipment when warranted due to a vacation request.

700.5 CLEARANCES

- A. Electrical equipment serving residential subdivisions will be installed adjacent to the rights-of-way and straddle the property line to provide service to two parcels. Refer to the specific section of City Standards on the spacing requirements for installation of water and sewer service lines and applicable rights-of-way infrastructure, i.e. fire hydrants. The locations and clearances from LPC facilities are established to provide adequate clearances and access for the two utilities sharing an easement.
- B. Traffic signs shall not be installed above underground LPC distribution facilities. Maintain clearance requirements as outlined in Section 103 "Utility Separation & Crossings" of the City Standards and Detail 700.01 "Trench Clearances".
- C. Electrical equipment requires proper clearances or setbacks on all sides for the safety of city staff, customers, and the public to ensure safe access and maintenance as well as protection from vehicular traffic. This includes driveways, alleys, parking lots, etc. Protection such as bollards will be installed at the Customer's expense when electrical equipment is located in areas where less than the recommended clearances exist or the equipment is at risk of vehicular damage. Reference Details 700-01 "Trench Clearances", 700-02 "Equipment Clearances", and 700-18 "Bollard Installation". Default clearances shall be as follows:
 - (1) Five (5) feet along the sides and back and (10) feet directly in front from landscape material
 - (2) Five (5) feet along the sides and back and (10) feet directly in front from structures
 - (3) Five (5) feet along the sides and back adjacent to residential driveways
 - (4) Five (5) feet minimum from vehicular traffic with use of bollards
 - (5) Five (5) feet or greater from a driving surface behind a curb or protective feature
 - (6) 10 feet from a driving surface where no curb or protective feature is proposed
 - (7) Specific clearances from overhead and underground electric utility facilities are outlined in Section 103 "Utility Separation & Crossings" of these City Standards and in Details 700-01 "Trench Clearances" and 700-02 "Equipment Clearances". Additional clearances may be required according to the current version of the NESC at the time of construction.

700.06 STANDARD NOTES FOR PLAN SUBMITTALS

Specific notes are to be included on Plats, Site Plans, and Public Improvement Plan submittals as applicable and are listed in the Appendix.

700.07 REQUEST FOR SERVICE

The following items are to be included with the initial submittal of the construction drawings to the Design Review Committee (DRC).

- A. Electronic file submission as outlined in Section 103 Engineering Design Submittals of these City Standards.
- B. Completed electric service request checklist including acknowledgement signature located in the appendix. Additional electrical information required for services is outlined below:
 - (1) Residential service electrical information shall include:
 - a. Product types and locations;
 - b. Square footage of homes;
 - c. Electric panel rating;
 - d. Number and size of air conditioning units;
 - e. Electric heat if applicable.
 - f. Any other significant loads such as EV, PV, Heat Pump loads, batteries, etc.
 - (2) Commercial and multifamily service electrical information shall include:
 - a. One-line diagram;
 - b. Load calculations;
 - (3) Irrigation controller loads and private lighting requirements.
 - (4) Billing information, including names and mailing addresses of the parties responsible for payment of construction costs and month-to-month billing when meter sets are complete.

700.08 DESIGN

- A. LPC will complete a design with the first submittal of Public Improvement Plans or the first submittal of the Site Plan if no Public Improvement Plans are required. Multi-phase developments may require LPC to complete an overall capacity design with the first phase submittal. LPC may request additional information or files and coordinate the design with the Design Engineer. The trench line and equipment locations shall be shown on the second submittal of the master utility plan and landscape plans. As revisions are required, updates will be reflected with each submittal. The Design Engineer and LPC will coordinate this effort.
- B. Customer and/or developer will provide an electric one-line diagram for all commercial and multi-family developments that shows the proposed service size/ampacity and voltage. All unit numbers, as well as house panels, must be labeled on the one-line document.

700.09 SLEEVE REQUIREMENTS

Crossings for roadways, ditches, or other surface features will be shown on the master utility plan as shown on LPC's provided CAD file. The Customer is responsible for coordination and installation of the appropriate quantity and size of sleeve as directed by LPC. Sleeve locations, sizes, and quantities shall be provided by LPC and shown on plan and profile drawings. The Design Engineer, LPC, and other City staff will coordinate conflicts as they arise in the planning stages to mitigate conflicts during the construction effort. See the installation requirements.

