GENERAL SPECIFICATIONS FOR ELECTRIC CONSTRUCTION

Rolla Municipal Utilities

RMU

People You Know, Service You Trust

ROLLA MUNICIPAL UTILITIES
102 West 9th Street
Rolla, Missouri 65401
(573) 364-1572

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GENERAL SPECIFICATIONS FOR ELECTRIC CONSTRUCTION

1. GENERAL INFORMATION

1.1 AUTHORITY AND INTENT

These specifications are drawn and approved by the Rolla Board of Public Works of the Rolla Municipal Utilities, Rolla, Missouri and shall be enforced, and no part thereof altered without approval of said Board or their duly appointed representative. The specifications herein supersede all previous electric specifications and drawings issued by Rolla Municipal Utilities (RMU) prior to this date and are subject to change without notice.

These specifications are intended to govern all electric service supplied by RMU. They are supplementary to, and are not intended to conflict with, any applicable City codes and ordinances, the National Electrical Safety Code, and the National Electrical Code. All specifications contained herein apply to Customers, Contractors, Developers, and/or any others who act on behalf of an Owner.

RMU reserves the right to specify the phase and nominal voltage at which service shall be supplied and to serve at different voltages where distribution is made at other nominal voltages.

Copies of RMU's General Rules and Regulations and electric rate and fee schedules are available at RMU's Business Office during normal business hours and at www.rmurolla.org.

Should there be any questions or comments in regards to these specifications, please contact RMU by phone at (573)364-1572, by fax at (573)364-1540 or email at info@rmurolla.org.

1.2 DEFINITIONS

RMU: Rolla Municipal Utilities
City: City of Rolla, Rolla, Missouri
Staff: Employees of Rolla Municipal Utilities
Owner or referred to by male gender (i.e. his, him, etc): Any person or company applying for, receiving, using, or accepting electric service or any other service supplied by RMU; any Contractor, Developer, or Customer; and/or any person(s) acting on behalf of the Owner.
A: Amp(s)
V: Volt(s)
AC: Alternating Current
NEC: National Electrical Code, 2005 or later edition, as adopted by the Rolla City Council.
NESC: National Electric Safety Code, C2-2007 or later edition as adopted by the Rolla City Council.

2. SERVICE RULES

2.1 TYPE OF SERVICE, VOLTAGE AND PHASE

Before purchasing equipment for installation on RMU service, transferring such equipment to a new location or before starting to rewire an existing installation which may necessitate a relocation of the service entrance, elimination of obsolete wiring, or increasing the capacity of the main service switch or of the wiring, etc., Owner should contact RMU. The purpose of this contact is to determine the type of service which will be available for the load contemplated, the voltage and phase at which the service will be supplied, and the location on the premises of the Owner to which RMU will connect the service conductors. Early contact will enable RMU to meet requests for electric service more promptly. It will help to reduce delays in providing the required service facilities and avoid the installation of equipment not suitable for operation on the type of service which RMU will supply.

The standard electric service offered by RMU is 60 Hertz alternating current.

All secondary service provided is solidly grounded at the distribution transformer. Secondary service requires that the grounded neutral or grounded phase conductor be terminated at Owner's main service disconnect and approved ground. (See Section 6 herein.) Owner desiring ungrounded or impedance grounded service should provide isolation transformers or consider primary service for this purpose.

Choice of voltage and type of system offered depends on location and size of load. Owner should consult RMU to determine the voltage and method of supply that will be available.

2.1.1 TEMPORARY SERVICE - Temporary service is defined as electric service provided for a short term need, such as that service required by Owners during building construction. Where temporary service is to be provided from an overhead line, Owner shall provide the support for attachment of the service wire and metering, *as shown on Detail #1.* For service from underground lines, Owner shall provide the support for meter, cable and service equipment, *as shown on Detail #2.*

The Owner is required to furnish and install all materials for the service entrance. The service must be self-supporting, and may not be attached to any RMU pole or equipment for support. It must be equipped with ground fault circuit interrupters and conform in all aspects to the NEC and NESC. Overhead services shall be located at least 10 feet, and not more than one span unless otherwise approved, from RMU poles and equipment, and RMU may charge costs associated with installation of a temporary service if beyond one span.

A Temporary Service must be initially inspected by the appropriate inspection authority before it can be connected by RMU. It is the Owner's responsibility to notify the inspector when the service work is complete and ready for inspection.

Please refer to RMU's General Rules and Regulations and/or call RMU for additional information.

2.1.2 PERMANENT SERVICE - Unless specific arrangements are made to the contrary, electric service shall be considered rendered on a continuous, permanent basis subject to termination as provided in the RMU General Rules and Regulations.

2.1.3 SINGLE-PHASE SERVICE, 120/240V, GROUNDED NEUTRAL - This service is suitable for lighting, small motors and general household appliances nominally rated 110V to 120V or from 220V to 240V. The 120/240V three-wire service is normally limited to 800A.

Single-phase installations requiring in excess of 800A in service capacity at 120/240V, may be increased beyond 800A by preferably installing 120/208V three-phase, four-wire service entrances, or subject to RMU approval, installing multiple single-phase, 120/240V services.

2.1.4 THREE-PHASE, FOUR-WIRE SERVICE, 120/208V, GROUNDED WYE - Three-phase, four-wire service will normally be designated for new connections for the following conditions:

A. The load cannot, in RMU judgement, be supplied from a single-phase supply.

B. The power load is of such character as not to interfere with the lighting load.

Service is supplied from a Y-connected secondary from which 120/208V three-phase, four-wire service may be supplied. Multiple three-wire services connected at a common three-phase, four-wire distribution point shall be balanced between phases.

