STANDARDS AND SPECIFICATIONS

CITY OF HURRICANE

DESIGN AND INSTALLATION
OF UNDERGROUND POWER DISTRIBUTION SYSTEMS

BOOK NO. _____

ADOPTED BY HURRICANE CITY COUNCIL
JUNE 06, 1996

Updated – December 01, 1996
Updated– July 14, 1999
Updated – September 28, 1999
Updated – January 6, 2000
Updated – January 25, 2006
Updated - March 20, 2008
Updated- December 5, 2013
Updated- April 10, 2014
Updated- May 30, 2014
Updated- January 4, 2016
Updated- June 28, 2017

City of Hurricane
Underground Power Distribution System

TABLE OF CONTENTS

Title

City of Hurricane
Underground Power Distribution Systems

TABLE OF CONTENTS

Title **Page**

LIST OF DRAWINGS

SECTION

I

CITY OF HURRICANE
Underground Power Distribution Systems

GENERAL PREFACE

The City of Hurricane Power Department has prepared and approved this set of standards and specifications for the purpose of maintaining a safe, consistent and reliable underground power distribution system. These standards are required to be used by anyone who is involved with design and/or installation of underground power distribution systems within the Hurricane City limits.

In the event these standards and specifications are revised or changed; proper notice will be given **to approved vendors/contractors that these revisions or changes may affect.** A determined phase-out period or arrangement will be made for anyone who may have warehoused pre-purchased equipment that becomes obsolete due to the revision or change.

Hurricane City Power Department generally does hook-ups on Fridays.

Hurricane City Power Department will do all primary terminations.

If a Contractor needs to have the City of Hurricane Power Department provide access to electrical facilities they are required to set up an appointment to have Hurricane City Power meet them at the job site.

All costs for underground power distribution systems are the responsibility of the Contractor/Developer unless otherwise stated in this Standard and Specifications.

If a Contractor/Developer re-plats or otherwise changes the underground power distribution system within a development, it will be the Contractor/Developer's responsibility to make sure the system meets the requirements of this Standards and Specifications. All costs for the changes to the underground power distribution system will be the responsibility of the Contractor/Developer.

City of Hurricane
Underground Power Distribution System

A Contractor/Developer has the right to contest any item in these Standards and Specifications by being included on the agenda at a regularly scheduled City of Hurricane Power Board Meeting. Arrangements for being on the agenda can be made by contacting the Hurricane City Power Department.

If this standard is in conflict with federal, state, or local codes, the more stringent requirement is to be followed.

NOTICE

ALL CONTRACTORS AND OWNERS/BUILDERS INSTALLING PRIMARY AND SECONDARY ELECTRICAL FACILITIES MUST FILL OUT AN INFORMATION SHEET AT THE HURRICANE CITY OFFICE BEFORE ANY CONSTRUCTION CAN BE STARTED.

SEE SAMPLE IMFORMATION SHEET ON THE NEXT PAGE:

INFORMATION SHEET
CITY OF HURRICANE
POWER DEPARTMENT

526 West 600 North, Hurricane, Utah (435) 635-5536

Project Name and Address: _____

_____

Contractor: _____Date:_____

Contact Person: _____Phone: _____

Business Address: _____

Mailing Address if different: _____

Phone: (_____) _____

Qualification Card:

Date Issued: _____/ _____/ _____

SIGNATURE: _____Date: _____
Contractor

SIGNATURE: _____Date: _____
City of Hurricane Representative

SECTION

II

City of Hurricane
Joint Utility
Design and Construction Standards

The following Design and Construction Standards are to be followed at all times unless a problem exists. When the standards cannot be followed, the Hurricane City Power Board will be required to approve the alternative.

- A proximity detail and street locations will be required on all utility drawings.
- For joint utilities trench details, see Drawing DR-1 (Drawings Section).
- For placement and layout of utilities, see Drawings DR-1 and DR-2 (Drawings Section).
- For burial depths, see Drawing DR-1 (Drawings Section).
- Licensed Professional Engineers will be required to submit sealed (drawings that are stamped by a professional engineer) utility drawings as per the standards contained herein. All utilities (i.e. gas, cable, phone, power, sewer and water) will be shown on the appropriate drawings. The utility drawings are subject to approval by the City Staff. **All drawings are to be submitted on computer disks in Auto CAD format version 2004 or greater.**
- Phone, cable, and power joint trench will be located on the north and west side of roadways. In new developments, with sidewalks, the joint trench will be located at the back of the sidewalk; s much as possible. In planned developments without sidewalks, the joint utility trench will be five feet (5') back of curb. Locations must be approved by City Staff.
- Water and Gas will be located on the south and east sides of roadways. In new developments with sidewalks, the gas line will be located behind the sidewalk and the water line five feet (5') into the roadway off of curb; as much as possible. In planned developments without sidewalks, the requirements are lip of curb for gas and water stays the same. Locations must be approved by City Staff.
- Generally, sewer will be located fifteen feet (15') off power side (north and west sides of roadways) curb and gutter. In private development or streets, the centerline will be used to place sewer as much as possible. Locations must be approved by City Staff.
- Generally, storm drains will be designed to fall at the inside lip of curb and gutter.
- **Cable and phone boxes will be located on the adjacent side of property corners from power, see Drawing DR-2 (Drawings Section)**

- Gas mains will stay five (5') minimum off of back of sidewalk on public streets.

- **For commercial projects, building layout, square footage, panel size in amps, number of meters/breaker sizes, voltage needed and load calculations will be required.**

- **For multi-destiny lot projects, the number of units per lot and building, panel size in amps, number meters/breaker sizes and voltage needed will be required.**

- **Qualified Contractors must have a valid Hurricane City Underground High Voltage Certificate to install electrical facilities in the Hurricane City Power System**

  Only a Hurricane City Power approved contractor or Journeymen Electrician may install secondary service lines from Hurricane City Power's designated connection point to the customers meter base. This includes all conduit and wire installation.

- Qualified Electrical Contractors will be responsible to install the joint trench as described and shown on Drawing DR-1 (Drawings Section).

- Utility conduits/lines will be color coded as follows:

Power	Black with red stripe or gray
Water	Blue or white or ductile iron
Pressurized Irrigation Water	Blue or w3hite or ductile iron
Sewer	Green or White
Gas	Orange or Yellow
Phone	White or gray and labeled
Cable TV	White with company label

City of Hurricane
Joint Utility
Design and Construction Standards

TABLE 1

UTILITY LOCATIONS

Utility	Side of Roadway	Location with Sidewalk	Location without Sidewalk
Joint Trench (phone, cable, and Power	North and West	At back of sidewalk	Five feet (5') back of curb
Gas	South and East	Behind sidewalk	Lip of curb
Gas Mains		Five feet (5') minimum off of back of sidewalk on public streets	
Sewer	North and West	Fifteen (15') minimum off of back of sidewalk on public streets	Fifteen feet (15') off curb & gutter or centerline of roadway as much as possible
Storm drains	North and West	Inside lip of curb and gutter	Inside lip of curb and gutter
Cable boxes and phone boxes	North and West	Left side of power transformers and secondary boxes looking from the street	Left side of power transformers and secondary boxes looking from the street

Note: All locations must be approved by Hurricane City Staff.

SECTION

III

City of Hurricane
Underground Construction Standard
Cable Installation

I. SCOPE

This standard outlines installation details for primary and secondary cable used in underground distribution.

II. DEFINITIONS

A. SECONDARY CABKES

All cables with voltage ratings of 600 volts or less including grounding conductors.

B. PRIMARY CABLES

All cables with voltage ratings greater than 600 volts. Thickness of conductor insulation shall be 220 mils.

C. BURIAL DEPTH

Vertical distance from the surface under which cables are installed to the center of the conduit nearest the surface.

III. INSTALLATION

A. CABLE INSTALLATION METHODS

1. Conduit Sizes.

   See Drawings DR-1 (Drawings Section).

2. Loading Guidelines.

   Loadings on the City of Hurricane's system are limited to the values listed below. These limitations are set to allow the City to maintain three-phase balanced loads on the system's main overhead circuits.

   a) Primary Conductor Loading.

      1) A maximum of 400 kVA connected is allowed for single phase.

      2) A 1/0 AWG aluminum conductor is required where the connected single-phase and/or three-phase load is less than 400 kVA connected per cable/phase or total 1,200 kVA connected for three-phase cable.

3) When the connected single-phase and three phase loads exceed 400 KVA per cable a backbone-feeder system shall be used. It is required that a 4/0 AWG aluminum conductor be used for the backbone when the total connected KVA is less than 3,600 KVA. When the total connected exceeds 3,600 KVA an aluminum conductor of 750 kcmil is required. The size of the conductor shall be approved by the City of Hurricane Power Department. The connected load shall be divided so that it can be fed by 1/0 AWG aluminum conductor feeders.

KVA

4) If 750 kcmil aluminum conductor is required for the backbone feeder, switchgear must be installed.

3. Cables in Conduit.

a) Miscellaneous Installation Instruction.

1) Cables shall be pulled so that all conduit and bends will be installed and backfilled before any wire is pulled. This will result in minimum tension on the cables.

2) **Any pulls over 950 feet must be approved by Hurricane City Power Department Staff.**

3) In highly congested manholes or where cables must be bent sharply to permit pulling, a feed-in tube shall be used for pulling cables. This will reduce pulling tensions and prevent damage to the cables being pulled and to other adjacent cables.

4) A. Single-phase conductor cables must be installed one cable per conduit and conduit must be nonmetallic as per requirements.

5) Three-phase conductor cable must be installed three cables per conduit and conduit must be nonmetallic as per requirements.

6) Before making a pull, conduits shall be cleared and free of dirt, rocks, etc.

7) **No bent steel conduit or steel conduit shall be used without the approval of Hurricane City Power Department Staff.**

8) Cable pulling compounds (Bentonite clay in a water slurry or pulling compound) shall be used to facilitate pulling of primary and secondary cables. Compounds shall be compatible for use with high voltage cable(s) shield(s).

9) When two or more cables (secondary) and/or bare conductors are pulled into one conduit, they shall be pulled at the same time.

10) Primary cables shall not be installed in the same conduit with secondary or communication cables.

11) Primary or secondary cables shall not be pulled into plastic conduit until all conduit joints made using plastic conduit cement have been allowed to dry for at least one-half (1/2) hour.

12) Sufficient excess cable shall be pulled into all duct runs to allow at least five (5') of cable to be removed from each end of the installed cable, yet providing adequate cable for termination or splicing. Removal of the five feet (5') of cable will eliminate cable damaged by pulling grips from the system.

b) Maximum Pulling Line Tensions.

When pulling cable(s) into conduit, the pulling line used shall have a safe working load rating (minimum) equal to the manufacturer's specification maximum allowable pulling line tensions. An approved hydraulic pressure cable tension monitoring system or dynamometer will be used on all pulls where the cable(s) cannot be pulled by hand.

c) Pulling Eyes and Grips.

Cables shall be pulled into conduit with a pulling eye attached to the cable's conductor or a pulling grip placed over the cable sheath, insulation or jacket.

d) Pulls with Bends and/or Sweeps.

Extreme care must be exercised when pulling cable into runs containing sweeps or bends. There are two (2) concerns; 1) the cable manufacturer's maximum recommended pulling tension must not be exceeded, and 2) the cable manufacturer's maximum sidewall bearing pressure is not to be exceeded. Different manufacturers of cable have differing requirements as

to the maximum pulling tension depending on the type of pulling used (pulling grips such as "Kellams" or pulling eyes affixed to the cable's conductor). Sidewall bearing pressures are also dependent on the manufacturer. It is the Engineer's responsibility to calculate expected cable-pulling tensions and sidewall bearing pressures based on the manufacturer's recommendations. Pulling tension calculations shall be provided to the City of Hurricane for approval.

The number of 90 degree and 45 degree elbows will be limited to the following:

- **For secondary or primary conduit runs using 4" PVC or less, the number of 90 degree elbows shall be limited to two (2), and if needed one (1) 45 degree elbow may be used in addition to the two (2) 90 degree elbows.**
- **For primary conduit runs using 6" PVC, the number of 90 degree elbows shall be limited to one (1).**
- **Any additional elbows (90 or 45 degree) needed to be installed must be approved by Hurricane Power Department.**

B. BENDING RADIUS FOR CABLES

The minimum bending radius for both single and multiple conductor cables shall be per manufacturer's specification.