700.10 CHARGES

- A. Charges for the development review and design effort are billable and collected with charges for the installation of LPC distribution facilities. If the project does not move forward to the construction phase, review and design charges will be invoiced to the Customer and are due upon receipt.
- B. The Customer can either request the City complete the excavation and subsurface installation for local LPC distribution facilities or has the option to use a contractor. Such distribution facilities include:
 - (1) PVC and/or cable in conduit (CIC);
 - (2) Ground vaults; and
 - (3) Street light poles.
- C. In all cases, LPC is responsible for installing and connecting the electric equipment specific to electrical apparatus.
- D. It is the responsibility of the Customer to advise LPC of subsurface installation choices prior to the preparation of the Public Improvement Agreement.
- E. The Customer shall pay all costs associated with the installation of LPC distribution facilities to serve the site. LPC will complete an estimate and invoice of the project costs.
- F. The Public Improvement Agreement will outline the subsurface infrastructure responsibilities. For Customer installations of the electric conduits, conductors, ground vaults / junction boxes, etc., the Public Improvement Agreement will outline the securities and warranties. The subsurface installation will be organized as all other public improvements including the acceptance process.
- G. Payment in full is required when the Customer elects to have LPC complete the subsurface installation separate from the Public Improvement Agreement. This will place the project on a construction schedule pending notification from the Customer of site readiness.
- H. Change orders will be issued to the Customer when the site conditions, scope changes, material requirements, or initial estimating changes occur.
- I. Damages that occur to LPC facilities due to development construction activity are invoiced directly to the Customer for payment and are due within 30 days.

700.11 FEES

An Electric Community Investment Fee (ECIF) is charged to specific projects requiring a building permit. LPC must expand system facilities if it is to accommodate new development, which includes substations and main feeder networks. The funding for these capital expenditures is collected through the imposition of the ECIF. The fee schedule and policy is outlined in Chapter 14.32, City Code.

700.12 SITE DEVELOPMENT PLANS

The Customer will include LPC as a Contractor installing on behalf of the Customer in the permits required for on-site development. Such permits include, but are not limited to, the following:

Stormwater Permit for Construction activities	CDPHE
Stormwater Permit for Construction Activities	City of Longmont
Work in Ditch Right-of Way	Individual Ditch Companies
City Work in Right-of-Way Permit	City of Longmont
County Work in Right-of-Way Permit	Boulder County
State Work in Right-of-Way Permit	Colorado Department of Transportation

701.00 CUSTOMER INSTALLATIONS
701.01 SUBSURFACE INFRASTRUCTURE
A. SLEEVE INSTALLATION

- (1) The Customer is responsible for providing crossings of surface features as outlined. Reference Detail 700-03 “Customer Installed Sleeve”.
- (2) The Customer will install schedule 40 PVC. All sweeps shall have a 48-inch radius. PVC joints shall be made with long line bell ends and couplings using cold weather glue. The location, size, and quantity of sleeves will be outlined on the utility sheets and details of the construction plans or as specified by LPC.
- (3) The conduit shall be installed so that it lines up with the trench path as identified on the Public Improvement Plans. A minimum of 36 inches of cover over the conduit shall be provided, as measured from final grade, and shall not be installed at a depth greater than 48 inches. Any deviation from these specifications must be approved in advance by LPC. Trench compaction shall be 95% and meet all applicable criteria specified in Section 109 “Utility Trenching of these City Standards” and Detail 700-04 “Trench Detail”. Trenches must remain open until they have been inspected and approved to be closed by LPC. The Customer must maintain access to the ends until the crossing is utilized for the LPC distribution system installation. Each crossing location shall be identified using a red tie marker, purchased at the LPC Warehouse. The marker shall have one end wrapped around the conduit(s) at each end of the crossing and extend above grade for a visual reference. Where multiple conduits are installed, use only one marker tie at each crossing end point as referenced in Detail 700-03 “Customer Installed Sleeve”.
- (4) Conduit crossings for communication utilities may be placed in the same trench as LPC with approval. The conduit shall be extended beyond the LPC easement for future access by the communications utility Refer to Detail 700-03 “Customer Installed Sleeve”.
- (5) In no case shall a crossing for use with a gas line be placed closer than five (5) feet from electric conduits. The conduits shall be extended beyond the LPC easement for future access by the gas utility.
- (6) It is the responsibility of the Customer to ensure the integrity of the crossing until used by LPC. Prior to use, any damage to the crossing must be repaired by the Customer prior to LPCs mobilization.
- (7) Should the Customer identify a conflict with the proposed depth, location, or other considerations for the conduit crossing, they must immediately contact LPC.
- (8) When LPC is installing the subsurface infrastructure they will excavate along the tie marker to expose the conduit ends. If the tie marker has been damaged or removed during construction, LPC will excavate within three (3) feet either side of the crossing location, as shown on the plans, up to a depth of 52 inches to attempt to expose the conduit. If the conduit cannot be located or is inaccessible, LPC will inform the Customer’s Representative that the conduit cannot be accessed due to surface features, the installation does not meet the criteria in this specification, and/or the conduit appears to be missing. LPC will move to another portion of the job or leave the job site. The Customer is responsible for all work necessary to provide access to the conduit to the satisfaction of LPC, or to make other changes as necessary to correct the problem. The corrections may include but are not limited to installing new conduits using open trench or horizontal boring methods. In the event LPC is required to leave the project and re-mobilize, an additional mobilization charge may occur.
- (9) Any existing rights-of-way landscaping disturbed during LPC distribution infrastructure installation shall be repaired by the Customer to meet Section 600 of the City Standards. It will be the Customer’s responsibility to schedule all necessary inspections for this work with the City of