Service entrance panel ampacity is limited to 3000A for 120/208V, three-phase, four-wire service. Service entrance requirements greater than 3000A at 120/208V shall be reviewed with RMU.

2.1.5 THREE-PHASE, FOUR-WIRE SERVICE, 277/480V, GROUNDED WYE - Three-phase, four-wire, 277/480V service will be designated for qualifying Owners whose load is of such nature as to be unable to be supplied at 120/208V. It may also be requested by Owner in lieu of 120/208V service. Where this voltage may be designated by RMU or desired by the Owner, RMU should be consulted before purchasing equipment or the start of wiring on the premises.

Service is supplied from a Y-connected secondary from which 277/480V, three-phase, four-wire service may be supplied.

Service entrance ampacity is limited to 3000A for 277/480V, three-phase, four-wire service. Service entrance requirements greater than 3000A at 277/480V shall be reviewed with RMU.

2.1.6 THREE-PHASE PRIMARY DISTRIBUTION SERVICE - Primary service is offered at voltages designated by RMU. Such service is normally supplied by extending primary distribution lines to a substation located on Owner's premises. However, there are locations within the RMU service area to which circuits at these distribution voltages have not been extended and for engineering, economic or other reasons RMU may, in some cases, elect to supply primary service from a substation located on the Owner's property. Owner is requested to discuss power requirements with RMU before purchasing equipment or the start of Owner wiring.

2.2 BALANCING LOAD

When three-wire, single-phase AC is supplied, all 120V apparatus must be connected as equally as possible on the two sides of the circuit.

Where single-phase load is connected to a meter measuring three-phase, three-wire or four-wire service, the unbalancing of the phases arising from the use of such single-phase load shall not exceed 10% of the total demand in kilowatts measured at the time of maximum use.

2.3 INSTALLATION OF RMU TRANSFORMERS ON OWNER PROPERTY

Where construction, safety or engineering requirements do not permit the installation of RMU transformers on existing easements or public property, Owner shall provide sufficient space and easements for transformers, switches and related equipment adjacent to paved surfaces intended for normal vehicular traffic or parking, for the purpose of installing or changing RMU equipment. This equipment will be installed in one of the following ways, as determined by specific conditions through consultation with RMU.

A. Pole Installation: Used where equipment can be pole mounted. Requires relatively little space.
B. Pad Mounted Transformer Installations: The transformer must be located and/or protected from the hazard of physical damage. The transformer must also be located away from building walls, fences, decorative or protective walls and barriers and shrubs to permit maintenance and operation of the unit. *Clearance requirements and protective barriers are shown on Detail #14.* Owner installing the foundation pad must receive RMU approval of pad orientation for primary and secondary cable access.

2.4 SERVICE CONNECTIONS

Service connections may be at primary or secondary voltage, delivered from overhead or underground facilities, and may involve an Owner substation. These circumstances are described in the following sections.

2.4.1 NUMBER OF SERVICES - Number of services is governed the NEC and if multiple services to a building are requested RMU must approve.

2.4.2 SECONDARY VOLTAGE SERVICE CONNECTION

a. Overhead Service: The overhead service is the service wires, called a service drop, extending from a pole on an easement strip or public right-of-way to the premises. Owner is to provide an attachment point for the service drop to attach to the building and to connect to the service head at a location nearest agreed upon RMU service point (refer to Section 3). Owner will normally locate the service entrance based on rules herein. If there is a doubt as to which point on the building will be nearest RMU service point, a request should be made for RMU to review the point where the service drop will be attached to the building and the routing of the overhead service line. When construction or extensive remodeling of existing buildings are planned, Owner shall consult with RMU for the appropriate service entrance location. Drawings are to be submitted for the purpose of securing adequate service facilities, meter locations and proper Owner-owned service equipment.
b. Underground Service: The Owner is required to provide trenching and cable for the service portion of the underground system. Installation of cable within conduit is at the discretion of the Owner. Owner is urged to notify RMU of proposed work because approval of construction plans will have to be completed prior to lateral installation. The normal service connection point to building should be nearest to the direction from which the service lateral enters the property to be served. Owner installations must be in accordance with all applicable building codes and RMU specifications.

2.4.3 PRIMARY VOLTAGE SERVICE CONNECTION - Owners planning primary service connections should promptly contact RMU, and obtain RMU specifications on connection requirements, relaying and fuse coordination, meter equipment and location, before ordering service equipment. RMU reserves the right to specify whether primary service connection will be made overhead or underground.

3. SERVICE WIRING

3.1 ELECTRICAL SAFETY AND CODE CLEARANCES

It is the policy of Rolla Municipal Utilities to operate the electric transmission and distribution system with care and safety for the public and RMU Staff. The NESC is used for design, construction, maintenance, and operation of the electric transmission and distribution system by RMU, as well as any associated activity by the public and private industry. The applicable NESC in effect at the time of installation will apply.
RMU reserves the right to terminate service without prior notice when a hazardous condition exists.
The current edition of the NESC should be consulted for current electrical safety code clearances.

3.2 MINIMUM CLEARANCE FROM OVERHEAD LINES

For this section, the term "clearance" means the shortest distance between any two surfaces.

Minimum clearance between any building or other structure and any overhead transmission line, overhead distribution facility, or electric utility pole will be maintained in accordance with the provision of latest edition of the NESC.

Minimum clearance between signs, chimneys, radio and television antennas, storage tanks, and other structures, and any overhead transmission line, overhead distribution facility, or electric utility pole will be maintained in accordance with the provisions of the NESC.