C. BURIAL DEPTH

See Drawings DR-1 (Drawings Section)

D. SOIL COMPACTION

1. Backfill placed over primary and/or secondary cables must be compacted; machine compaction shall be used after placing a minimum of twelve inches (12") of fill loose over the conduit.

a) Over Conduit.

Refer to the Conduit Installation section for compaction requirements.

E. MULTIPLE PRIMARY CIRCUITS IN ONE TRENCH

1. When the cables comprising two primary circuits (whether single or three-phase) are installed in a common trench the horizontal separation between the two circuits (closest cable to closest cable) shall be twelve inches (12") minimum.

NOTE: This requirement is not meant to prohibit random lay of different phases of the same circuit in a common trench.

TABLE 2

CLEARANCES FROM UNDERGROUND POWER CABLE TO OTHER UNDERGROUND UTILITIES

Water:	5 Feet horizontal
Sewer:	5 Feet horizontal
Natural Gas:	10 feet horizontal
Cable TV:	1 foot vertical
Phone:	1 foot vertical

City of Hurricane
Underground Construction Standard
Cable End Caps

I. SCOPE

The standard details requirements applicable to cable end caps used to seal the ends of primary and secondary cables.

II. GENERAL

A. TEMPORARY CAPS

Cable end caps shall be used for temporarily sealing the ends of primary and/or secondary cables during the periods of time between installation of the cables and completion of splices or terminations and during yard storage. In no case shall the cables be left uncapped or unprotected.

B. PERMANENT CAPS

When the ends of primary and/or secondary cables are to be capped and then buried, left in a manhole or switchgear, etc. for future use they must be capped with cable end caps.

III. INSTALLATION

A. TEMPORARY CAPS

1. Cut the end of the cable to be capped off to the desired length (square cut).

2. Determine the appropriate cable end cap for primary and secondary cable.

3. Push the cable end cap onto the end of the cable until the mastic in the cap surrounds the cable end.

B. PERMANENT CAPS

1. Cut the end of the cable to be capped off to the desired length (square cut).

2. Determine the appropriate cable end cap for primary and secondary cable.

3. Slip the cable end cap over the cable net.

4. Heat the cable end cap thereby causing it to shrink in diameter and conform to the cable end. This will totally seal the cable end against environmental conditions.

City of Hurricane
Underground Construction Standard
Cable End Caps

IV. CAUTIONS AND COMMENTS

Caution: both the temporary and permanent cable end caps have a voltage rating of 600 Volts and **must not** be used to cap energized primary cables.

City of Hurricane
Underground Construction Standard
Cable Marking Location

1. SCOPE

This specification details the standard method to be used for making primary and secondary underground cables to indicate the general direction from which each cable extends from a given site.

It also details a method for identifying individual phases in multi-cable primary and secondary cable systems.

II. DEFINITIONS

A. SECONDARY CABLES

All cables with voltage ratings of 600 volts or less including grounding conductors.

B. All cables with voltage ratings greater than 600 volts.

III. INSTALLATION

A. DIRECTION IDENTIFICATION

Primary and secondary cables shall be marked with one tag indicating direction or exit from underground facilities (i.e., vaults, primary junction boxes, service holes, manholes, secondary junction boxes, transformers, or splice boxes). This tag shall indicate the general direction of the cable(s) to the next facilities where the cable is located. The tags used must be approved by the Hurricane City Staff.

All tags will be labeled with next point of connector (i.e. Transformer 1 to Transformer 2). See Drawings DR-3 and DR-4 (Drawings Section).

All equipment will be numbered as per the instruction drawings prior to tagging the cable in order to be accurate. The tagging will be inspected by City of Hurricane Power Department personnel prior to energizing.

NOTE: Approved tags can be purchased at any Intermountain Farmers outlet.

B. PHASE IDENTIFICATION

When individual phases in a primary or secondary multi-cable installation are to be identified, bands of colored tape shall be used. Each phase shall be identified with bands as follows:

"A" Phase ……Black
"B" Phase ……Red
"C" Phase ……Blue

SAFETY

Do not shortcut or forget safe working procedures. Regardless of the accuracy of cable labeling, it cannot be relied upon when working and handling cables. The energized status of any individual cable must be tested. Proper cable grounding procedures must be followed.

City Of Hurricane
Underground Construction Standard
Conduit Installation

I. SCOPE

This standard outlines installation details for plastic conduit used in underground Distribution.

II. DEFINITIONS

A. PLASTIC CONDUIT

Conduit shall be one of the following types:

1. PVC Schedule 40

B. BURIAL DEPTH

1. Conduit:

   Vertical distance measured from the surface under which conduits are installed to the center of the conduit nearest the surface.

2. Concrete Encased Conduit

   Vertical distance measured from the surface under which conduits are installed to the top of the concrete envelope surrounding the conduits.

C. SWEEP

Changes in direction of a conduit or group of conduits with an angle of bend of 10 Degrees or less or a radius of bend of fifteen feet (15') or more.

D. Change in direction of a conduit or group of conduits that, due to the angle of bend or radius of bend, cannot be defined as a sweep.

III. APPLICATIONS

A. Refer to drawing DR-1 (Drawings Section) for determining conduit depth and location for primary and secondary cable applications.

B. CONDUIT SIZES

Refer to Drawing DR-1 (Drawings Section) for determining conduit sizes for primary and secondary conductors.

C. WARNING TAPE

Six-inch (6") red warning tape shall be installed twelve inches (12") below final grade for the length of the entire trench.

IV. INSTALLATION

A. The minimum allowable burial depths for non-encased and concrete encased conduits are shown in the following table.

Table 3

BURIAL DEPTHS-NON-ENCASED AND ENCASED CONDUIT

	Installed Under Paved Surface		All Other Locations	
	Non-Encased Conduit	**Concrete Encased Conduit**	**Non-Encased Conduit**	**Concrete Encased Conduit**
SCH 40 PVC Conduit Secondary	36 Inches	See Notes	36 Inches	See Notes
SCH 40 PVC Conduit Primary	48 Inches	See Notes	48 Inches	See Notes

NOTES: A. If, in a particular installation, burial depths less than permitted by the table above are required, the reduced burial depths must be approved by the City of Hurricane Power Department personnel.

B. Concrete encased conduit must be with a three-inch (3") envelope. There must also be six inches (6") of select bedding and eighteen inches (18") of fill on top of the concrete encasement Refer to Drawing DR-5 (Drawing Section)

City Of Hurricane
Underground Conduit Standard
Conduit Installation

B. TRENCHES FOR CONDUITS

1. Trench Bottoms.

When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1") in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6") deeper than the burial depth required for the conduits and then backfilled to the required burial depth with sand or screened backfill. Backfill shall be compact to within 95 percent (95%) of the maximum dry density prior to installation of conduit.

2. Trench Backfill

a) Direct Buried Plastic Conduit.

At least twelve inches (12") on one-inch minus material shall be placed over the conduits. The remaining backfill shall be spoil roved from the trench unless specific backfill requirements exist.

b) Concrete Encased Plastic Conduit.

The JUT (Joint Utility Trench) trench shall be backfilled with (1") minus material from the bottom of the trench to the top. No spoil material shall be used, unless screened, (1") minus, and is compactable material

c) Drying Time for Concrete Before Backfilling.

Backfill shall not be placed in trenches containing concrete-encased conduits until the concrete has been allowed to set for at least 36 hours.

C. SOIL COMPACTION

When backfill placed over direct buried plastic conduit must be compacted; machine compaction shall not be used within twelve inched (12") of the conduits. for concrete encased plastic conduits, machine compaction may be used without restriction on proximity to the concrete envelope.

D. When conduits are installed between manholes, they shall be graded to drain towards the manholes whenever possible. The minimum slope necessary to accomplish this is three inches (3") per 100 feet (100') of conduit.

E. CONCRETE ENVELOPE REQUIREMENTS

1. Minimum Envelope Dimensions.

   When conduits are encased in concrete, they shall be enclosed by a concrete envelope. See Drawing DR-5 (Drawings Section).

2. Concrete.

   A three-quarter inch (3/4") minus 3000 PSI mix as per ASTM (American Society for Testing and Materials) C94 specification is required. In all cases a Type 2 modified or Type 5 cement will be used. Air entraining agents shall not to be used. Slump shall not exceed six inches (6") at site.

3. Conduit Retention

   Weights of approximately 75 pounds or other means may be used to prevent conduits from floating during pouring of the concrete envelope.

F. CONDUIT BENDS AND SWEEPS

1. Minimum Radius

   a) Bends.

      The minimum radius of bends in conduits shall not be less than ten (10) times the diameter of the largest conduit being installed. If smaller minimum bending radii are required, they shall not be less than the manufacturer's recommended minimum bending radii of the cables to be installed in the conduits.

G. SHORING, LAYING BACK, SPOIL PLACEMENT AND RETENTION

When employees must enter a trench to install conduits, the trench shall be shored or laid back and the spoil shall be effectively retained and placed back from the edges of the trench as required by local, state and national codes or ordinances to ensure that the employees are not subject to moving ground or cave-ins.

City of Hurricane
Underground Construction Standard
Conduit Installation

H. If conduit is damaged during installation, damaged section(s) shall be removed and replaced with like conduit and couplings. Use of split ducts for repair of damage during installation is not permitted. A full stock length (usually 10 foot segments) will be used to repair a damaged section. Repair collars will not be allowed.

I. RISER POLE CONDUIT 9INCLUDES POWER, PHONE, TV)

Conduits for a riser pole shall be rigid steel and shall continue up the pole from the PVC elbow to the top of the riser. The riser pole conduit shall be straight and supported with s six-inch (6") aluminum-strut system. Any crooked or misaligned conduits will not be accepted. The Contractor shall install the first ten feet (10') of the riser and one six-inch (6") standoff. The City will provide the rest of the materials for the completion of the power riser at the Contractor's expense. Placement and height of riser shall be approved by City of Hurricane Power Department personnel. See Drawings DR-23.

NOTE: There will be a free charged for the installations: Please see City of Hurricane Power Department personnel for current fees. These fees are subject to change without notice.

City of Hurricane
Underground Construction Standard
Enclosure Installation

I. SCOPE

This standard outlines installation details for primary enclosures (manholes, splice boxes, etc.) use in an underground distribution system.

II. INSTALLATION

A. ABOVE GROUND PRIMARY ENCLOSURES

1. Ground Sleeve Installation Depth.

   The ground sleeve shall be installed with the top being within six inches (6”) above the finished grade.

2. Pad Installation Depth.

   The mounting pad shall be placed on the finished grade.

B. LOCATION

Primary enclosures shall be located such that adjacent obstacles such as fences, buildings, etc. do not interfere with operation, installation, or maintenance of the enclosures. If less than ten feet (10’) of clear space is to be provided, City of Hurricane Power Department approval is required.

City of Hurricane
Underground Standard
Equipment, Line Location and Right of Way Requirements

I. SCOPE

This standard outlines the location, with respect to property lines, of underground distribution facilities. See Drawings DR-6 and DR-7 (Drawings Section).

II. **BACK LOT AND SIDE YARD LINE INSTALLATIONS**

Installation along back lot and side yards will not be allowed. If front installation is not possible, Contact Hurricane City Power for further review of electrical installation plan.

III. RIGHT-OF-WAY REQUIREMENTS

Before any power system design approval, the property owner or developer will be required to grant the City of Hurricane the proper easements and rights-of-way.

The standard requirements are as follows:

Residential:

7.5 feet (7.5') on the front of each lot or parcel
7.5 feet (7.5') on the sides and back of each lot or parcel

Multi-Building or Condominium:

10 feet (10') around perimeter of each phase

Commercial:

15 feet (15') on the front of each lot or parcel
7.5 feet (7.5') on the side and back of each lot or parcel

Common Areas:

The equipment (i.e. transformers, vaults, switches) will be placed along access Roads as per standards. If placement along access roads cannot be accomplished as determined by the City of Hurricane Power Department, equipment will be placed with at least ten feet (10') of clearance from any permanent structure.

All power equipment will be designed and installed as per the location drawings contained in these specifications; Drawings DR-6, DR-7, and DR-8 (Drawings Section) in order to assure equipment falls within the established rights-of-way and easements and to maintain consistency of equipment placement throughout the City.