Longmont. Any work that does not adhere to current City Standards and/or is without the approved inspection by the City shall be corrected at no cost to the City.

B. TRENCH

The trench alignment is determined by the development's final electric design and/or the easement location chosen by LPC. As required, the Customer is responsible for surveying property lines, trench alignment, elevations, and equipment locations as needed. The minimum trench width is eight (8) inches and must be at a depth that will provide a minimum of 36 inches to a maximum 48 inches of cover over the top of the conduit. The bottom of the trench must be smooth and continuous. Where soil conditions require, the Customer may be required to provide bedding material. The trench must remain open and accessible until inspected. Reference Trench Detail 700-04.

C. PVC INSTALLATION

- (1) As required, the Customer will install schedule 40 PVC. All sweeps shall have a 48-inch radius. PVC joints shall be made with long line bell ends and couplings using cold weather glue. The location, size and quantity of conduits will be outlined in the utility sheets and details of the construction plans. Conduits shall enter ground vaults / junction boxes as shown in Details: 700-09 "Single-Phase Transformer Vault", 700-11 "Primary Junction Vault" and 700-12 "Secondary Junction Box (J-Box)".
- (2) All pipes shall be carefully placed in the trench as level and straight in the bottom as possible. Pipe and accessories shall be inspected for defects prior to being lowered into the trench. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed into the trench. The ends of the pipe shall be plugged or capped when work stops or is directed into equipment locations. Trenches must remain open until they have been inspected and approved to be closed by LPC.
- (3) At any time, the electrical design may call for multiple conduits in specific trench segments. The Customer is responsible for assuring proper pipes are directed to equipment locations as shown on the plans provided by the City.

D. TRACER WIRE INSTALLATION

Where a PVC conduit is installed for future use and no electrical conductor exists, a tracer wire will be installed along the entire length of the pipe as directed by LPC. A #14 AWG copper wire with insulation will be taped securely to the top of the pipe and three (3) feet of excess wire coiled in the ground vault / junction box as shown in the Detail 700-06 "Tracer Wire Installation".

E. CONNECTION TO EXISTING SYSTEM

The Customer shall coordinate all access into existing electrical equipment with LPC. At no time is a Customer to access LPC equipment without approval by LPC and an LPC representative on site. Charges for the standby personnel will be invoiced to the Customer.

F. GROUND VAULTS

- (1) Ground vaults / junction boxes are subsurface features that support electrical equipment. They are specific to equipment types and shall be installed as shown on the plans. They shall be installed two (2) inches higher than the proposed sidewalk or finished surface area, and level with the sidewalk. Following excavation for ground vaults / junction boxes, the subgrade shall be compacted and three quarter (3/4) inch washed rock shall be installed below the ground vault / junction box as specified in Details 700-09 "Single-Phase Transformer Vault", 700-11 "Primary Junction Vault" and 700-12 "Secondary Junction Box (J-Box)".