Minimum clearance over streets, alleys, parking lots, rights-of-way, easements, etc., by overhead distribution facilities, will be maintained in accordance with provisions of NESC.

Any Owner who proposes any action that would result in violation of the minimum clearances as set out in Section 3 of this document will give ninety (90) days prior notice of such proposed action to RMU.

Any Owner who proposes to change the use of land or change the grade of land that would result in conflict with Section 3 of this document will give ninety (90) days prior notice of such action. Upon such a notice, RMU will determine the feasibility of relocating such line, distribution facility, and/or electric utility pole which is in conflict with the proposed action to a suitable and safe location.

Should RMU determine that such relocation is feasible, RMU will perform the necessary relocation at the expense of the Owner whose proposed action violates the minimum clearance requirements. Relocation of such overhead transmission line, distribution facility, and/or electric utility pole may begin on a mutually agreed upon date.

Should RMU determine that the relocation of a transmission line, distribution facility, and/or electric utility pole is not feasible, RMU may require action to prevent a violation of the minimum clearance requirement. Any action that RMU requires pursuant to this subsection will be performed at the expense of the Owner whose proposed action violates the minimum clearance requirement.

3.3 EQUIPMENT OPERATION AROUND FACILITIES

3.3.1 OVERHEAD - When operating equipment around overhead electrical lines, Federal Occupational Safety & Occupational Health Administration (OSHA) standards shall be maintained. Contacting the line can result in severe injury or death. If work must be accomplished near an overhead electrical line, contact RMU for assistance in avoiding contact with these energized facilities.

When performing tree trimming near energized power lines, the Owner must stay a minimum of 10 feet away from the power line. If the Owner needs to trim or cut trees which are closer than 10 feet, RMU must be contacted.

3.3.2 SCHEDULED OUTAGES AND LINE COVERUP - RMU will de-energize a power line or place line coverup for construction purposes, provided that no other Owners are affected by this action and/or the integrity of the electric system is not damaged by the action. If a power outage or line coverup is requested, a minimum of seven (7) working days advance notice is required to schedule the work with RMU. Contact RMU to request a scheduled power outage or line coverup.

The expense, for a scheduled power outage or placement of line coverup that occurs outside of normal business hours or a scheduled power outage or placement of a line cover up that requires what staff deems to be extensive work, shall be the responsibility of the party who requests the work be performed. If necessary, RMU Staff will prepare a cost estimate and notify the Owner requesting the scheduled outage or line coverup of the estimated cost. Included in this estimate are non-refundable labor charges for all work performed by RMU and may include a refundable deposit on line coverup materials. After RMU receives payment of the deposit (if required), the work will be scheduled with RMU. The labor will be charged on an actual cost basis upon completion of the work. The deposit will be refunded when RMU receives a written request for coverup removal, and all labor costs are paid in full.

3.3.3 UNDERGROUND - All excavation shall be done in accordance with the Underground Facility Safety and Damage Prevention Act of Missouri.

Grading or excavation work shall not be started until an underground facilities location has been completed. Digging into underground power lines can result in severe injury or death to the operator and others, and can cause interruption of service to wide areas. Contact Missouri One-Call at 1-800-DIG-RITE (800-344-7483) or 811 or missouri-811.org.

3.4 SERVICE SUPPLY CONDUCTORS - OVERHEAD

3.4.1 OWNERSHIP OF OVERHEAD SERVICE - RMU shall own and maintain the service wire from the point of connection to the RMU system to the service drop attachment point. Refer to Section 3.4.4.

3.4.2 LOCATION AND CLEARANCES - SERVICE WIRES, 600V OR LESS - RMU will review the proposed location and alignment of the overhead service drop with the Owner. The location of such shall be as approved by RMU. Service drop clearances shall comply with appropriate requirements of the NESC and the NEC. Service drop conductors shall not be readily accessible to physical contact. Changes, additions, and/or grading on Owner premises shall not cause clearances under and around service wires to be less than indicated herein. RMU shall be advised when clearance problems exist. In some cases, Owner may be responsible for costs incurred to restore clearances. Improper clearance is reason for disconnection of service.

3.4.3 SERVICE ENTRANCE LOCATION - The service drop and attachment point, service bus or service entrance shall not be enclosed in any building, alteration, facade or addition.

Service entrance and service drop attachment shall be located at a point closest to RMU supply point. RMU shall approve the service entrance and service drop attachment point. If any doubts exist as to the proper location, please consult RMU.

For multi-tenant buildings, including townhouses, service entrances of less than 400A per tenant can utilize ganged meter packs at a location(s) approved by RMU to facilitate connection to a single service drop(s). Service of 400A or more per tenant for multi-tenant buildings shall be handled on a case-by-case basis.

Pre-bussed service boxes and associated risers shall be provided by the Owner. They shall be sized to accommodate the proposed services and installed on the outside of the building at approved locations. Individual conduits or service cable shall be provided from the service box to the meter location to assure integrity and security of the unmetered circuit. Meters shall be located as close as practical to service box. Combination pre-bussed ganged meter bases are also an acceptable alternate.

3.4.4 SERVICE DROP ATTACHMENT - The service entrance must be located where there is adequate material and strength for RMU to attach its service drop. The attachment must have sufficient height to provide the required service drop and drip loop clearances as specified herein. The attachment point must be accessible by ladder. Preferred points of attachment are building studs or solid masonry at least one foot from a corner. Some trim and soffit boards are acceptable when substantially reinforced. Owner shall be responsible for the installation and maintenance of an adequate attachment point.