SECTION

IV

City of Hurricane
Underground Construction Standard
Primary Junction Installation

I. SCOPE

This standard outlines installation details applicable to Fused 15 kV, 200 and 600-Ampere Primary Junction Installation.

II. INSTALLATION

A. All single-phase padmount transformers will have a ground sleeve, see Drawing DR-9 (Drawings Section). All three-phase transformers will be placed on the transformer pad as shown on Drawing DR-10 (Drawings Section).

B. Fusing requirements for any subdivision or residential development will be reviewed, coordinated and approved by the City of Hurricane Power Department. As a general guideline, the first tap of the City's Main Distribution System for a subdivision or residential development will not require a sectionalizer it the total connected load is less than 300 kVA and provided there is an overhead feeder connection available. If the first tap is for a load greater than 300 kVA or an overhead feeder connection is not available; a sectionalize rust be installed and paid for by the development. Any development requiring service off an existing underground system must install and pay for sectionalizing equipment if the additional load causes the total load to exceed 300 kVA. Theses guidelines will also apply to single-phase industrial or commercial facility development.

Fusing requirements for any industrial or commercial facility will be reviewed, coordinated and approved by the City of Hurricane Power Department. System that has the potential of serving more than one commercial or industrial location or more than one circuit/feeder. Fusing will be determined by the Hurricane City Power Department and each subdivision or development will be fused according to the needs.

C. Connection requirements vary between the type of service being rendered (residential, commercial, or industrial) and location on the electrical system.

City of Hurricane
Underground Construction Standard
Primary Junction Installation

Residential Single-Phase Less Than 400 kVA
When a proposed subdivision is being planned, if the location permits tapping to an existing overhead feeder that has adequate existing excess capacity, and if the proposed subdivision's connected load is less than 400 kVA, the development can be served by a single-phase tap. The subdivision shall not contain a single transformer larger than 100 kVA. No sectionalizing equipment will be required other than a fused disconnect located on the proposed riser pole. The fuses at the riser pole disconnect shall not be greater than 40T. Fuse sizing must be approved by City Staff.

Residential Three-Phase 400 kVA-1200kVA
When the proposed subdivision load exceeds 400 kVA but is less than 1,200 kVA, a three-phase feed into the subdivision must be established. This feed will be tapped via appropriate sectionalizing cabinets, see Drawings DR-11 or DR-12 (drawings Section) to serve single – phase loads up to 400 kVA per phase. Loads served by such a system shall be balanced by connected transformer kVA per phase. No single transformer shall exceed 100 kVA. A set of three (3) fused disconnects will be provided on the riser pole serving the subdivision. The fuses at the riser pole disconnects shall not be larger than 40T. Fuses on the outgoing lines at the sectionalizing cabinets shall not be larger than 40E. Fuse sizing must be approved by City Staff.

Residential Three-Phase 1200 kVA-3600kVA
When loads proposed for the planned subdivision exceed 1,200 kVA but are less than 3,600 kVA, the subdivision will be served by a three-phase 4/0 AWG feeder. Loads on the feeder will be balanced as near as practical by connected transformer KVA. No single-phase tap (1/0 AWG) shall exceed 400 kVA of connected transformer capacity. Each such single – phase tap will be connected to the backbone feeder via a fused disconnect cabinet. Such fused cabinets will have fuses sized to coordinate with the overhead protective device at the riser pole. The fuses at the riser pole disconnects shall not be larger than 80T. The fuses on the outgoing lines at the disconnect cabinet shall not be larger than 80E. Fuses for outgoing taps less than 1,200 kVA three-phase (400 kVA single-phase) shall not be larger than 40E. Fuse sizing must be approved by City Staff.

Residential Three-Phase Greater Than 3600 kVA
When loads proposed for the planned subdivision exceed 3,600 kVA the subdivision will be served by a three-phase 750 kcmil backbone feeder. Taps to serve single-phase connected kVA of 400 or less are permitted but shall be connected to the feeder by a switched, fused cabinet. Careful pre-planning of the subdivision's electrical system is required to minimize the number of requires switched fused cabinets. Where a switch cabinet is required, no more than nine (9) fised single-phase taps can be fed from the cabinet. Each tap shall have not more than 400 kVA of connected single-phase load. Single-phase loads shall be balanced between the phases by balancing connected transformer kVA. Fuses shall be sized based on connected kVA and shall coordinate with the up-line protective devices. Fuses on the outgoing lines at the disconnect cabinet shall not be larger than 80E. Fuses for outgoing taps

Less than 1,200 kVA three-phase (400 kVA single-phase) shall not be larger than 40E. City of Hurricane Power Department personnel shall be consulted early in the planning stage to determine the appropriate maximum fuse size.

Commercial Single-Phase Less Than 400 kVA
Maximum single-phase load is 400 kVA. No transformer may be larger than 100 kVA. Single-phase taps will be protected by a fused disconnect on the riser pole. The fuses at the riser pole disconnect shall not be larger than 40T. Fuse sizing must be approved by City Staff.

Commercial Three-Phase Less Than 1500 kVA
Maximum load from a riser before applying fused switchgear is 1,500 kVA. No tap shall consist of more than three (3) transformers without the use of fused switchgear. The fuses at the riser pole disconnects shall not be larger than 80T. Fuse sizing must be approved ty City Staff.

Commercial Three-Phase 1500 kVA-3600 kVA
When loads proposed for a planned commercial development exceed 1,500 kVA but are less than 3,600 kVA, the development will be served by a 4/0 AWG feeder and switchgear will be required. When applying fused switchgear no tap shall consist of more than three (3) transformers totaling 1,500 Kva of connected load. The fuses on the outgoing lines at the switchgear shall not be larger than 80E. Fuses for outgoing taps less than 1,200 kVA three-phase (400 kVA single phase) shall not be larger than 40E. Fuse sizing must be approved by City Staff.

Commercial Three-Phase Greater Than 3600 kVA
When loads proposed for the planned subdivision exceed 3,600 kVA the subdivision will be served by a three-phase 750 kcmil backbone feeder. Taps to serve single-phase connected kVA of 400 or less are permitted but shall be connected to the feeder by a switched, fused cabinet. Careful pre-planning of the subdivision's electrical system is required to minimize the number of required switched, fused cabinets. Where a switch cabinet is required, no more than nine (9) fused single-phase taps can be fed from the cabinet.. Each tap shall have not more than 400 kVA of connected single-phase load. Single-phase loads shall be balanced between the phases by balancing connected transformer kVA> Fuses shall be sized based on connected kVA and shall coordinate with the up-line protective devices. Fuses on the outgoing lines at the disconnect cabinet shall not be larger than 80E. City of Hurricane Power Department personnel shall be consulted early in the planning stage to determine the appropriate maximum fuse size.

City of Hurricane
Underground Construction Standard
Primary Junction Installation

Residential and Commercial

When fused switchgear is required the developer/customer is responsible to pay their pro-rata share of the current costs for a three-phase fused bay. Current costs to be obtained from the City of Hurricane Power Department.

TABLE 4

FUSE SIZES

Description	Location	Fues Size
Residential Single-Phase Less Than 400 kVA	Riser Pole	40T
Residential Three-Phase 400 kVA-1200 kVA	Riser Pole Cabinet Outgoing Taps	40T 40E
Residential Three-Phase Greater Than 3600 kVA	Riser Pole Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than 1200 kVA	80T 80E
Residential Three-Phase Greater Than 3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than 1200 kVA	80E 40E
Commercial Single-Phase Less Than 400 kVA	Riser Pole	40T
Commercial Three-Phase Less Than 1500 kVA	Riser Pole	80T
Commercial Three-Phase 1500 kVA-3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than1200 kVA	80E 40E
Commercial Three-Phase Greater Than 3600 kVA	Cabinet Outgoing Taps Cabinet Outgoing Taps Less Than1200 kVA	80E 40E

Note: The fuse sizes shown are a maximum. Fuse sizing must be approved By Hurricane City Staff.

City of Hurricane
Underground Construction Standard
Primary Junction Installation

III. TESTING BEFORE ENERGIZING

A. LOADBREAK ELBOWS AND INSULATING RECEPTABLES

Primary Junction Installation, which include loadbreak elbows and/or insulating receptacles, shall be operated before the installation is energized to ensure that there is no interference from concentric neutral conductors, adjacent elbows, etc.

B. SWITCHES

Test operate all switches in Fused, Primary Installations prior to energizing to ensure that adjacent obstacles such as fences, walls, etc. do not interfere with the switch operating handle.

IV. LOCATION

Primary Junction Installations shall be located such that adjacent obstacles such as fences, buildings, etc. do not interfere with installation or operation and maintenance of the installation.

City of Hurricane
Underground Construction Standard
Secondary Junction Installation

I. SCOPE

This standard describes the installation of secondary junction boxes and mobile home park meter pedestals.

II. INSTALLATION

A. BURIAL DEPTS

1. Secondary Junction Boxes.

Secondary junction boxes shall be installed with 6 inches (6") being left above final grade and be located six to twelve inches (6" – 12") behind sidewalk. See drawings DR-2 and DR-13 (Drawings Section)

2. Mobile Home Park Metering Pedestals.

Mobile Home Park Metering Pedestals shall be installed to the depth indicated on the pedestal by the manufacturer, see Drawings DR-17 (Drawings Section).

III. SAFETY

A. LOCKING

1. Secondary Junction Boxes.

All secondary junction boxes shall be bolted with penta head bolts. Standard tumbler-type locks or other devices **are not** approved for this application.

2. Mobile Home Park Meter Pedestals.

The access panel to the unmetered bus in all mobile home park meter pedestals shall be locked with pedestal equipment locks. Standard tumbler type locks or other devices are not approved for this application.

City of Hurricane
Underground Construction Standard
Cable Taps (200 Amperes)

I. SCOPE

This standard outlines installation details for 200 ampere, 15 kV loadbreak junctions used in underground distribution.

II. INSTALLATION

A. GENERAL

200 ampere, 15 kV loadbreak junctions must be installed in primary enclosures. they are not suitable for direct burial.

B. TESTING BEFORE ENERGIZING

Operate loadbreak elbows and insulating receptacles before energizing 200 Ampere, 15 kV loadbreak junction installations to ensure that:

1. They can be operated without interference from concentric neutral conductors, adjacent elbows, etc.

2. The mounting location of the loadbreak junction is such that rings and covers or doors of primary enclosures, adjacent junctions, etc. do not interfere with] their operations.

City of Hurricane
Underground Construction Standard
Cable Taps (600 Amperes)

I. SCOPE

This standard outlines installation details applicable to 15 kV, 600 ampere spice-tap configuration used in underground distribution systems.

II. INSTALLATION

When assembling 15 kV, 600 ampere spice-tap configurations, a spanner wrench may be used to facilitate installation or removal of connector plugs and reducing tap wells (with or without studs). They are not suitable for direct burial.

III. CAUTIONS

600 Ampere elbows are deadbreak and only suitable for operation when de-energized.

SECTION

V

City of Hurricane
Underground Standard
Transformer Installation

I. SCOPE

This standard describes the installation of single-phase and three phase transformers used in underground distribution.

II. EQUIPMENT

A. PRIMARY SYSTEM CONFIGURATION

1. Single-Phase Padmount Transformers.

Single-Phase padmount transformers should be equipped with two primary bushings for installation in loop or radial feed primary systems.

2. Three-Phase Padmount Transformers.

Three-phase padmount transformers shall be purchased with six primary bushings (loop Feed).

III. INSTALLATION

A. Connect the secondary ground strap, supplied on most padmount transformers, Between the transformer tank wall and the secondary neutral.

B. The soil backfill to be placed around the transformer ground sleeve shall be compacted to within 95 percent (95%) of the maximum dry density to support the transformer.

CAUTION: Do not disconnect either end of the secondary ground strap unless the transformer is de-energized.

IV. TRANSFORMER SIZING

A. **Residential transformers will be sized based on 6KVA per residence; maximum of 200 amperes.**

B. Commercial/Industrial transformers will be sized based on **60** percent **(60%)** of the panel size.

City of Hurricane
Underground Construction Standard
Transformer Installation

V. TRANSFORMER ORDINANCE

Please refer to the City of Hurricane's most recent transformer ordinance.

VI. TRANSFORMER POLICY

If is permissible for a Contractor to acquire transformers from sources other than the City of Hurricane Power Department, provided the transformer(s) fully meets Hurricane City specifications.