- (2) Where electrical equipment is installed on a hill or slope, the Customer shall design a retaining wall that meets the requirements outlined in the City Standards and may be subject to the approval of the Utilities & Public Works Division and/or LPC.
- (3) Transformer
 - a. Residential single-phase: Install an eight-foot ground rod. Refer to Detail 700-09
 - b. Commercial three-phase: Install an eight-foot ground rod and a Concrete pad. Refer to Detail 700-10 "Three-Phase Transformer Pad"
 - c. Primary junction vault: Install an eight-foot ground rod. Refer to Detail 700-11
 - d. Secondary junction box. Refer to Detail 700-12
 - e. Street light poles. Refer to Detail 700-13

G. BACKFILLING

- (1) Backfilling of LPC trenches and equipment locations in the rights-of-way or adjacent to concrete surface features will be to 95% compaction. This shall be achieved by using Flow-Fill to backfill the trench to a point 12 inches below finished grade. Flow-Fill is required for trenches less than 12 inches wide unless directed otherwise by LPC or when requested by the customer and approved by LPC. For trenches greater than 12 inches wide, where Flow-Fill is not utilized as backfill, the Customer shall use native backfill material that is free from angular rock as outlined in Section 109 "Utility Trenching" of these City Standards. Inspection of the trench and native backfill material may dictate the use of six (6) inches of sand as bedding and/or backfill material to protect the conduit as approved by LPC. When Flow-Fill is not used, compaction tests shall meet the requirements in Section 109 "Utility Trenching" of these City Standards and shall be completed every one (1) foot of trench depth for every 150 lineal feet of pipe installation, and at all road crossings unless otherwise specified by LPC. Compaction around transformer and primary junction ground vaults / junction boxes must use Flow-Fill.
- (2) The Customer shall install warning ribbon to signal buried LPC facilities. The ribbon is to be placed at a depth of 12 inches below finished grade. The final 12 inches may be backfilled with native material. Compaction under hard surfaces must be compacted to 95% and when adjacent to the surface 90% is acceptable.
- (3) Any existing rights-of-way landscaping disturbed by the Customer during backfilling or electrical installation shall be prepared to meet Section 600 of the City Standards. It will be the Customer's responsibility to schedule all necessary inspections for this work with the Utilities & Public Works Division. Any work that does not adhere to current City Standards and/or without the approved inspection of the Utilities & Public Works Division shall be corrected at no cost to the City.

H. MATERIALS

- (1) LPC will provide materials specific to the electrical installation. Payment in full by the Customer is required before these materials can be picked up at the City Warehouse by the Customer.
- (2) Once material payment has been received, a two-week notice is required from the Customer to initiate the staging of materials at the City Warehouse located at 1100 South Sherman Street. The Warehouse will place materials in a staging area where the Customer is responsible for confirming the material type, integrity, and quantities by signing a receiving document. The materials are to be transported from the Warehouse to the site by the Customer within 48 hours. The City will not be responsible for materials which are damaged or stolen after the receiving document is signed. If additional materials are needed, the Customer is to request a change order from LPC prior to going to the Warehouse.
- (3) When the subsurface installation is complete, the City and Customer will review all materials used for the project. Material changes will be charged or credited to the project appropriately. Upon

completion of the itemized review, the City will review all material and determine if additional charges or credits to the Customer are required.

I. MATERIALS HANDLING

Reference details 700-07A and 700-07B for material handling.

J. INSPECTION

- (1) Inspections for trench, conduit, and ground vault / junction box installations will occur as outlined in Trench Detail 700-04. At no time shall a trench be closed without the approval of LPC. PVC conduit installed by the Customer is required to be tested by the customer after the trench has been closed and before LPC line crews pull cable. Customer must proof conduit with installation of pull tape. If LPC is unable to install conductor in a section of pipe or if ground vaults / junction boxes are not level, or to proper elevations, the Customer's representative shall be advised of the situation. It is the responsibility of the Customer to make the repairs. The Customer shall discuss the schedule for repairs with LPC. Job delays may result in additional costs.
- (2) The facilities installed by the Customer are subject to the acceptance and warranty process as outlined in the Public Improvement Agreement.
- (3) Charges for inspection will be based on the actual time and equipment required by the project and billed upon completion.

701.02 SERVICE LINE SIZES AND INSTALLATION

A. RESIDENTIAL SERVICES

- (1) All residential electric service conductors will be installed, owned, and maintained by the customer according to the current NEC standards. The installation, ownership, and maintenance of conductors and metering equipment beyond LPC's point of delivery are the property owner's responsibility. The point of delivery is dependent upon site conditions and may be defined as:
 - a. Electric transformer
 - b. Ground vault / junction box
Residential services larger than 200 amps may adhere to additional termination standards in secondary ground vaults or junction boxes when directed by LPC.
 - c. Overhead attachment point on Customer owned structure
- (2) It is the Customer's responsibility to restore compaction when entering into LPC equipment locations. Prior to the installation of the final meter, LPC will advise the Customer listed on the permit of any required corrections needed. Items deemed a safety issue must be corrected within 10 working days or will be subject to disconnect at LPC's discretion. All other repairs must be corrected prior to the Certificate of Occupancy. Any work completed by LPC to correct any damages, grade issues, or compaction deficiencies will be charged to the Customer and are due within 30 days.