3.4.5 SERVICE ENTRANCE HEIGHT - When the structure is too low to obtain proper clearance for the service wire attachment, the Owner must provide an approved upright or service mast of rigid metal conduit of sufficient strength and height for the attachment of the service drop wires. When an acceptable upright or mast is installed, RMU will supply and install the service cable from pole to the structure.

3.4.6 SERVICE ENTRANCE, SPACING - When more than one service entrance is provided on a building for the same class of service, the spacing between the service entrances should not exceed twenty-four (24) inches, unless approved by RMU.

3.4.7 SERVICE ENTRANCE, ADJOINING PROPERTY - Thirty-six (36) inches is required as the minimum permissible clearance between the wall through which the service entrance is brought out and the adjacent property line. The service entrance shall not overhang adjoining property.

3.4.8 SERVICE ENTRANCE - CONDUCTOR LENGTH

a. Services 800A or less: Service entrance conductors shall extend at least twenty-four (24) inches beyond the raceway and be left free for RMU to make the attachment to the service drop.
b. Services over 800A: Coordinate with Rolla Municipal Utilities.

3.4.9 RE-WIRE EXISTING SERVICE ENTRANCE – All re-wiring work shall be in compliance with applicable building codes and RMU specifications.

3.5 UNDERGROUND SERVICES

3.5.1 OWNERSHIP OF UNDERGROUND SERVICE - Owner shall own and maintain service wire and conduit, if installed, to the point of connection with the RMU system.

3.5.2 LOCATION, GENERAL - Service entrance provided from underground distribution systems shall be located and terminated in accordance with RMU specifications. The service lateral shall not be enclosed within or covered by any alteration, facade or addition to the building.

3.5.3 UNDERGROUND SERVICE CONDUIT

a. The underground service conduit will extend from the Owner service entrance to an RMU approved point of service on the Owner property, on public right-of-way or on utility easements adjacent to Owner property. Any portion of the service entrance that shall be exposed on utility poles must be adequately protected as approved by RMU. A minimum of Schedule 40 PVC is required for the portion of the service entrance which is buried or above grade on the customers' building. *Refer to Details #10, #11, #12, and #13.*
b. Service entrance riser shall extend up the utility pole to a point designated by RMU Staff. The proper location of the riser on the pole (quadrant) shall be obtained from RMU. Where the service entrance is to be extended to a location requiring pole setting, replacement or alteration

by RMU, such extension shall not be made until the pole work has been completed by RMU.

c. Conduit installations shall not include any conduit elbow fittings (LB) ahead of the meter.
d. Conduits are to be installed by the Owner into existing transformer compartments or pedestals. Owner shall contact RMU to schedule the opening of the transformer or pedestal and safety cover up of energized parts.
e. Conduit ownership remains with the Owner and any necessary repairs, including that portion extending up the pole, are the Owner's responsibility.

3.5.4 UNDERGROUND SERVICE CABLE

a. Underground service cables shall be provided in lengths adequate to extend up the pole to the secondary or the transformer terminals (including street crossings). Owner will completely install the entire length of the service cable.
b. Cables exposed to sunlight at the top of the pole, shall be ultra-violet (U.V.) resistant.
c. Cables to be installed in conduit or buried in direct contact with the earth shall be a type approved by the inspection authorities.
d. Cable ownership remains with the Owner and any necessary repairs, including that portion extending up the pole, are the Owner's responsibility.
e. For future maintenance, RMU will assist with the removal of the cable from the pole to allow repair or replacement and re-connect same to the secondary upon completion of the work.

3.5.5 CONDUIT SEALS - Termination of secondary distribution conduits within the building below grade is not a preferred installation due to water seepage problems. It has proven to be very difficult to insure long term water tightness of the conduit and cables through the building wall. It is the Owner's responsibility to provide drainage and sealing as needed to prevent damage to the electrical facilities and other property inside the building.

4. METERING

4.1 METERING RULES

All meters, overhead service drops, and other electrical facilities installed by RMU at the expense of RMU on the Owner's premises for the purpose of delivering or measuring energy to the Owner, will continue to be the property of RMU.

The Owner will provide and maintain without cost to RMU sufficient and proper facilities for the installation of meters and other apparatus at a readily accessible location.

4.1.1 ONE MAIN METER FOR SERVICE OF SAME TYPE - RMU will furnish and install only one main watthour meter to register all energy supplied to Owner at any individual premises, unless accuracy of measurement, engineering, safety reasons, rates or legal provisions require the installation of more than one meter. The Owner shall provide all necessary transformation equipment behind the meter to provide other types of service or voltage requirements. There may be Owner expense for additional requested meters.

4.1.2 METER INSTALLATION - All meter and service connections shall be made by RMU and no person other than RMU Staff is permitted to connect, disconnect or in any way remove an electric meter owned by RMU.

4.1.3 ACQUISITION AND INSTALLATION OF METER MOUNTING EQUIPMENT (METER SOCKET):

a. RMU will provide and install the watthour meter.
b. Where service is provided at primary voltages: Unless otherwise approved by RMU, the electric service shall utilize an underground service and a padmounted metering enclosure is to be installed the Owner shall provide and install a complete padmounted primary metering cabinet (including Current Transformers), except that RMU will provide (for installation by Owner) the 13 terminal meter socket.
c. Where service is provided at secondary voltages:
    i. Where the electric service will require installation of a Current Transformer utilizing a 13 terminal meter socket RMU will supply the 13 terminal meter socket that the Owner is required to install. The owner is required to provide and install the CT metering cabinet and all associated connections along with the conductor. RMU will provide and install the Current Transformers.
    ii. For all other metering configurations, the Owner shall be responsible for acquisition and installation of the meter mounting equipment (meter socket). If Current Transformer(s) are needed they will be provided and installed by RMU.