It will be the policy of the City of Hurricane Power Department that the Electrical Contractor will be responsible to furnish to the Power Department, prior to energizing the circuit or transformer, but not limited to, the following:

1. Certified, lad loss certificate, by serial number of unit

2. Certificate from manufacturer:
   a) Compliance of standards testing required in the transformer specifications.
   b) Warranty.
   c) Polychlorinated Biphenyl (PCB) certificate.

3. Numbering of Transformer and Information needed
   a) All nameplate information.
   b) Street Address.

It is the responsibility of the Contractor to see that the City of Hurricane Power Department inspector receives transformer information before the final inspection walk through. The City Power inspector will assign a number for each transformer to be painted on the front of transformer by the Contractor.

All appurtenances to the transformers such as, but not limited to, all elbows, neutral grounding bushings (when required), stand offs, dummy receptacles, etc. will be provided by the Contractor. Single-phase transformer secondary bar connectors capable of accepting 6-500kcmil copper or aluminum conductors shall be supplied by the Contractor.

Prior to placing a transformer on order, it will be the responsibility of the Contractor to ensure that the Transformer Distributor is aware of the conditions of the ordinance and the City of Hurricane Power Department. It also will be the responsibility of the Contractor to inform the Power Department of transformers placed on order, size of transformer, project name, and name of Transformer Distributor.

City of Hurricane
Transformer Bid Specifications
Single-Phase Padmounted Distribution Transformer

I. SCOPE

I.I GENERAL

I.I.I. This specification outlines the electrical characteristics and the mechanical features of single-phase, 60 Hz; oil filtered padmounted, deadfront compartmental-type distribution transformers with sepaarable insulated high voltage.

I.2 STANDARDS

1.2.1 All transformers shall be constructed and tested in accordance with latest revision of ANSI C57.12.25 (American National Standards Institute); and the applicable NEMA (National Electrical Manufacturers Association) standards.

1.2.2 No used or remanufactured material or components will be acceptable.

2. RATINGS

2.1 KILOVOLT AMPERE (kVA) RATINGS

2.1.1 The standard kVA ratings shall be one of the following:

2.1.1.1 **The standard KVA ratings shall be one of the following:**
25 KVA, 37.5 KVA, 50 KVA, 75 KVA, or 100 KVA as required.

2.1.2 These standard kVA ratings are continuous and based on not exceeding either a 65º C average wining temperature rise or an 80º C hot spot temperature rise. The temperature rise of the insulating oil shall not exceed 65º C when measured near the top of the tank.

2.2 VOLTAGE

2.2.1 The high voltage rating shall be 12470Y/7200 volts. The low voltage rating shall be 240/120 volts. Unless otherwise directed by the City of Hurricane Power Department.

2.3 BASIC IMPULSE INSULATION LEVEL

2.3.1 The basic impulse insulation level (BIL) shall be 95 kV.

City of Hurricane
Transformer Bid Specification
Single-Phase Padmounted Distribution Transformer

3. CONSTRUCTION

3.1 GENERAL

All transformers shall consist of a transformer tank and a high and low-voltage cable termination compartment. These components shall be assembled as an integral, tamperproof and weatherproof unit for mounting on a pad. The transformer shall meet the requirements for tamper resistance as set forth by the Western Underground Committee. There shall be no exposed bolts, screws or other fastening devices which are extremely removable. There shall be no openings through which foreign objects such as wires or rods might be inserted to contact live parts.

3.2 HIGH AND LOW-VOLTAGE COMPARTMENT

3.2.1 Access to the high and low-voltage compartment shall be through a hinged door suitable for locking with a padlock.

3.2.2 The high-voltage segment of the compartment shall contain the high voltage terminations and be provided with an elbow accessory parking stand. High voltage will be of the loop type configuration.

3.2.3 The low-voltage segment of the compartment shall contain the low-voltage terminations.

3.3 TANK

3.3.1 All transformer tanks shall have sealed tank construction and sufficient strength to withstand a pressure of seven (7) PSIG without permanent distortion.

3.3.2 A tank that has sealed tank construction is one that seals the tank from the atmosphere.

3.3.3 The tank shall remain effectively sealed for a top oil temperature range of -5ºC to 105ºC.

3.4 MAN COVER

3.4.1 Welded main cover construction shall be provided. If access to internal connection for testing is required, a handhole(s) shall be provided.

3.5 LOW-VOLTAGE TERMINATIONS

3.2.0 The electrical characteristics of the completely assembled low-voltage terminations shall be:

3.5.1.2 Insulation Class – 1.2kV.

3.5.1.3 Basic Impulse Insulation Level (BIL)-30 kV.

3.5.1.4 One minute withstand – 10 kV.

3.5.2 The terminals of the low-voltage terminations shall be as shown in Figure 4A, Low Voltage Terminals, of American National Standards Institute (ANSI) C57.12.25-latest revision.

3.5.3 The number location and arrangement of the low-voltage terminations shall be as shown I Figure 2, Interchangeability Dimensions-Type 2 Arrangement, of American National Standards Institute (ANSI) C57-12.25-latest revision.

3.5.4 All low-voltage terminations shall be externally bolted to facilitate field replacement.

3.6 HIGH-VOLTAGE TERMINATIONS

3.6.1 All high-voltage terminations shall be 15 kV class universal bushing wells an inserts suitable for use with 15 kV class loadbreak elbow connectors. NOTE: All loadbreak bushing inserts shall be provided with the transformer.

3.6.2 All high-voltage terminations shall be externally bolted to facilitate field replacement.

3.6.3 The number, location and arrangement of the high-voltage terminations shall be shown in Figure 2, Interchangeability Dimensions-Type2 Arrangement, of American National Standards Institute (ANSI) C57312.25-latest revision.

3.7 NEUTRAL CONNECTIONS

3.7.1 The H2 end of the high-voltage windings shall be connected to the transformer tank internally and this connection shall be securely grounded to the tank and shall be independent of all other connections.

3.7.2 The low-voltage neutral shall be a fully insulated bushing. A ground pad shall be provided on the outer surface of the tank. A removable ground strap shall be provided and connected between the low-voltage neutral bushing and the ground pad.

3.8 CORE AND WINDINGS

3.8.1 One piece core construction is desired. Where other construction is used, minimum assembly joints shall be provided. For approved two part cores, the core shall be held together with bands and torqued bolts. Crimped banding is not acceptable for ratings over 50 kVA.

3.8.2 Copper or aluminum winding conductors are desired.

3.8.3 Core material may be either silicon steel or amorphous.

3.8.4 Core losses shall be minimized by the core material and core construction.

3.9 INSULATION

3.9.1 All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil or the coils shall be would with primary conductor containing a thermosetting adhesive that when properly cured will form an effective bond.

3.9.2 Insulating/cooling fluid within the tank shall be electrical grade mineral oil or a non flammable environmentally accepted fluid.

3.9.3 All fluids shall be certified and indicated on the nameplate to be less than 1 parts per million (ppm) polychlorinated biphenyl (PCB) content.

3.9.4 Fluids other than mineral oil **shall have** submitted with the quotation complete chemical and electrical characteristics and a statement of being non-PCB.

3.10 GROUND CONNECTION

3.10.1 The tank shall have a welded ground lug boss attached on the secondary side of the tank near the bottom of the tank of secondary bushings and attached conductors.

3.10.2 The grounding boss shall be free of paint and shall be 7/16 inch (7/16”) deep and threaded for a one-half inch (1/2”) 13 NC grounding stud or connector.

3.10.3 The tank cover shall have a grounding strap between the cover and the tank.

City of Hurricane
Transformer Bid Specifications
Single-Phase Padmounted Distribution Transformer

4. ACCESSORY EQUIPMENT

4.1 HIGH-VOLTAGE PROTECTIVE FUSES

4.1.1 All transformers shall be equipped with an extremely removable, oil immersed, expulsion fuse, in a loadbreakk bayonet suitable for hot stick operation. This fuse must be designed to protect the transformer in the event of internal or secondary faults or under overload conditions and must be hook stick operable.

4.2 PRESSURE RELIEF DEVICE

4.2.1 Each transformer shall be equipped with s self-actuating relief device to relieve slow pressure buildup and to automatically vent when pressure reaches + 10 PSIG and recluses when pressure falls to + 6 PSIG.

4.3 ROLLING, LIFTING, AND MOUNTING FACILITIES

4.3.1 The transformer shall be equipped with lifting provisions of adequate strength and size and arranged on the transformer to permit lifting of the completely assembled and oil filled unit.

4.3.2 An internal flange shall be provided at the base of the high and low-voltage compartment to provide means for mounting the transformer on a pad.

4.4 INSTRUCTIONAL NAMPLATE

4.4.1 An instruction nameplate shall be located in the low-voltage segment of the high and low voltage compartment and shall be readable with cables in place.

4.4.2 If the nameplate is mounted on a removable part, the manufacturer's name and the transformer serial number shall be permanently affixed to a non-removable part.

4.4.3 The instructional nameplate shall conform to Section 6.4, Instruction Nameplate, of American National Standard Institute (ANSI) C57.12.25 latest revision. The nameplate shall also conform to Section 5.12, Nameplates, of American National Standard Institute (ANSI) C57.12.00 latest revision.

City of Hurricane
Transformer Bid Specification
Single-Phase Padmounted Distribution Transformer

5. TESTING

5.1 All transformers shall be tested in accordance with requirements of American National Standard Institute (ANSI) C57.12.25 latest revision. All transformers shall be capable of withstanding short circuit test.

6. FINISH

6.1 The transformer shall be given a durable, corrosion resistant, green or desert tan (as specified) outdoor finish capable of meeting or exceeding EEI finishing requirements.

6.2 All transformer surfaces in contact with the pad shall be designed or treated to minimize corrosion.

7. SHIPPING AND LABELING INSTRUCTIONS

7.1 Transformers shall be mounted on a pallet for shipment.

7.2 A shipping tag indicating the kVA size, manufacturer, voltage ratings, serial number and purchaser's order number shall be attached to all transformers.

8. LOSS EVALUATION

8.1 Load and no-load losses will be evaluated as follows:

No-Load Core Losses	Load Losses (Copper)
$6.85/Watt	$1.75/Watt

8.2 Evaluated losses will be calculated by multiplying the appropriate dollars/watt values by guaranteed maximum load losses at maximum nameplate kVA rating and no-load losses at 100 percent voltage. These products will be added to the bid price for evaluation.

8.3 Total watt losses shall not exceed the following:

Single-Phase Padmount 120/240 Volt

kVA Rating	Losses in Watts	kVA Rating	Losses in Watts
25 kVA	275 Watts	75 kVA	675 Watts
37.5 kVA	360 Watts	100 kVA	750 Watts
50 kVA	460 Watts	167 kVA	1,310 Watts

8.4 If the actual tested loss values exceed the guaranteed maximum values stated in the proposal of the Contractor, the Contractor will be charged a penalty value for every kilowatt by which the actual tested transformer losses exceed the guaranteed maximum losses upon which the proposal was evaluated. This penalty value will be the difference between the total actual test loss evaluation and the total guaranteed bid loss evaluation based on the evaluation factors as follows:

No-Load Core Losses	Load Losses (Copper)
&6.85/Watt	$1.75/Watt

8.5 All actual tested loss data will be transmitted to the City of Hurricane Power Department within five (5) days after shipment of the transformers.

9. VENDOR EVALUATION

9.1 Vendor evaluations, as well as loss evaluations, will be used to determine the low bidder. Delivery dates will be of prime concern during the bid evaluation.

10. EXCEPTIONS

10.1 Exceptions to this Specifications **shall not** be accepted, unless approved by the City of Hurricane City Power Department Superintendent. Any exceptions shall be noted in the proposal.

11. WARRANTY

11.1 Manufacturer shall warrant to Purchaser that the apparatus or service to be furnished hereunder shall be of the highest quality and free from defects in material, workmanship, and title and will be of the kind designated in the pertinent purchase order. The Manufacturer's warranty shall be effective for a period of twelve (12) months after the date of shipment to Purchaser.

11.2 The Manufacturer shall guarantee that all transformers furnished under this specification are of first class material and workmanship throughout, that they have been tested in accordance with this specification, and that the results of the tests comply with the requirements of this specification, and, in lieu of other claims against it, agrees to replace or repair it.

11.2.1 Any transformer found to be defective in material or workmanship or found not to be in compliance with the requirements of this specification before or during installation of the transformer.