B. MULTI-FAMILY AND COMMERCIAL DEVELOPMENT SERVICES

- (1) Multi-family and commercial development service conductors and conduits are installed, owned, and maintained by the customer. They must meet the National Electric Code and be approved by the Building Inspection & Permits division. The Customer will install cable of sufficient length for termination.
- (2) In multi-family or commercial developments where more than two (2) service lines are installed out of a transformer or junction facility, the use of heat shrink tubing is required to identify the secondary conductors. Each service line requires heat shrink tubing with a color that is unique to

the unit it serves at both the meter housing and the electric source. The heat shrink tubing is not provided by the City. Reference Detail 700-15 "Service Line Identification".

- a. All 3 phase service conductors shall have unique jacket colors and be color coordinated according to current industry standards.
- (3) All connections to underground City-owned facilities will be made by City personnel after approval by the Building Inspection & Permits division.

701.03 SECONDARY CABINET INSTALLATION

- A. In the event that more than the allowed number of conductors are required, a secondary cabinet shall be required. The secondary cabinet shall be supplied, installed, owned, and maintained by the Customer and shall be the point of attachment for the service. The Customer shall install 4-inch PVC conduits from the transformer to the secondary cabinet. The total quantity of 4-inch PVC conduits will be determined by the size of the utility transformer. LPC will install, own, and maintain the cable(s) from the transformer to the secondary cabinet. LPC will terminate all cables within the utility transformer. The Customer will terminate all cables within the secondary cabinet. The secondary cabinet shall have a minimum clearance of 5 feet from the utility transformer but not exceeding 10 feet. For additional information refer to Detail 700-19 "Secondary Cabinets".
- B. All connections to City owned facilities will be made by LPC or its authorized contractor or representative.
- C. The total number of connections within a single-phase transformer is limited to four (4) with a max cable size of 500 kcmil.
- D. The total number of connections within a 25 kva to a 225 kva, three-phase transformer will be limited to six (6), with a max cable size of 500 kcmil.
- E. The total number of connections within a 300 kva to a 2500 kva, three-phase transformer will be limited to 10 and the maximum cable size which will be terminated is 750 kcmil. No more than 7 runs of 750 kcmil secondary may be installed in three-phase transformers sized from 300-2500 Kva.
- F. When 8 to 10 runs of 750 kcmil secondary conductors are necessitated, customer will be required to install a concrete cable tray as shown on drawing (700-10).
- G. The customer will install sufficient length for termination. Refer to detail 700-15 "Service Line Identification".

702.00 INSTALLATIONS

702.01 SUBSURFACE INFRASTRUCTURE

LPC will install the site-specific subsurface infrastructure as requested by the Customer. The Customer is responsible for preparation of the site. Additional charges may be incurred when the site is not properly prepared prior to the start of work by LPC. These charges may result from soil conditions, inadequate grading, surveying, road crossings, or construction phasing of other utilities.

A. Project designs and invoicing for the installation of LPC facilities are based on the Customer having met all of the following site readiness requirements:

(1) For All Development Types

- a. Customer installed street and sidewalk crossings shall be located and installed in accordance with City Standards. Reference Detail 700-03 Customer Installed Sleeve
- b. A 10-foot corridor along LPCs trench path must be graded to within two (2) tenths of final grade at the time of LPCs installation. This path must be sloped relatively flat and smooth to facilitate trencher access and cable installation.
- c. LPCs trench path shall be free of construction equipment, materials, scrap, concrete, or any object(s) that may inhibit trenching operations.
- d. The Customer is to coordinate the installation of facilities according to specifications, from deepest to shallowest, (i.e., sewer, water, electric, gas, communications, irrigation, landscaping). Facilities requiring an installation depth less than LPC utilities, which are installed prior to LPC facilities, will require a change order and may result in additional installation charges.
- e. Customer installed facilities shall be placed as shown on the master utility plan, back-filled, and compacted. (i.e., sewer, water, storm drainage, etc.)
- f. The Customer shall provide utility locates for underground infrastructure installed but not currently owned and maintained by the City, i.e., sewer, water and storm drainage. Additionally, all empty conduits used as sleeves for irrigation and dry utilities must be located and clearly identified. LPC shall not be responsible for repairs to underground utility infrastructure that is not properly located and marked by using standard utility locating materials, paint, stakes, locating flags, per the typical locating procedure. Minimum accuracy of all locate marks must be within 18 inches either side of the underground infrastructure to be considered properly located.