4.2 METER LOCATIONS AND WIRING

4.2.1 METER LOCATION - In general, all electric meters must be located outdoors at the point closest to the service drop or lateral termination.

This policy applies to all new installations and re-wire work where the meter and/or service equipment is involved. All meters shall be located and mounted in devices in accordance with RMU specifications.

Meter locations required for new or re-wire work shall conform to this policy, even though other existing meters on the premises may not conform. It is recommended, but not necessarily required, that existing meters which are not involved in the wiring work, be upgraded to present standards.

Meter locations will be approved by RMU and must meet the following conditions in addition to other electric service requirements:

a. Where multiple meters are to be installed the meters should be grouped at locations approved by RMU.
b. Where Current Transformers (CT's) are required for a secondary service, the metering, including CT's, shall be located on the line side (ahead) of service disconnecting device unless otherwise approved or required by any applicable building codes.
c. Meter shall be located to directly measure Owner load and energy. Series (subtractive) metering will not be allowed.
d. All CT's shall be located outdoors and installed in weather tight, approved cabinets, unless otherwise specified by RMU. Approved Current Transfomer locations are:
    i. Mounted at the weatherhead;
    ii. Outdoor CT cabinet (location to be approved by RMU);
e. Service will be refused if meters and current transformers are not installed in accordance with RMU specifications and building code requirements. Unapproved metering locations include:
    i. Over stairs and in stair wells, either indoors or outdoors.
    ii. In basements, where the only entrance is through a trap door.
    iii. On lattice or metal lath partitions.
    iv. In or on walls of storage lockers or bins.
    v. Meter locations inside occupant or tenant space, in single or multi-occupant buildings.
    vi. In bedrooms, bathrooms, toilet rooms, restaurant kitchens, stairways, elevator or ventilating shafts, or in any place where it will cause inconvenience to either Owner or RMU representatives.
    vii. Over windows, doors, stoves, furnaces, radiators, heaters, boilers, sinks, tubs or any place subject to flying objects or dust, grease, excessive heat, moisture or fumes.
    viii. Under water pipes or other pipes from which condensation may drop, or within five feet of belts or moving machinery.
    ix. In that part of a basement extending under a sidewalk.
    x. Where the meter would be subject to excessive vibration.
    xi. On a wall abutting a street or alley when subject to mechanical damage.
    xii. On outside walls over air conditioning units where units are less than three feet from wall, including air conditioning units that are installed after meter equipment is mounted.

4.2.2 RE-WIRE WORK AND METER LOCATION ON EXISTING BUILDINGS

a. If the existing service needs to be changed to provide increased capacity or maintenance to the service as the result of a change in location, disconnection of service due to other improvements, or a damaged service line needs to be replaced, the electric service as a whole must be revised as necessary to meet current RMU specifications.
b. All work performed in conjunction with rework must be in compliance with any applicable building codes.

4.3 SERVICE DISCONNECT

All services shall have a means of disconnect.

For locations that utilize a 480V service with a capacity of 400 amps or less the installation must include a service disconnect on the line side of the meter.

4.4 METER MOUNTING HEIGHTS

Meter mounting heights are *shown on Detail #3.*

4.4.1 OVERHEAD supplied individual meter sockets shall be mounted such that the bottom of the meter opening is between 5'0" and 5'6" above finish grade.

4.4.2 UNDERGROUND supplied individual meter sockets shall be mounted such that the bottom of the meter opening is between 5'0" and 5'6" above finish grade.

4.4.3 EXCEPTION: RESIDENTIAL SERVICE ONLY - If meter socket is located over a driveway or walkway 36" in width or narrower, the meter socket shall be raised to 6'6" as measured from bottom of meter opening to final grade.

4.4.4 NON-RESIDENTIAL SERVICE rate meter sockets and enclosures shall not be elevated to avoid hazards, but must be protected from pedestrian and vehicular traffic or parking hazards by Owner. Details of suggested barrier are *shown on Detail #4.*

4.4.5 Current transformer enclosures shall be mounted such that the bottom of the enclosure is no higher than 6 feet above final grade and no lower than 1'6" above final grade.

4.4.6 Vertically grouped multi-meter centers shall be installed such that the top meter as measured from the bottom of the meter opening to final grade shall not exceed 6'6". The lowest meter measured as above shall be no lower than 2'0" outdoors.

4.4.7 Horizontally ganged meter centers shall be installed at the same heights as individual meter sockets.

4.4.8 RMU provided transformer rated, three-phase meter mounting equipment shall be mounted between 5'0" and 5'6" as measured from the bottom of the meter window on enclosures or meter opening on sockets to final grade.

4.4.9 RMU provided single-phase transformer rated meter socket shall be located similarly. Residential sockets may be elevated to 6'6", *see Section 4.4.3.*

4.5 MULTI-METER INSTALLATIONS

4.5.1 Refer to Owner Furnished Meter Mounting Equipment Requirements, Section 5 of these specifications.

4.5.2 The owner must install a means of disconnect in accordance with all applicable building codes.

4.5.3 If the service is 480 volts and 400 amps or less the meter shall be placed on the load side of the disconnect. For all other service conditions where the number of meters and/or fault duty requires a main service disconnect, the individual meters shall be located on the line side (ahead) of each Owner disconnect.

4.5.4 Pre-fabricated, combination multi-meter equipment with fused or circuit breaker type disconnects shall be provided subject to RMU approval of meter sockets, location, electrical one line, cable landing space, security provisions, etc., before fabrication.