11.2.2 Any transformer failing during normal and proper use within the Manufacturer's guarantee period which shows defects of materials or workmanship.

City of Hurricane
Transformer Bid Specifications
Three-Phase Padmounted Distribution Transformer

I. SCOPE

1.1 GENERAL

This specification outlines the electrical characteristics and the mechanical features of deadfront outdoor three-phase, 60 Hz, oil immersed, self-cooled pad-mounted, compartment-type distribution transformer with separable insulated high voltage connectors.

1.2 STANDARDS

1.2.1 All transformers shall be constructed and tested in accordance with latest revision American Standards Institute (ANSI) C57.12.26, and the applicable National Electrical Manufacturers Association (NEMA) standards.

1.2.2 No used or remanufactured material or components will be acceptable.

2. RATINGS

2.1 KILOVOLT AMPERE (kVA) RATINGS

2.1.1 The standard kVA ratings shall be on of the following:

2.1.1.1 75 kVA, 112.5 kVA, 150 kVA, 225 kVA, 300 kVA, 500 kVA, 750 kVA, 1000 kVA, 1500 kVA, or 2000 kVA as required.

2.1.2 These standard kVA ratings are continuous and based on not exceeding either a 65º C average winding temperature rise or an 80º C hot spot temperature rise. The temperature rise of the insulating oil shall not exceed 65º C when measured near the top of the tank.

2.2 VOLTAGE

2.2.1 The high voltage rating shall be 12470/7200 volts. The low voltage rating shall be 208Y/120 volts or 480Y/277 volts as required, unless otherwise directed and approved by the City of Hurricane Power Department.

2.3 TAP RATINGS

2.3.1 The transformers shall be equipped with: (2) 2-1/2 percent taps above and (2) 2-1/2 percent taps below normal voltage. All taps shall be full capacity taps.

2.3.2 Tap changing to be through the wall in the high voltage connection compartment for external to tank adjustment.

2.3.3 Taps shall have the positions of the changer clearly marked to indicate actual voltage on the primary, or as a percent (%) of above and below normal primary voltage.

2.3.4 Taps shall be operable only with the transformer de-energized.

2.4 BASCI IMPULSE INSULATIONLEVEL

2.4.1 The basic impulse insulation level (BIL) shall be 95 kV.

3. CONSTRUCTION

3.1 GENERAL

3.1.1 All transformers shall consist of a transformer tank and a high and low-voltage cable termination compartment. These components shall be assembled as an integral, tamperproof and weatherproof unit for mounting on a pad. The transformer shall meet the requirements for tamper resistance as set forth by the Western Underground Committee. There shall be no exposed bolts, screws or other fastening devices which are externally removable. There shall be no openings through which foreign objects such as wires or rods might be inserted to contact live parts.

3.2 TANK

3.2.1 Transformer tank shall be suitable for outdoor installation. The tank shall be of a construction that effectively seals the tank interior from the atmosphere but will allow entry for service.

3.2.2 Construction of the seal shall maintain the integrity of the seal over an operating oil temperature range of -5º C to 105º C.

3.2.3 Tank construction shall be such that it has sufficient strength to withstand a pressure of seven (7) PSIG without permanent distortion.

3.3 HIGH AND LOW-VOLTAGE COMPARTMENT

3.3.1 The high and low-voltage cable terminating compartment shall:

3.3.1.1 Be compartmentalized into high-voltage and low-voltage segments by a suitable barrier.

3.3.1.2 Includes two doors, one for the high-voltage segment and one for the low-voltage segment. These doors shall have stainless steel hinges and pins and three-point latching with provisions for padlocking. Unlocking the padlock shall permit access to the low-voltage segment of the terminating compartment only. Access to the high-voltage segment of the terminating compartment shall not be attained until an additional fastening device has been released.

3.3.1.3 Meet the dimensional requirements of Figure 7 – Compartment Designations and Specific Dimensions for Loop-Feed and Radial-Feed Transformers, of ANSI Publication C57.12.26 latest revision.

3.3.1.4 The high-voltage compartment shall be equipped with accessory elbow stands for each elbow.

3.4 TERMINATION ARRANGEMENT AND DIMENSIONS

3.4.1 The termination arrangements and dimensions for Figures 6, 7, and 8 of ANSI Publication C57.12.26 latest revision shall be applicable to this specification.
Figure 6 – Specific Dimensions for Loop-Feed Transformers
Figure 7 – Compartment Designations and Specific Dimension for Loop-Feed and Radial-Feed Transformers.
Figure 8 – Low-Voltage Terminal Arrangements and Specific Dimensions

3.5 HIGH-VOLTAGE TERMINATIONS

3.5.1 Configuration – The configuration of the high-voltage terminations shall be Loop Feed (ANSI C57.1226 latest revision)

3.5.2 Type – The high-voltage terminations shall be 15 kV class universal bushing wells and inserts suitable for use with 15 kV class loadbreak elbow connectors.
The continuous current rating shall be 200 Amps.
NOTE: All loadbreak bushing inserts shall be provided with transformer.

3.6 LOW-VOLTAGE TERMINATIONS

3.6.1 Terminals – The terminals of the low-voltage terminations shall be a shown in Figure 9A, 9B, or 9C of ANSI Publication C57.12.26 latest revision for the applicable transformer size Figure 9 – Low-Voltage Terminals.

3.6.2 Configuration – The configuration of the low-voltage terminations shall be as shown in Figure 8 – Low-Voltage Terminal Arrangements and Specific Dimensions.

3.6.3 Secondary low-voltage bushings shall include a full capacity neutral (grounded conductor) bushing

3.6.4 The electrical characteristics of the completely assembled low-voltage bushing and terminals shall be:

3.6.4.1 Insulation Class – 1.2 kV.

3.6.4.2 Basic Impulse Insulation Level (BIL) – 30 kV.

3.6.4.3 One minute withstand – 10 kV.

3.6.5 Internal connections to the secondary bushings shall be by lugs welded to the secondary conductor and bolted to the bushing stud.

3.7 FUSING EQUIPMENT

3.7.1 The transformer shall be equipped with externally removable, oil immersed, expulsion fuses in loadbreak bayonets in series with under oil partial range current limiting fuses.

3.7.2 All under oil fuses shall be easily accessible through a large “hand hole” in the high voltage compartment. The hand hole shall be large enough and placed in such a location that all internal fusing elements will be “within” the hand hole area. In no case shall the hand hole area be smaller than 10 inches by 12 inches (10” X 12”) unless approved in writing by the City of Hurricane Power Department. The hand hole cover shall be tamper resistant and its locking device shall be accessible from inside the high voltage or low voltage transformer compartment.

3.7.3 The transformer shall be equipped with an under oil partial range current limiting fuse. The bayonet expulsion fuses and backup current limiting fuses shall be coordinated to ensure that the current limiting fuse will only operate on faults internal to the transformer. The current limiting fuse used shall have an interrupting rating of 50,000 Amp (minimum) symmetrical.

3.8 CORE AND WINDINGS

3.8.1 All wye-wye connected transformers shall have four – or five-legged core construction or shall otherwise include provisions to prevent excessive tank heating. The core construction or other provisions for preventing tank heating shall be adequate for unbalanced loading conditions of one or more of the primary phases of the transformer being energized from the same (single-phase) source.

3.8.2 One piece core construction is desired. Where other construction is used, minimum assembly joints shall be provided. For approved two part cores, the core shall be held together with bands and torqued bolts. Crimped banding is not acceptable for ratings over 50 kVA.

3.8.3 Copper winding conductors are desired.

3.8.4 Core material may be either silicon steel or amorphous.

3.8.5 Core losses shall be minimized by the core material and core construction,

3.8.6 Transformers shall be equipped with a common H◦X◦ bushing with a copper grounding strap to the transformer case.

3.9 INSTALLATION

3.9.1 All insulating paper used as layer insulation in transformer coils shall be coated on both sides with a thermosetting adhesive and properly cured prior to impregnating with oil, or the coils shall be wound with primary conductor containing a thermosetting adhesive that when properly cured will form an effective bond.

3.9.2 Insulating/cooling fluid within the tank shall be electric grade mineral oil or a less flammable, environmentally accepted fluid where required.

3.9.3 All fluids shall be certified and indicated on the nameplate to be less than 1 parts per million (ppm) polychlorinated biphenyl (PCB) content.

3.9.4 Fluids other than mineral oil **shall have** submitted with the quotation complete chemical and electrical characteristics and a statement of being non-PCB.

3.10 PRESSURE RELIEF DEVICE

3.10.1 Each transformer shall be equipped with a self-actuating relief device to relieve slow pressure buildup and to automatically vent when pressure reaches + 10 PSIG and recluses when pressure falls to + PSIG.

3.11 MOUNTING AND LIFTING

3.11.1 Mounting shall be suitable for concrete pad mounting. Provide suitable anchorage brackets for Seismic Zone3.

3.11.2 The tank shall have lifting provisions of adequate strength; size and arrangement on the transformer to permit lifting the transformer in an upright position when filled with insulating fluid.

3.12 GROUND CONNECTION

3.12.1 The tank shall have a welded ground lug boss attached on the secondary side of the tank near the bottom of the tank clear of secondary and attached conductors.

3.12.2 The grounding boss shall be free of paint and shall be 7/16 inch (7/16") deep and threaded for a one-half (1/2") 13 NC grounding stud or connector.

3.12.3 The tank cover shall have a grounding strap between the cover and the tank.

3.13 ACCESSORIES

3.13.1 ANSI C57.12.26, latest revision, standard accessories shall be provided.

4. FINISH

4.1 The transformer shall be given a durable, corrosion resistant, nonchalking, green or desert tan (as specified) outdoor finish capable of meeting or exceeding EEI finishing requirements.

5. SHIPPING AND IDENTIFICATION

5.1 SHIPPING

5.1.1 Transformers shall be mounted on a pallet for shipment.

5.2 IDENTIFICATION

5.2.1 The nameplate shall contain the manufacturers name, address, kVA, primary voltage, secondary voltage(s), % impedence, rated temperature rise, a wiring diagram indicating connections and voltages with polarity (additive or subtractive), core losses (no load and full load), insulating fluid identification, and PCB content, weight when full, manufacturers part (catalogue) number, and serial number unique to the transformer.

5.2.2 The nameplate shall conform to ANSI standards C57312.00 and C57.12.26 latest revisions.

5.2.3 The nameplate shall be mounted on a permanently attached backing plate with welds or rivets. Removable nameplates or nameplates attached to removable parts will not be accepted.

6. TESTING

6.1 All transformers shall be tested in accordance with requirements of American National Standard Institute (ANSI) C57.12.26 latest revision. All transformers shall be capable of withstanding short circuit test.

7. LOSS EVALUATION

7.1 Load and no-load losses will be evaluated as follows:

No-Load Core Losses	Load Losses (Copper)
$6.85/Watt	$1.75/Watt

7.2 Evaluated losses will be calculated by multiplying the appropriate dollars/watt values by guaranteed maximum load losses at maximum nameplate kVA rating and no-load losses at 100 percent voltage. These products will be added to the bid price for evaluation.

7.3 Total watt losses shall not exceed the following:

3-Phase Padmount 120/208 Volt

kVA Rating	Losses in Watts	kVA Rating	Losses in Watts
75 kVA	815 Watts	300 kVA	2,380 Watts
112.5 kVA	1,125 Watts	500 kVA	4,060 Watts
150 kVA	1,300 Watts	750 kVA	6,500 Watts
225 kVA	1,950 Watts	**1000 KVA**	**8,980 Watts**

3-Phase Padmount 277/480 Volt

kVA Rating	Losses in Watts	kVA Rating	Losses in Watts
150 kVA	1,385 Watts	750 kVA	4,500 Watts
225 kVA	2,000 Watts	1,000 kVA	6,500 Watts
300 kVA	2,460 Watts	1,500 kVA	10,500 Watts
500 kVA	4,325 Watts	2,000 kVA	14,000 Watts

7.4 If the actual tested loss values exceed the guaranteed maximum loss values stated in the proposal of the Successful Bidder, the Successful Bidder (Seller) will be charged a penalty value for every watt by which the actual tested transformer losses exceed the guaranteed maximum losses upon which the proposal was evaluated. This penalty value will be the difference between the total actual test loss evaluation and the total guaranteed bid loss evaluation based on the evaluation factors as follows:

No-Load Core Losses	Load Losses (Copper)
$6.85/Watt	$1.75/Watt

7.5 All actual tested loss data will be transmitted to the City of Hurricane Power Department Superintendent with five (5) days after shipment of the transformers.