(2) For All Development Types except Single Family Residential

The Customer is responsible for accurate survey information, including elevations, for the center of LPCs trench path and five (5) feet offsets for two corners of each of LPCs equipment locations.

(3) For Single Family Residential only

- a. Concrete sidewalks, curbs, gutters and pavement shall be installed.
- b. Concrete Driveways and landscaping and irrigation shall not be installed prior to LPCs facilities.
- c. Sidewalks shall be free of all debris with front property lines painted on the sidewalk and the rear property lines clearly staked. The Customer shall not place property pins within LPCs prepared path until the installation of LPCs infrastructure has been completed.

702.02 ELECTRICAL APPARATUS

Upon completion of the subsurface infrastructure either by the Customer or LPC, LPC will schedule the installation of specific electrical equipment. Construction power will be available when all on-site and off-site electric distribution is installed and energized.

703.00 METERING REQUIREMENTS

703.01 GENERAL

- A. Meter housings, service disconnects, and associated metering equipment for all types of services shall be located on the outside of the building or structure and accessible to LPC as referenced in Chapter 14.32, City Code. Single meters shall be installed at a height of five feet, six inches above ground or platform to the center of the meter and shall not be fenced in. Meter banks shall be cold-sequenced and installed with the lowest meter at least 24 inches above the ground or platform and the highest meter is not to be over 75 inches above the ground or platform.
- B. Meter housings for irrigation controllers, site entryways, or any other private use may be installed on Customer owned and maintained unistrut or cedar post. The installation shall be hot-sequenced and the meter housing shall have a phenolic badge as outlined below. All installations must be maintained and in good working order. Installations deemed unsafe will be de-energized until all electrical equipment is brought up to current code.
- C. All metering installations with aluminum conductors must have oxide inhibitor to provide an airtight seal around conductors and to prevent oxides from forming.
- D. All installations other than fire pump services must have a hot-sequence disconnect.
- E. Current Transformer (CT) and Potential Transformer (PT) requirements: All electrical services over 400 amps, single-phase, three-phase, 120/240 volt, 277/480 volt & 120/208 volt require CTs. All other services over 400 amps, will require CTs and PTs. Meter housings, CTs, and PTs are required to be obtained from LPC at 1100 South Sherman Street. The Customer will be charged for this material.
- F. Labeling of single, commercial, and multiple meter sockets are the Customer's responsibility. Each meter of a multiple meter socket and all individual meter sockets will have a permanent phenolic badge which corresponds exactly to the labeling of the apartment, office, or room is metered by each meter. Badge requirements are as follows:
- G. The badge will be a minimum size of one (1) inch by two (2) inch. Letters and numbers must be with text a minimum of three eighths (3/8) inch height.
- H. Meters will not be installed until all sockets are labeled correctly with phenolic badges and riveted permanently to the electric equipment. When internal number and/or lettering schemes are changed or incorrect labeling creates inaccurate information in the City records, the Customer will be responsible for all electricity delivered through unmarked, illegible, or incorrectly labeled meter sockets and is responsible for ensuring that mis-wiring does not occur between tenant spaces. The City will bill all expenses incurred to the owner, who shall pay such expenses within 30 days of receipt of billing. This will include actual labor, equipment, and material charges incurred by LPC to correct the situation.
- I. Meters will not be installed until a ring-out inspection has been approved via the metering department. See detail drawings MTR-9 & MTR-13 for additional details.
- J. Bolt in (K-Base) metering equipment is not allowed.
- K. Exceptions to the metering specifications must be approved by LPC staff at 303-651-8386.

- L. Reference Standards for Metering for additional details.

703.02 METER LOCATION

- A. Meter housings, service disconnects, and associated metering equipment for all types of services shall be located on the outside of the building or structure and accessible to LPC staff.
- B. Residential meter housings, service disconnects, and associated metering equipment must be located on the quarter of the building in closest proximity to the service connection point.
- C. Meters shall not be installed in places difficult to access, such as over open pits, moving machinery, hatchways, in the path of water from at least 36 inches in front of and around the meter. Refer to detail drawing MTR-8. No plants, shrubs, or other obstructions including HVAC line sets and condensing units shall be placed within 36 inch clearance area. Customers shall be given seven (7) days to comply after written notice. After the expiration of the seven (7) days, the City, in its discretion, may modify the meter access to this regulation at the Customer's expense or discontinue service.
- D. Where the meter is recessed in the wall of the building, a space of not less than twelve inches on each side of the center line of the meter base shall be provided to permit access for City test equipment or meter changes.
- E. Meters currently located on the inside of Customer premises shall be moved to the outside whenever the existing service is modified or there is any change of service.
- F. All meter equipment must be installed in readily accessible locations for LPC personnel.