4.5.5 All disconnecting devices located ahead of meters shall be provided with lock-off capability to permit isolating of service.

4.5.6 Meters shall be grouped in location(s) approved by RMU. Owner is responsible to permanently mark the flat, apartment, office or location identification at each meter before the meter is set.

4.6 REQUIREMENTS, SECURITY AND WIRING

4.6.1 Metered and unmetered wires shall not be installed in the same wireway, pull box, enclosure, etc.

4.6.2 Adequate provisions must be made for the sealing (see Section 5.4.6) and security of meter, unmetered service equipment and circuits. Covers of all unmetered service equipment, pull boxes, troughs, wireways, busways, etc., shall be drilled and tapped for one or more 1/4" x 20 bolts to adequately seal the covers. Sealing bolts shall be furnished with the equipment or by Owner. Maintenance access to unmetered disconnects will not normally be sealed. (i.e. breakers, fuses)

4.6.3 All unmetered feeder busways shall be approved by RMU. Busway openings shall be Owner pre-engineered for installation. "Plug-in" busway shall not be used. Busway approval is required before energize the electric service..

4.6.4 When aluminum service entrance conductors are used in the meter device, the wire should be thoroughly cleaned with a wire brush and then liberally coated with oxide inhibitor.

4.6.5 A minimum clearance of three (3) inches shall be maintained from the outer edge of the meter base and the service entrance switch, another meter base, wiring troughs, or any obstruction such as down spouts, doors, chimneys, shutters or building projections.

4.6.6 All sockets energized before a meter is set are a hazard and shall be covered with a meter socket cover furnished by RMU. These will be furnished and installed by RMU.

4.6.7 Unused hubs or openings shall not be left open. Hubs shall be closed with a threaded pipe plug and knockouts with knockout closures.

4.6.8 Raceway or conduit connections at the top of meter device shall be watertight and the bottom knockouts closed.

4.6.9 Meter socket mounting must be plumb and rigidly supported to prevent movement, sway and vibration. Meter sockets, not mounted to a permanent structure, must be supported in a manner approved by RMU. *Refer to Detail #6 and #7 for a preferred meter socket support.*

4.6.10 Meter mounting equipment shall be surface mounted including line side conduits.

4.6.11 Meter cabinet covers, pull boxes, CT cabinet covers and any miscellaneous service equipment covers shall include hinged covers unless otherwise approved by RMU.

4.6.12 Owner shall provide appropriate cable lugs for the termination of RMU maintained conductors.

4.7 CURRENT TRANSFORMER INSTALLATIONS - FOR SERVICES UNDER 600V

4.7.1 SERVICE REQUIRING CURRENT TRANSFORMERS: Current transformers (CT) shall be installed on services whose rated ampacity is greater than 400A.

4.7.2 INSTALLATION REQUIREMENTS

a. CT Cabinet: CT's shall be installed in Owner provided, owned, installed and maintained enclosure, compartment, box or as part of panel boards as specified herein. The CT enclosure, compartment, box, etc., is dedicated for metering purposes only. Unauthorized access is not permitted. (see Section 4.7.2.F) No Owner equipment or other wiring shall be allowed in or to pass through the dedicated space. Mounting height limitations are stated in Section 4.4. CT's for 480 volt services that are 400 amps or less shall normally be installed on the load side of the service disconnect while for all other services the CT's shall be installed on the line side of the disconnect, unless otherwise approved by RMU.

b. Meter Enclosure: The transformer rated meter enclosure and sockets shall be provided as noted in section 4.1.3. The meter socket shall be installed by Owner. The meter device shall be mounted on an outside building wall at a point approved by RMU. (See Section 4.6.9.) The meter enclosure or socket shall be located as close as practical to the CT's.

c. Current Transformers: RMU provides and installs the CTs. Owner provides the CT enclosure, and installs line and load side wiring. The CT enclosure for three-phase shall be a minimum 32"x36"x9" deep, and for single-phase shall be a minimum 24"x32"x9" deep.

d. Meter Loop:
   i. The metering conduit between CTs and meter device are Owner installed. (No "LBs" will be permitted). The conduit shall have a minimum diameter of 1" and shall be rigid metal, with a minimum of conduit fittings. Owner wiring is not permitted in this conduit. RMU will provide the meter "loop" wires consisting of No. 12 AWG, solid copper wires with individually colored insulation. Splicing of meter loop wires and the installation of pull boxes are prohibited.
   ii. RMU Staff will terminate meter loop and ground wires in CT box and on meter equipment in the meter enclosure or socket.

e. CT Cabinet Enclosure Covers and Sealing:
   i. All Owner provided CT enclosure covers shall be provided with a hasp for padlocking if hinged or, if not hinged, shall be sealed with 1/4" x 20 sealing studs as needed to prevent removal of cover. (see Section 5.4.6.) If the CT space is part of panel boards or switchgear, the CT space shall be barricaded from within and covered with its own, separately sealed steel cover or door.
   ii. All CT cabinets must include a hinged cover. CT cabinets shall be weather and rain resistant for outdoor installation.

5. METER MOUNTING EQUIPMENT REQUIREMENTS

The watthour meters will be furnished, installed and maintained by RMU.

All meter mounting equipment shall meet RMU requirements stated herein.

RMU will not maintain lists of approved manufacturer's catalog numbers. RMU will be available to review information provided by the Owner as they work to meet these requirements by reviewing and commenting on designs and/or manufactured samples.