8. VENDOR EVALUATION

8.1 Vendor evaluations, as well as loss evaluations, will be used to determine the low bidder. Delivery dates will be of prime concern during the bid evaluation.

9. EXCEPTIONS

9.1 Exceptions to this Specification **shall not** be accepted, unless approved by the City of Hurricane Power Department Superintendent. Any exceptions shall be noted in the proposal.

10. WARRANTY

10.1 Manufacturer shall warrant to Purchaser that the apparatus or service to be furnished hereunder shall be of the highest quality and free from defects in material, workmanship, and title and will be of the kind designated in the pertinent purchase order. The Manufacturer's warranty shall be effective for a period of twelve (12) months after the date of shipment to Purchaser. Terms of Manufacturer's warranty shall be included in the bid proposal and will be a criterion for evaluation of the proposal.

10.2 The Manufacturer shall guarantee that all transformers furnished under this specification are of first class material and workmanship throughout, that they have been tested in accordance with this specification, and that the results of the tests comply with the requirements of this specification, and, in lieu of other claims against it, agrees to replace or repair:

10.2.1 Any transformer found to be defective in material or workmanship or found not to be in compliance with the requirements of this specification before or during installation of the transformer.

10.2.2 Any transformer failing during normal and proper use within the Manufacturer's guarantee period which shows defects of materials or workmanship.

SECTION

VI

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

I. SCOPE

This standard outlines minimum requirements for the service equipment, service conductors, etc., installed from the secondary junction box to and including the meter, for residential and residential subdivisions.

It also includes information necessary to determine ownership maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATION

A. GENERAL

This standard shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state and local codes and ordinances and the City of Hurricane Power Department requirements.

III. DEFINITIONS

A. SERVICE EQUIPMENT, See Drawings DR-14, DR-15, and DR-16 (Drawings Section)

The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

The underground supply conductors that extend from the City's secondary junction box to the metering provision.

C. GROUNDING ELECTRODE

Grounding shall be done thru a UFER grounding system, or per latest building code requirements

D. GROUNDING ELECTRODE CONDUCTOR

The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

E. BURIAL DEPTH

1. Underground service conductors will be installed in conduits with supplemental protective covering or in raceways.

   The vertical distance from the surface under which the conduit, supplemental protective covering or raceway is installed to the portion of the conduit, supplemental protective covering or raceway nearest the surface.

F. METERING PROVISIONS

The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting a National Electrical Manufacturers Association (NEMA) meter enclosure, required for installation of a meter.

G. SERVICE RISER

Conduit, conduit elbow, etc. that extend from the bottom of the service trench to the meter mounting provisions and main disconnecting means and enclose the service conductors.

H. SERVICE CONDUIT

Non-metallic conduit into which underground service conductors are pulled, excluding service risers.

IV. CODES

A. Underground services shall be installed in accordance with applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

B. All equipment and conductors installed shall meet or exceed applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

V. INSTALLATION

1. Type.

   All underground service conductors shall be type USE (underground service entrance.)

2. Protection.

   Underground service conductors shall be protected by installation in conduit (PVC Schedule 40).

3. Splices.

   Underground service conductors shall not be spliced.

4. Installation Methods

   a) In Conduit.

      Underground service conductors pulled in conduit; care shall be taken to ensure that the conductors are not damaged during the pulling operation. Pulling tensions shall be monitored to ensure proper installation.

5. Grounding Requirements

   A grounding electrode shall be connected, via grounding electrode conductors, to the underground service conductors (grounded conductors only) on the line side of and/or within the service disconnecting means.

6. Size.

   The underground service conductors shall have adequate ampacity to supply the load requirements of the premises served by the conductors. The City of Hurricane Power Department requires that all services less than 150 amperes be served by 2/0 aluminum conductor and services between 150-200 amperes be served by 4/0 aluminum conductor. Above 200 amperes, the service conductor will be a minimum of 350 kcmil aluminum conductor.

B. SERVICE EQUIPMENT

1. Continuous Current Rating.

   All service equipment shall have a minimum current rating of 100 amperes.

2. Short Circuit Current Rating.

   Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. SERVICE DISCONNECT MEANS

All service disconnecting means shall have a current rating of not less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

When multiple switches or circuit breakers are used as the disconnecting means, their combined current rating shall not be less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

D. SERVICE CONDUIT

1. General.

   Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that the underground service conductors can be pulled into and through the conduit without damage.

2. Burial Depth.

   Burial depths for service conduits shall be a minimum of 24 inches (24”).

3. Trench Requirements.

a) Trench Bottoms.

When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1") in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6") deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or backfill.

b) Trench Backfill.

The JUT (Joint Utility Trench) trench shall be backfilled with (1") minus material from the bottom of the trench to the top. No spoil material shall be used, unless screened, (1") minus, and is machine compactable material.

E. METERING PROVISIONS

1. General.

a) Typical requirements for meter mounting provisions for residences are shown ion Drawings DR-14, DR-15, and DR-16 (Drawings Section). When meter mounting provisions different from those shown are required, specific metering provision requirements shall be detailed by the City of Hurricane Power Department.

b) The meter mounting provisions must be installed in a true vertical plane.

c) Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.

d) Remote metering will not be allowed for new construction or rebuild/add on construction jobs.

e) **The meter main will provide a disconnect.**

2. Location.

a) Meters **shall not** be located in carports, breezeways, covered or screened porches, or other areas that might be enclosed at some future date.

b) The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.

c) **A level standing and working surface of 48 inches x 48 inches (48" x 48") shall be provided in front of all meters. Meters shall not be located behind fenced in areas. Access to meters shall not be hindered by any obstacles, including landscaping.**

d) Meters shall be set at a height of five feet six inches to six feet six inches (5'6" to 6'6").

e) **Meters shall be installed on front of the premises (side of building facing the street) or within the first Ten feet (10') of the front of the premises**

f) Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

F. SECONDARY DISTANCES

The distances from the City of Hurricane Power transformer that secondary cable can be run due to voltage drop to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load.

The maximum secondary cable distances are based on:

- Aluminum conductors in non-magnetic conduit
- A five volt (5V) drop across the secondary cable
- Up to 100 amperes of load current in the first table
- Up to 200 amperes of load current in the second table
- 0.95 load power factor

The voltage drop calculations are based on Table 13 from the ANSI/IEEE Standard 141-1986, IEE Recommended Practice for Electric Power Distribution (IEEE Red Book).

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Residential Subdivisions

Table 5

SECONDARY 600V CABLE LENGTHS
RESIDENTIAL – UP TO 100 AMPERES

Conductor	Maximum Distance
1/0 AWG	150 feet
2/0 AWG	185 feet
4/0 AWG	280 feet

Table 6

SECONDARY 600 V CABLE LENGTHS
RESIDENTIAL – UP TO 200 AMPERES

Conductor	Maximum Distance
4/0 AWG	140 feet
350 kcmil	225 feet
500 kcmil	295 feet

The residential subdivision design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

I. SCOPE

This standard outlines minimum requirements for the service equipment, service conductors, etc. for mobile homes and trailer parks.

II. DEFINITIONS

A. SERVICE EQUIPMENT

The equipment containing the disconnecting means, overcurrent protective devices, and receptacle or other means for connection of a mobile home feeder assembly. This equipment shall be located adjacent to and not mounted in or on the mobile home.

B. FEEDER ASSEMBLY

The underground feeder conductors, including the grounding conductor together with the necessary fittings and equipment or a power supply cord, which are designed to connect a mobile home to its metering provisions.\

C. The conductors which connect the service equipment to the distribution panel inside the mobile home. There shall be four (4) conductors, one (1) of which shall be identified by a continuous green color or a continuous green color with one (1) or more yellow striped for use as a grounding conductor.

D. As a minimum, a 5/8 inch X 8foot (5/8" X 8') ground rod shall be used as the grounding electrode. When a metal underground water pipe system is available on the ground rod shall be used as grounding electrodes.

E. GROUNDING ELECTRODE CONDUCTORS

The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

F. BURIAL DEPTH

1. Underground Service Conductors Installed in Conduits with Supplemental Protective Covering or in Raceways.

   The vertical distance from the surface under which the conduit, supplemental protective covering or raceway is installed to the portion of the conduit, supplemental protective covering or raceway nearest the surface.

G. METERING PROVISIONS

The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc., required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.

III. CODES

A. INSTALLATION

Underground services shall be installed in accordance with the applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

All equipment and conductors installed shall meet or exceed applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

IV. INSTALLATION

A. FEEDER ASSEMBLY

All conductors in the feeder assembly shall be insulated, shall be color-coded and shall be installed without splices.

B. GROUNDING

The neutral conductor and the grounding conductor shall be bonded together only at the service equipment, not on or within the mobile home.

C. Continuous Current Rating.

1. Continuous Current Rating.

Mobile home service equipment shall have a 100-ampere minimum rating unless otherwise permitted by federal, state, or local authorities.

2. Short Circuit Rating.

Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

D. PROTECTIVE EQUIPMENT SIZING

The service equipment shall contain a property rated fused disconnect switch or a circuit breaker corresponding to the load requirements of the mobile home.

E. BURIAL DEPTHS

The minimum burial depths shown as follows shall apply to mobile home underground service and underground feeder assembly conductors.

1. Direct Buried Plastic Conduit – 24 inches (24”)

F. CONDUCTORS

Underground service conductors shall be type USE (underground service entrance) and underground feeder assembly conductors shall be type USE or UF.

G. METERING PROVISIONS

1. Individual Meters.

Typical requirements for meter mounting provisions for mobile homes and trailers with individual meters are shown on Drawing DR-17 (Drawings Section). When meter mounting provisions different from those shown are required, specific meter mounting provision requirements shall be detailed by the City of Hurricane Power Department.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Mobile Home and Trailer Parks

2. Single Meter.

When mobile home parks or trailer courts are metered at a single point, the metering provisions at that point shall be detailed by the City of Hurricane Power Department.

3. General Requirements.

a) Metering provisions must be installed in a true vertical plane.

b) Metering provisions with extruded or cast aluminum meter jaws shall not be used.

c) A level standing and working surface of 30 inches X 30 inches (30" X 30") shall be provided in front of all meters, permitting ready access to the meter.

d) The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.

e) Mobile home meter pedestals shall be constructed and installed so that the vertical distance from the ground level to the centerline of the meter is 30 inches (30") minimum to 72 inches (72") maximum.

f) Meter will be located at nearest supply point as determined by City of Hurricane Power Department.

g) Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

h) **The meter main will provide a disconnect.**

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

I. SCOPE

This standard outlines minimum requirements for the service equipment, service conductors, etc. for apartments and condominiums.

It also includes information necessary to determine ownership and maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATION

A. GENERAL

This specification shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state and local codes and ordinances and City of Hurricane Power Department.

B. SERVICE CONNECTION CRITERIA

1. Services Inspected by Inspecting Authority

Underground services **shall not** be connected to the City electrical system until:

a) Hurricane City authorized personnel has certified that the service is in compliance with applicable local, state and national codes and ordinances.

III. DEFINITIONS

A. SERVICE EQUIPMENT

The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

The underground supply conductors that extend from the utility's secondary system to the customer's meter.

C. GROUNDING ELECTRODE – ALL LOCATIONS

As a minimum, a 5/8 inch X 8 foot (5/8" X 8') ground rod shall be used as the grounding electrode. When a metal underground water pipe system is available on the premises, the water pipe system and the ground rod shall be used as grounding electrodes.

D. GROUNDING ELECTRODE CONDUCTORS

The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

E. BURIAL DEPTH

Minimum of 24 inches (24") cover.

F. METERING PROVISIONS

The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.

IV. CODES

A. INSTALLATION

Underground services shall be installed in accordance with City of Hurricane Power Department applicable requirements and local, state and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

All equipment and conductors installed shall meet or exceed applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
For Apartments and Condominiums

V. INSTALLATION

A. UNDERGROUND SERVICE CONDUCTORS

1. Burial Depths.

   The minimum burial depth for conduit protected burial underground service conductors shall e 24 inches (24”).

2. Type.

   All underground service conductors shall by type USE (underground service entrance).

3. Protection.

   Underground service conductors should be installed in rigid nonmetallic conduit approved for the purpose (PVC Schedule 40).