703.03 CONSTRUCTION POWER

- A. Construction power will be available for site trailers and model homes after LPC has completed their construction efforts and the approval for temporary use applications has been completed by the City. All electric services require a building permit and inspection by the Building Inspection & Permits division. The City provides temporary construction power for a period of 12 months or less where electrical service is required.
- B. On single family residential the Customer shall post the address on the meter housing that is large enough to be seen from the street.
- C. The Customer shall install the construction power within two (2) to three (3) feet of the secondary junction box or transformer. Refer to drawing MTR-1. In locations where the transformer will be the source, the temporary construction power shall not be located in front of the transformer and shall maintain minimum clearance requirements as referenced in Detail 700-02 "Equipment Clearances".
- D. All requirements for permanent wiring found in the latest version of National Electric Code (NEC) apply to temporary installations.
- E. All service installations must have an approved meter socket with sealing mechanism. All electric meters shall have a lever-operated bypass, excluding CT rated services.

703.04 RESIDENTIAL – SINGLE SERVICE

- A. Meters shall be in direct line of sight with the secondary ground vault /junction box. Reference Detail 700-16 “Metering Single Family” for additional information.
- B. All residential services must have a load side service disconnect sized accordingly and located next to the meter. Gutters, raceways, and conduit after metering point is allowed. OH duplexes or paired homes will each have their own OH stack and weather head.

703.05 SINGLE-PHASE SERVICES: 201-400 AMPS (CLASS 320 METERING)

Single-phase three (3)-wire, 120/240 volt, or 120/208 volt, 400 amp services utilize a class 320 (CL320) meter and require the installation of an approved CL320 meter socket purchased by the Customer. The CL320 meter socket must include a lever operated bypass that can operate as a 320-amp continuous duty bypass device. (Meter socket combined with the service disconnect). Any single-phase three (3)-wire, 120/240 volt and 120/208 volt service shall have a five-jaw meter socket installed. The fifth jaw shall be installed in the nine (9) o'clock position and connected to the neutral.

703.06 THREE-PHASE SERVICES: 201-400 AMPS (CLASS 320 METERING)

Three-phase 4-wire, 120/208-volt, 277/480 volt or 120/240 volt, 400 amp services utilize a class 320 meter and require the installation of an approved CL320 meter socket purchased by the Customer. The CL320 meter socket must include a lever operated bypass that can operate as a 320-amp continuous duty bypass device. (Meter socket combined with the service disconnect). Any three-phase, four (4)-wire, service shall have a seven-jaw meter socket installed. The seventh jaw shall be installed to the neutral.

703.07 COMMERCIAL: - 200 AMPS

- A. All commercial services must be hot-sequenced. All service installations must have an approved meter socket with sealing mechanism and shall be equipped with a lever-operated bypass. All 200 amp, three-phase, four (4)-wire, 120/208 volt or 277/480-volt self-contained services shall have a seven-jaw meter socket installed. See Detail MTR-16.
- B. Services rated at 277/480 volt up to 400 Amp will be non-CT Rated. When the load is greater than 400 amps, PTs with CTs are required. A CT cabinet with integral PT mounting provisions is required. PT mounting height must not exceed eight (8) feet. Electrical conductors shall not be placed in front of the PTs.
- C. CTs and PTs shall only be installed in approved NEMA Type 3R CT cabinets equipped with a hinged door, lockable hasp, and fasteners that cannot be removed from the exterior of the cabinet, which will be supplied and installed by the Customer. Keyed door locks are not allowed. The CT cabinet and meter socket shall be installed such that the meter socket is not obstructed with the cabinet door in the full open position. For Switchgear CT compartments, barriers shall be installed on all 4 sides of compartment. The compartment shall not have any Customer installed equipment behind hinged sealable doors. All panels providing access to unmetered conductors shall have fasteners that cannot be removed from either the exterior or the Customer compartment. No conductors, other than those serving the CT compartment and the ground bus shall be installed in or routed through the compartment. 277/480 volt switchgear shall be manufactured with provisions for unobstructed mounting of PTs inside the same compartment as CTs. If switchgear is to have door fronts, there shall be no other Customer equipment inside the metering section. CT cabinets and meter sockets may not be used as a pull-box or junction box. No connections shall be made in the CT compartment or meter socket to supply another meter, more than one load circuit, or Customer equipment. For multiple loads a switchboard or combination CT/multi-main equipment must be used. Gutters, raceways, and conduit after metering point is allowed. Minimum distance from the floor or

the ground shall be 24 inches to the bottom of the cabinet. Refer to Detail MTR-13 “Commercial Switchgear Specifications”.