Failure by Owner to install a meter mounting device, also known as meter socket, meeting these requirements may lead to the delay of service until these requirements are met. Other sections of these specifications pertain to mounting location, mounting heights and other service requirements.

5.1 GENERAL REQUIREMENTS

5.1.1 The meter socket and any integrated electrical equipment shall meet requirements of the Underwriters Laboratories (UL) and shall be labeled UL approved for the type of service equipment provided. Meter sockets shall meet standards contained in the latest revision of UL414 and ANSI C-12, Code for Electricity Metering.

5.1.2 Devices shall be labeled as to ampacity class, maximum voltage and manufacturer's name and catalog number.

5.1.3 If the service is 480 volts and 400 amps or less the meter shall be placed on the load side of the disconnect. For all other service conditions where the number of meters and/or fault duty requires a main service disconnect, the individual meters shall be located on the line side (ahead) of each Owner disconnect

5.1.4 All meter socket equipment and line side wiring shall be surface mounted. Flush or semi-flush equipment is prohibited.

5.1.5 The meter socket shall be of steel construction, weather and rain resistant and have a baked painted finish over galvanized steel sheet. Fabrication with aluminum sheet, fiberglass or non-metallic material is prohibited.

5.1.6 All meter socket covers shall be ringless. See 5.4.6 for sealing.

5.2 *Section 5.2 intentionally blank*

5.3 BOLT-IN METER SOCKETS

Bolt-in meter sockets are not allowed for new construction and where revisions are taking place that require changes to the electric service the Owner must make revisions as needed to eliminate the use of any bolt-in meter socket.

5.4 MISCELLANEOUS REQUIREMENTS

5.4.1 Meter sockets shall meet all applicable RMU specifications and building codes.

5.4.2 On all individual meter sockets for underground service, the line conductors will be installed to wrap around the socket interior to the top lugs. Side wire way designs for direct upward connection of U.G. cables are not permitted.

5.4.3 Bypass type meter sockets shall be provided with a clear polycarbonate safety shield over the socket interior.

5.4.4 The 5th terminal on non-bypass and horn bypass sockets shall be located in the 9 o'clock position and on clamp jaw bypass sockets the 5th terminal shall be located in the 6 o'clock position.

5.4.5 The meter neutral terminal on 5 and 7 terminal sockets shall be bonded to the neutral conductor. Where needed due to local requirements, the socket shall include a grounding electrode bonding clamp.

5.4.6 Sealing - All covers shall be equipped with no more than one securely fastened hasp or stud for padlocking and sealing by RMU utilizing a meter or transformer seal. Depending on the cover size, non-sealable fasteners may be used to mechanically secure the cover in addition to the single sealing hasp. Covers that secure more than one meter, shall similarly be secured with only one sealing and padlocking hasp or stud.

5.5 SPECIAL REQUIREMENTS

5.5.1 Where Owner disconnects and/or fuses are combined with the meter equipment, the cover for the meter and the cover for Owner access to the switch/fuse and load side wiring shall be separated such that RMU meter and lines side service compartments may be secured and sealed (see Section 5.4.6) separately from Owner side. On such combination units, internal barriers shall be permanently installed to prevent access to meters and unmetered wiring via Owner compartments. On multi-meter equipment, the line side cable terminal compartments shall have sealable and lockable covers separate from meter covers.

6. OWNER WIRING AND INSTALLATION

6.1 NOTIFY RMU OF NEW OR RE-WIRE WORK

Owner shall promptly notify RMU (refer to Section 2) of the electrical work planned. Prompt notification will minimize delays when work is completed.

6.2 INSPECTIONS OF WIRING

Owner wiring shall be subject to inspection and approval by local code authority and/or RMU. Contact the City of Rolla for code requirements.

When inspections are required, RMU will not provide service until Owner wiring has been approved by the proper authorities. RMU reserves the right to refuse service at any time that it deems that the inspecting authority has been remiss or if the service is otherwise unacceptable.

6.3 EMERGENCY REPAIRS AFTER HOURS, WEEKENDS, AND HOLIDAYS –
Reconnection can be made for emergency reasons if Owner provides RMU with name and address, along with number on business license if applicable. RMU will promptly notify electrical inspection authority of this action.

6.4 *Section 6.4 intentionally blank*

6.5 OWNER ACCESS

Owner may access RMU owned and RMU secured meter, and CT equipment in the pursuit of legitimate work. The Owner is instructed to obtain prior approval from RMU for such action and work intended. Failure to obtain prior approval and to provide prompt notification will cause access to be considered unauthorized and subject to legal action.

When a new service or rewired service originates from an energized, unmetered Owner owned service compartment (i.e., connection box, pull box, terminal box, trough, etc.), Owner must inform RMU for the purpose and extent of the work before starting any work. Generally, a job site meeting with RMU Staff will be necessary to review capacity and suitability of the service compartment and to schedule the work. Only after specific RMU approval, will Owner be permitted to terminate service wires within the compartment. Owner is not permitted to energize new wiring beyond the meter socket unless emergency situations exist and such work is specifically approved by RMU before work is started. Owner should schedule outages to other tenants as needed to complete the wiring.

6.6 GROUNDING

All secondary AC supply systems shall have a grounded neutral or grounded phase conductor from RMU point of distribution to Owner service entrance disconnect equipment and approved ground. Owner shall install a grounding conductor as prescribed in the NEC or by local regulations. All electrical supply systems must be grounded. A solid copper conductor No. 6 for 100A service and No. 4 for 200A service, must be run from the appropriate lug on the neutral bus in the circuit breaker of fuse panel to 1/2 inch ground rod driven 8 feet into the earth. The conductor must be secured to the adjacent wall to protect it or the conductor must be run in a conduit. When grounded to a cold water pipe, the ground wire shall be attached by means of an approved ground clamp and connected to the ground terminal of the service switch.