4. Splices.

   Underground service conductors shall not be spliced.

5. Installation Methods.

   a) In Conduit.

      Underground service conductors shall be pulled in conduit. Care shall be taken to ensure that they are not damaged during the pulling operation. Pulling tension shall be monitored to ensure proper installation.

6. Grounding Requirements.

   A grounding electrode shall be connected, via grounding electrode ` conductors, to the underground service conductors (grounded conductors only) on the line side of an/or within the service disconnecting means.

7. Size.

a) Service Conductors Owned and Maintained by Customer.

The underground service conductors shall have adequate ampacity to supply the load requirements of the premises served by the conductors. The City of Hurricane Power Department requires that all services less than 150 amperes be served by 2/0 aluminum conductors and services between 150-200 amperes be served by 4/0 aluminum conductor. Above 200 amperes the service conductor will be a minimum of 350 kcmil aluminum conductor.

B. SERVICE EQUIPMENT

1. Continuous Current Rating.

All service equipment shall have a minimum current rating of 100 amperes unless otherwise permitted by federal, state, or local authorities.

2. Short-Circuit Current Rating.

Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. SERVICE DISCONNECTING MEANS

All service disconnecting means shall have a current rating of nor less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

When multiple switches or circuit breakers are used as the disconnecting means, their combined current rating shall not be less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

D. SERVICE CONDUIT

1. General

Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that underground service conductors can be pulled into and through the conduit without change.

2. Burial Depths.

   Minimum burial depths for service conduits shall be as follows:

   Non-Metallic Conduit – 24 inches (24”).

3. Trench Requirements.

   a) Trench Bottoms.

      When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1”) in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6”) deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or screened backfill.

   b) Trench Backfill.

      1) Non-Metallic Conduit.

         At least twelve inches (12”) of compacted sand or screened backfill shall be placed over the conduits. The remaining backfill shall be spoil removed from the trench.

E. METERING PROVISIONS

1. General.

   a) Typical requirements for meter mounting provisions for residences are shown in this specification and shall apply to all apartment and condominium situations.

      When meter mounting provisions different from those shown in this specification are required, specific meter mounting provision requirements shall be detailed by the City of Hurricane Power Department.

   b) The meter mounting provisions must be installed in a true vertical plane.

c) Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.

d) Remote metering will not be allowed for new construction or rebuild/add on construction jobs.

e) **The meter main will provide a disconnect.**

2. Location.

a) Meters **shall not** be located in carports, breezeways, covered or screened porches or other areas that might be enclosed at some future date.

b) The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.

c) **A level standing and working surface of 48 inches x 48 inches shall be provided in front of all meters. Meters shall not be located behind fenced in areas. Access to meters shall not be hindered by any obstacles, including landscaping.**

d) **Meters shall be installed on the front of the premises (side of building facing the street) or within the first ten feet (10') of the front of the premises.**

e) Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

3. Mounting Heights.

a) Single Horizontal Row of Meters.

When meters for an apartment or condominium can be mounted in a single horizontal row, the vertical distance from the ground level to the center line of meters shall be five feet six inches (5'6") minimum to six feet six inches (6'6") maximum.

b) Multiple Rows of Meters.

When meters for an apartment or condominium can be mounted in two (2) or more horizontal rows, the vertical distance from the ground level to the center line of the top row of meters shall be six feet six inches (6'6") maximum and the distance from the ground level to the center line of the bottom row of meters shall be four feet zero inches (4'0" minimum.

4. Labeling Meter Bases.

Meter bases shall be numbered according to the ` apartment/condominium numbers as recorded on the official plat. One inch (1") wide placards shall be used to identify what each meter/unit disconnect breaker is feeding. Placards shall contain the unit number and/or address to correlate what each meter/unit disconnect breaker is feeding. For example: Unit 1, Unit2, or 299 n 2600 W, 287 N 2600 W.
Placards shall be installed to the right or directly beneath the unit disconnect breaker to which the correlating meter is feeding. Placards shall be installed using self tapping screws and shall be lubricated using s rust resistive compound.
No letters shall be used to identify meters/unit disconnect breaker. For example: Unit A, Unit B, Unit C.

F. SECONDARY DISTANCES

The distances from the City of Hurricane Power transformer that secondary cable can be run due to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load.

The maximum secondary cable distances are based on:

- Aluminum conductors in non-magnetic conduit
- A five volt (5V) drop across the secondary cable
- Up to 200 amperes of load current
- 0.95 load power factor

The voltage drop calculations are based on Table 13 from the ANSI/IEEE Standard 141-1986, IEEE Recommended Practice for Electric Power Distribution (IEEE Red Book).

TABLE 7

SECONDARY 600V CABLE LENGTHS
APARTMENTS AND CONDOMINIUMS – UP TO 200 AMPERES

Conductor	Maximum Distance
4/0 AWG	140 Feet
350kcmil	225 Feet
500 kcmil	295 Feet

The apartment/condominium facility design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

City of Hurricane
Underground Construction Standard
Secondary Line and Meter Installation
for Commercial Facilities

I. SCOPE

This standard outlines minimum requirements for the service equipment, service conductors, etc. for commercial facilities.

It also includes information necessary to determine ownership and maintenance responsibility for associated conductors, equipment, etc.

II. APPLICATIONS

A. GENERAL

This specification shall be used as a guideline for determining whether or not the service equipment, service conductors, etc. that comprise the secondary service meet all applicable national, state and local codes and ordinances and City of Hurricane Power Department requirements.

B. SERVICE CONNECTION CRITERIA

1. Services Inspected by Inspecting Authority

Underground services **shall not** be connected to the City electrical system until:

a) Hurricane City authorized personnel has certified that the service is in compliance with applicable local, state and national codes and ordinances.

III. DEFINITIONS

A. SERVICE EQUIPMENT

The equipment, containing the disconnecting means and overcurrent protective devices, located near the point of entrance of supply conductors to a building, and intended to constitute the main control and means of cutoff of the supply to a building.

B. UNDERGROUND SERVICE CONDUCTORS

The underground supply conductors that extend from the utility's secondary system to the customer's meter.

C. GROUNDING ELECTRODE – ALL LOCATIONS

Grounding shall be done thru a UFER grounding system, or per latest building code requirements.

D. GROUNDING ELECTRODE CONDUCTORS

The conductors used to connect the grounding electrode to the grounded conductor of the underground service.

E. BURIAL DEPTH

Minimum of 24 inches (24") cover.

F. METERING PROVISIONS

The enclosures, meter sockets, switch boxes, conduit, conduit elbows, etc. required to provide a place for mounting ring type socket meters, required for measuring usage of electrical energy.\

G. SERVICE RISER

Conduit, conduit elbow, etc. that extend from the bottom of the service trench to the meter mounting provisions and main disconnecting means and enclose the service conductors.

H. SERVICE CONDUIT

Non-Metallic conduit into which underground service conductors are pulled, excluding service risers.

V. CODES

A. INSTALLATION

Underground services shall be installed in accordance with City of Hurricane Power Department applicable requirements and local state and national codes and ordinances.

B. EQUIPMENT AND CONDUCTORS

All equipment and conductors installed shall meet or exceed applicable City of Hurricane Power Department requirements and local, state and national codes and ordinances.

VI. INSTALLATION

A. UNDERGROUND SERVICE CONDUCTORS

1. Burial Depths.

The minimum burial depth for conduit protected buried underground service conductors shall be 24 inches (24”).

2. Type.

All underground service conductors shall be type USE (underground service entrance).

3. Protection.

Underground service conductors should be installed in rigid nonmetallic conduit approved for the purpose (PVC Schedule 40 or HDPE Schedule 40).

4. Splices.

Underground service conductors shall not be spliced.

5. Installation Methods.

a) In Conduit.

Underground service conductors shall be pulled in conduit. Care shall be taken to ensure that they are not damaged during the pulling operation. Pulling tension shall be monitored to ensure proper installation.

6. Grounding Requirements.

A grounding electrode shall be connected, via grounding electrode conductors, to the underground service conductors (grounded conductors only) on the line side of an/or within the service disconnecting means.

7. Size.

a) Service Conductors Owned and Maintained by Customer.

The underground service conductor shall have adequate ampacity to supply the load requirements of the premises served by the conductors. The City of Hurricane Power Department requires that all services up to 200 amperes be served by a minimum of 250 aluminum conductor. Above 200 amperes, the service conductor will be a minimum of .50kcmil aluminum conductor.

B. SERVICE EQUIPMENT

1. Continuous Current Rating.

All service equipment shall have a minimum current rating of 100 amperes unless otherwise permitted by federal, state, or local authorities.

2. Short-Circuit Current Rating.

Service equipment and its overcurrent protective devices shall have short circuit current ratings greater than or equal to the short circuit current available at their supply terminals.

C. SERVICE DISCONNECTING MEANS

All service disconnecting means shall have a current rating of not less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

When multiple switches or circuit breakers are used as the disconnecting means, their combined current rating shall not be less than 100 amperes unless otherwise permitted by federal, state, or local authorities.

D. SERVICE CONDUIT

1. General

Service conduit installations shall be carefully designed (length, number of bends, bend radii, etc.) to ensure that underground service conductors can be pulled into and through the conduit without damage.

2. Burial Depths

Minimum burial depths for service conduits shall be as follows:

Non-Metallic Conduit – 24 inches (24")

3. Trench Requirements

a) Trench Bottoms

When conduits are direct buried or concrete encased, the bottom of the trench into which the conduits are placed shall be free from rocks exceeding one inch (1") in their largest dimension. When the trench bottom contains rocks exceeding this size requirement, the trench shall be excavated six inches (6") deeper than the burial depth required for the conduits and then backfilled to the required burial depth with compacted sand or screened backfill.

b) Trench Backfill

1) Non-metallic Conduit

At least twelve inches (12") of compacted sand or screened backfill shall be placed over the conduits. The remaining backfill shall be spoil removed from the trench.

E. METERING PROVISIONS

1. General

a) Typical requirements for meter mounting provisions for residences are shown in this specification and shall apply to all commercial facilities.

When meter mounting provisions different from those shown in this specification are required, specific meter mounting provision requirements shall be detailed by the City of Hurricane Power Department.

b) The meter mounting provisions must be installed in a true vertical plane.

c) Meter mounting provisions with extruded or cast aluminum meter jaws shall not be used.

d) Remote metering will not be allowed for new construction or rebuild/add on construction jobs.

e) **The meter main will provide a disconnect. All meter sockets shall contain a bypass lever.**

2. Location

a) Meters **shall not** be located in carports, breezeways, covered or screened porches, or other areas that might be enclosed at some future date.

b) The area on either side of a door or swinging window equal to the width of the door or swinging window is unacceptable as a meter location.

c) **A level standing and working surface of 48 inches x 48 inches shall be provided in front of all meters. Meters shall not be located behind fenced in areas. Access to meters shall not be hindered by any obstacles, including landscaping.**

d) Meters must be accessible to the City Meter Reader and shall not be hindered by animals, landscape, fences, etc.

3. Mounting Heights

a) Single Horizontal Row of Meters

When meter for a commercial facility can be mounted in a single horizontal row, the vertical distance from the ground level to the center line of the meters shall be five feet six inches (5’6”) minimum to six feet six inches (6’6”) maximum.

b) Multiple Rows of Meters

When meters for a commercial facility can be mounted in two (2) or more horizontal rows, the vertical distance from the ground level to the center line of the top row of meters shall be six feet six inches (6’6”) maximum and the distance from the ground level to the center line of the bottom row of meters shall be four feet zero inches (4’0”) minimum.

4. Labeling Meter Bases

Meter bases shall be numbered according to the apartment/condominium numbers as recorded on the official plat.
One inch (1") wide placards shall be used to identify what each meter/unit disconnect breaker is feeding. Placards shall contain the unit number and/or address to correlate what each meter/unit disconnect breaker is feeding. For example: Unit 1, Unit 2, or 299 N 2600 W, 287 N 2600 W.
Placards shall be installed to the right or directly beneath the unit disconnect breaker to which the correlating meter is feeding. Placards shall be installed using self tapping screws and shall be lubricated using a rust resistive compound.
No letters shall be used to identify meters/unit disconnect breaker. For example: Unit A, Unit B, Unit C.

F. SECONDARY DISTANCES

The distances from the City of Hurricane power transformer that secondary cable can be run due to voltage drop limitations are listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load. The City of Power Department sizes the power transformers at commercial facilities at **sixty** percent **(60%)** of the customers panel amperage rating.