D. Cabinet dimensions are identified in Detail MTR-10.

704.00 SMALL CELL FACILITIES

704.01 COMBINATION SMALL CELL AND LPC STREET LIGHT POLES

- A. Pole shall be round, straight, galvanized steel with a preferred 12.75-inch outer diameter. Pole shall be galvanized in accordance with AASHTO M 111. Pole shall be dark brown in color and paint shall be powder coated over zinc paint. Other colors may be approved by LPC. Pole shall be designed to withstand a minimum wind velocity of 110 mph per TIA-222 revision G and IBC 2012 with ASCE / SEI 7-10. A minimum 15% of the pole structural capacity shall be reserved for future Longmont Internet- Of-Things installations. Weatherproof grommets shall be integrated into the pole design to allow for cable to exit. A hand hole shall be provided to maintain current and future LPC facilities. An optional hand hole may be provided above the base. Pole shall be architecturally compatible with the equipment cabinet.
- B. The luminaire mast arm length shall match that of the existing pole unless otherwise directed by LPC. All luminaires shall be mounted at the same height as surrounding streetlights unless otherwise directed by LPC. All luminaires shall be provided by LPC. Luminaire mast arms shall be galvanized steel and painted to match the pole.
- C. Antenna shall be 16-inch maximum outer diameter with shroud. The height of the antenna – including all associated equipment and hardware required for installation – from the top of the mast arm connection to the top of the antenna shall not exceed eight (8) feet. A tapered transition between the upper pole and antenna shall be included.
- D. Antennas located on the side of a pole, along with all other hardware required for complete installation, shall fit within a 38-inch height by 16-inch width by 12-inch depth maximum shroud and securely strapped to the pole. The shroud shall be colored to match the pole.
- E. Radio frequency warning labels shall be mounted exterior to the pole. 4-inch by 6-inch maximum plate with carrier's name, location identifying information, and emergency telephone number shall be permanently fixed to the pole.
- F. Equipment cabinet shall be round, galvanized steel with a preferred 16-inch diameter (20-inch diameter maximum) and five (5) feet eight (8) inch maximum height. Equipment cabinet shall be galvanized according to AASHTO M 111. Equipment cabinet and pole shall match color. All equipment shall be located internal to the equipment cabinet or recessed as much as possible. 100 A meter housing (with lever bypass) for carrier electric service shall be recessed into the equipment cabinet. Meter disconnect shall be recessed into the cabinet. Meter shall be properly grounded per current NEC. A hand hole for streetlight electrical service shall be provided. At each equipment cabinet hand hole, provide a submersible, waterproof, in-line fuse holder with a FNQ-R 15A fuse for each hot and a submersible, waterproof connector on neutral (if required). A passive ventilation system shall be provided for temperature control. Pole and equipment shall be grounded to meet applicable NEC sections including (but not limited to) 410.30(B) (5), 250.118, AND 250.122. All hardware attachments shall be hidden.
- G. Precast concrete foundations designed to meet ACI 318-14 are preferred and should be installed whenever possible. A minimum of four 2-inch PVC Schedule 40 conduit sweeps shall be installed. Conduit shall accommodate LPC electrical, carrier electrical, and fiber. Any additional conduit sweeps are for future LPC use. Anchor bolts shall be hidden from view. Top of foundation shall be four (4) inches above final grade. Foundation depth, embedment depth, dimensions and reinforcement shall be designed by a Professional Engineer.

- H. Fiberglass Pull/splice boxes are required for separate electrical and fiber services. Refer to NEC article 314 "Pull and Junction Boxes and Conduit Bodies Minimum Size" for box size requirements based on conduit and wire sizes. Fiberglass pull/splice boxes shall be set one (1) to three (3) feet from the concrete foundation. The wire terminations in this box shall be made using submersible insulated pedestal lug connections. Provide one multi-lug connector for each phase, neutral, and ground connector to be spliced in this in-grade splice box.