The maximum secondary cable distances are based on:

- Aluminum conductors in non-metallic conduit
- A five volt (5V) drop across the secondary cable
- Up to 200 amperes of load current
- 0.95 load power factor

The voltage drop calculations are based on Table 25 from the ANSI Standard 241-1983, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings.

TABLE 8

SECONDARY 600V CABLE LENGHTS
COMMERCIAL FACILITIES – UP TO 200 AMPERES

Conductor	**Maximum Distance**
250kcmil	170 feet
350kcmil	225 feet
500 kcmil	295 feet

The commercial facility design should consider the location of the power source as close as possible to the center of the load to keep voltage drop within satisfactory limits.

SECTION

VII

City of Hurricane
Underground Construction Standard
Street Light Installation

I. SCOPE

This standard outlines the requirements for installing street lights erected in the sub-division within Hurricane City Limits.

II. EQUIPMENT SPECIFICATIONS/INSTALLATION

A. POLICY: It is the policy of the City of Hurricane that all street lights erected in the City shall adhere to the following standard.

B. PURPOSE AND OBJECTIVE: To ensure street lights are installed according to uniform construction guidelines and equipment specifications.

C. STREET LIGHT POLE SPACING AND HEIGHT:

Pole Height 14' 200' – 250'
Pole Height 25' 225' – 300'

A street light shall be placed at each intersection.

All poles shall be anchor base poles and the foundation design shall be adequate for the height of pole, the arm that is being installed, the soil conditions and 80-mile per hour winds. Luminaries shall be 120 volt.

Street lights will be consistent within a subdivision and choices are:

1. Holophane Fixtures
   A. Decorative
      Granville #GVU100MH12BRSBH (DR-21A)
      Arlington #PTU10DMH12BG3BH (DR-21B)

   B. Non Decorative

      Mongoose #G150MH12LWFAKBR (DR-21C)

2. Holophane Poles
   A. Decorative
      NY/North Yorkshire #NY14F5/17-CA/XX (DR-21D)
      WI/Wadsworth #W14F5/17-CA/XX (DR-21D)
      CH/Charleston #14F5/16-CA/XX (DR-21A)

      Note: These poles are verde green but other colors will be Considered for Power Department approval.

   B. Non Decorative
      Mongoose #SSS2555CD1R3VG (DR-21C)

City of Hurricane
Underground Construction Standard
Street Light Installation

Number of Street Lights Allowed Due to Voltage Drop

The number of 100 Metal Hilite Street Lights capable of being served from a single distribution transformer at 120 volts due to voltage drop limitations listed below. These limitations are based on the distribution transformer having the capacity to adequately serve the load. The voltage drop calculations are based on one (1) street light within fifty feet (50') of the transformer and a 300 foot (300') spacing between

#10 copper conductor
Four (4) street lights (150 watts X 4 lights = 600 watts); distance from transformer to the furthermost street light 900 feet (900')

#8 copper conductor
Five (5) street lights (150 watts X 5 lights = 750 watts); distance from transformer to the Furthermost street light is 1,200 feet (1,200')

#6 copper conductor
Six (6) street lights (150 watts X 6 lights = 900 watts); distance from transformer to the Furthermost street light is 1,500 feet (1,500')

Street light cables shall be run in one-inch (1") conduit unless otherwise approved by the City of Hurricane Power Department.

There will be no substitutes to the above specifications without Power Department approval.

City of Hurricane
Underground Construction Standard
Street Light Installation

III. INSTALLATION STREET LIGHT

A. Installation

Customers requesting to add or delete street lights will be required to meet with the Hurricane City Power Department staff during a regularly scheduled planning meeting in order to discuss details and procedures.

If the City Council, or City of Hurricane Power Board determines a street light should be installed at City expense for safety or other reasonable public consideration, the Power Department will install the street light(s) as directed and according to this policy.

IV. OWNERSHIP

Street lights shall be installed at Owner's/Developer's expense in new/proposed subdivisions and projects. Owner will warrant light for one year, then the City of Hurricane accepts ownership.

V. FOOTING SPECIFICATION

Per manufacturer, See Drawing DR-19 (Drawings Section).
This drawing is for 14' decorative and 25' mongoose light only.

SECTION

VIII

City of Hurricane
Underground Construction Standard
Concrete Neutral URD Primary Cable
(URD is Underground Residential Distribution

I. SCOPE

All primary cable used on the City of Hurricane electrical system shall comply with the following:

1. Insulation Type – EPR

2. Insulation Thickness:

    a) Minimum average thickness -220 mils minimum.
    b) Thickness at any point – 209 mils (175 mils is acceptable for cables manufactured by Kerite).

3. Voltage Class – 15 kVA

4. All cable produced under this specification shall comply with the latest editions of AEIC C56 and ICEA S-68-516

5. All cable installed shall be new

6. All cable installed in a conduit shall be the same voltage, insulation level, size, and cable manufacturer.

7. Conductor sizes are:

1/0 AWG aluminum compressed stranding with 16-#14 AWG bare copper concentric neutral wires (full neutral) with an encapsulating jacket whose thickness is not less than 0.05 inches (0.05”). Jacket material shall be LLDPE or approved equal and shall be insulating. Single-phase 1/0 AWG underground cable shall be installed in two and one-half inch (2 ½”) conduit and three-phase 1/0 AWG underground cable shall be installed in four inch (4”) conduit, unless otherwise approved by the City of Hurricane Power Department.

4/0 AWG aluminum compressed stranding with 18-#14 AWG bare copper concentric neutral wires (1/3 neutral) with an encapsulating jacket whose thickness is not less than 0.05 inches (0.05”). Jacket material shall be LLDPE or approved equal and shall be insulating. 4/0 AWG underground cable shall be installed in four-inch (4”) conduit, unless otherwise approved by the City of Hurricane Power Department.

500kcmil aluminum compressed stranding with 15-#12 AWG bare copper concentric neutral wires (1/3 neutral) with an encapsulating jacket whose thickness is not less than 0.08 inches (0.08”). Jacket material shall be LLDPE or approved equal and shall be insulating. 500kcmil underground cable shall be installed in six-inch (6”) conduit, unless otherwise approved by the City of Hurricane Power Department.

City of Hurricane
Underground Construction Standard
Concentric Neutral URD Primary Cable
(URD is Underground Residential Distribution)

750 kcmil aluminum compressed stranding with 24-#12 AWG bare copper concentric neutral wires (1/3 neutral) with an encapsulating jacket whose thickness is not less than 0.08 inches (0.08”). Jacket material shall be LLDPE or approved equal and shall be insulating. 750 kcmil underground cable shall be installed in six-inch (6”) conduit, unless otherwise approved by the City of Hurricane Power Department.

Approved cable manufacturers are Okonite, Kerite.

AEIC is Association of Edison Illuminating Companies
AWG is American Wire Gage
ICEA is Insulated Cable Engineers Association (formerly ICPEA)
EPR is Ethylene Propylene Rubber
LLDPE is Liner Low-Density Polyethylene

City of Hurricane
Underground Construction Standard
Primary Vault Specifications

THREE-PHASE AND SINGLE PHASE ABOVE GROUND PRIMARY VAULT

Units must meet the following specification: See Drawings DR-11 and DR-12 (Drawings Section)

1. Hurricane City Power Department approved.

2. Penta Head bolts on lid with locking capabilities

3. Fiberglass

4. All hardware including hinges to be stainless steel

5. Color – Munsell Green, Willow Green, or Desert Tan

6. Four-Way Junctions required

Approved Vendors

Nordic	ND-350	Three Phase
Nordic	ND-155	Single Phase

Other vendors of equivalent equipment are acceptable if approved by Hurricane City Power Department.

Vaults will include:

Three-Phase
Three (3) four-way junctions, standoff bracket and necessary receptacles, etc.

Single-Phase
One (1) four-way section, standoff bracket and necessary receptacles, etc.

NOTE: All 600 AMP and some 200 AMP (per City of Hurricane Power Department) terminations and pad mounted switchgear shall be mounted on concrete vaults.
See Drawing DR-18 (drawings Section).

City of Hurricane
Underground Construction Standard
Metal Enclosed Switchgear Specifications

The City of Hurricane Power Department, Engineer, Inspector or Power Superintendent **shall** determine the class of switchgear needed for each job. The switch gear specifications being a model P.H. 600 Amp Main Buss capacity. These will be designed per individual needs. Approved Manufacturers are A.B. Chance, S&C, and Federal Pacific.

Outdoor-Style, Manual Operation is as follows:

kV, Normal……...14.4
kV, Maximum……...17.0
kV,BIL…….95
Main Buss Continuous, Amperes……...600/200
Three-Pole Interrupter Switches
Continuous, Amperes (Source/Feeder)……...600/200
Live Switching, Amperes (Source/Feeder)…….600/200
Two-Time Duty-Cycle Fault-Closing.
Amperes RMS Asymmetrical……...23,400
Fuses with integral Load Interrupter
Maximum, Amperes……....200E
Live Switching, Amperes……..200
Two-Time Duty-Cycle Fault-Closing
Capacity, Amperes RMS Symmetrical…….12,500
Short-Circuit Ratings
Amperes, RMS Symmetrical……....12,500
MVA Three-Phase Symmetrical at
Rated Nominal Voltage…….310

The momentary and two-time duty-cycle fault-closing ratings of switches, momentary rating of bus, interrupting ratings of fuses, and on time duty-cycle fault-closing capabilities of the fuses with integral load interrupters shall equal or exceed the short circuit ratings of the pad-mounted gear.

The pad-mounted gear shall consist of a single self-supporting enclosure, containing single blade interrupter switches, non-key interlock; dual purpose barriers for the switches and fuses (-G1 & G2); component grounding studs for switches and fuses (H & J).

The switches and fuse components shall be arranged for full visibility when the enclosure doors are open. Open switch gaps and blown-fuse indicators shall be readily visible to provide for ease of operation.

Interrupter switches shall have a two-time duty-cycle fault-closing rating equal to or exceeding the short-circuit rating of the integrated pad-mounted gear assembly. This rating defines the ability to close the interrupter switch twice against a three-phase fault with asymmetrical current in at least one phase equal to the rated value, with the switch remaining

Operable and able to carry and interrupt rated current. Tests substantiating this rating shall be performed at maximum design voltage with current applied for at least ten (10) cycles. Certified test abstracts establishing this rating shall be furnished upon request.

Interrupter switches shall have the capability established by test to perform switching duties which include interrupting load current up through the assigned live-switching rating as well as transformer magnetizing currents associated with the applicable loads, and cable-charging current and line-charging current typical for distribution systems of the applicable voltage ratings. All arcing accompanying interruption shall be contained within the interrupters and are products and gases evolved during interruption shall be vented through exhaust-control chambers to eliminate discharge of ionized gases. Switches shall have a single blade per phase and shall be externally operable. A quick-make, quick-brake mechanism, nondefeatable under normal operation, shall make operation of the switchblades independent of the speed of the manual operating handle.

Solid-material power fuse shall be capable of detecting and interrupting all faults up to the short-circuit interrupting rating of the integrated pad-mounted gear assembly. Fusible elements shall be non-aging and non-damageable. All arching accompanying power fuse operation shall be contained within the fuse, and all arc products and gases evolved shall be effectively contained within exhaust control devices during fuse operation. Power fuses shall have a blown-fuse indicator that shall be readily visible without removing the fuse from the mounting. Fuse type shall be S & C Type SMU-20 for system compatibility.

Fuse mounting jaw contracts shall be equipped with integral load interrupters to permit live switching of fuses with a hookstick. Integral load interrupters shall have an on-time duty – cycle fault-closing capability equal to the short-circuit rating of the pad-mounted gear. The duty-cycle capability defines the level of available fault current into which the fuse can be closed without a quick-make mechanism and when operated vigorously through its full travel without hesitation at any point, with the integral load interrupter remaining operable and able to carry and interrupt currents up to the emergency peak-load capabilities of the fuse.

Mounting Pad for Model P.H. – PM – or PM

Provide an integrated designed on-piece mounting base for each S&C Model specified. Unit to be a Concast twenty inch (20”) deep complete with threaded studs strategically located to clip anchor per S&C installation instructions.

All terminations will be done with 3M Termination Kits and two (2) hole termination lugs. The Contractor will supply these.

DRAWINGS