A ground wire connection to the water pipe must consider the location of the water meter.

If an external grounding electrode is used, the grounding electrode conductor from the service equipment may exit the meter socket at the approved knockout. As an option, the grounding electrode conductor may extend from the grounding electrode to an approved grounding lug inside the meter socket, if the socket is so equipped.

Telephone and/or other electronic equipment may require grounding external to Owner premises. Such ground connections are not permitted inside RMU sealed (see Section 5.4.6.) and secured cable and meter compartments.

6.7 CONNECTION OF SERVICE

The connection of service to energize Owner load will be made by, and at the discretion of RMU when the meter is set.

7. MOTORS AND APPARATUS

7.1 GENERAL

Owner is invited to consult with RMU before purchase, installation, or wiring of motors or other apparatus to determine the kind of service that will be supplied and the manner in which such equipment should be connected.

All motors, apparatus and appliances shall have such characteristics which enable RMU to maintain a satisfactory standard of service to Owner being served and all other Owners in the immediate area. (See Section 2.2.2.)

RMU reserves the right to select the type of service to be supplied and should be consulted before equipment is purchased or ordered. The characteristics of motors 7 1/2 H.P. and larger or where the aggregate load of smaller motors is more than 20 H.P. require consideration.

7.2 PHASE & VOLTAGE

The types of voltage which are supplied by RMU and the conditions under which each is available are described in Section 2.1: Type of Service, Voltage and Phase.

In general, 7 1/2 H.P. and larger motors will be three-phase and motors smaller than 7 1/2 H.P. will be single-phase. There are, however, a number of exceptions to this rule.

7.2.1 In areas where Owners are supplied from a 120/208V or 277/480V, three-phase, four-wire system, service is sometimes available for motors smaller than 7 1/2 H.P.

7.2.2 In outlying and Residential areas where three-phase energy is not readily available, larger single-phase motors may be permitted, but only with the prior approval of RMU.

7.2.3 Where Owner is already using three-phase energy, motors smaller than 7 1/2 H.P. may be added to the three-phase service.

7.2.4 Three-phase service is not normally available for Residential Owners.

7.3 PROTECTION AGAINST ABNORMAL CONDITIONS

All motors and special apparatus should be equipped with suitable undervoltage time delay tripping devices to protect against sustained undervoltage or service interruption and to prevent automatic disconnection of equipment upon momentary voltage disturbances.

Three-phase motors should be equipped with suitable protective devices to prevent single-phase operation, improper direction of rotation and excessive heating due to overcurrents.

RMU will not be responsible in any way for damage to Owner equipment due to failure of Owner to provide adequate protection.

Owner should install an uninterruptible power source (UPS) or voltage suppressor where momentary or extended outages of voltage fluctuations will cause inconvenience, loss of electronic memory or trip alarms, etc.

8. GENERATORS

8.1 EMERGENCY GENERATORS

All Owners are required to notify RMU prior to the installation of an emergency generator and installation shall be compliant with all applicable codes and RMU specifications. All generators shall be installed to eliminate the possibility of operating in parallel with or backfeeding into the RMU electrical system. All generators must be installed in accordance with RMU General Specifications and City of Rolla Codes.

8.2 COGENERATION / NET METERING

There are rules and regulations that govern the installation and operation of Owner-owned cogeneration equipment. Safety rules prohibit the energizing of de-energized service supply lines from cogeneration equipment. Special metering is necessary to register both "IN" and "OUT" kilowatt hours and demand as appropriate.

Net Metering is available within the City at any point on RMU's existing facilities that have adequate capacity and suitable voltage for delivery of service. A completed and approved application/ agreement for Net Metering is required prior to connection to RMU facilities. Consult RMU for information.

9. RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT PROJECTS

The Owner shall contact RMU when beginning the planning and permitting processes for developments in Rolla. RMU will examine your project in relationship to existing facilities and work with you to route electric utilities to your project.

Electric facilities within a subdivision may be installed underground. Street crossings are installed before paving and the Owner shall coordinate the entire process to minimize delays. RMU Staff will install the conduit, conductors, transformers, and street lights. If circumstances dictate, overhead electric construction will be installed by RMU Staff.

The Owner of Non-Residential property is required to install the primary conduit system within the boundaries of the development project. Transformer pad construction requirements are shown in *Detail #15 or #16*, which should be secured from RMU when first considering such development plans.

RMU will not begin installation of electric distribution lines in a subdivision until the area between the curb and five feet beyond the property line is to final grade. Sewer lines must be installed, and the lot corners must be indicated by survey markers. All clearing of easements shall be the sole responsibility of the Owner. In preparing the right-of-way, trees shall be removed, underbrush cleared and trees trimmed so that the right-of-way shall be clear from the ground up and of the width required. Trees fronting each side of the right-of-way shall be trimmed symmetrically unless otherwise specified. Dead trees beyond the right-of-way, which in the act of falling would strike any electric line, shall be removed. Leaning trees beyond the right-of-way, which would strike any electric line (or within 5 feet of the outside conductor), are considered "Danger Trees". These danger trees could require topping or complete removal. Shade, fruit, or ornamental trees shall be trimmed and not removed unless otherwise authorized.

RMU installs new electric facilities curbside within a dedicated easement. RMU reserves the right to install electric facilities in other locations at the request of the Owner. All modifications may be subject to increased cost and is the responsibility of the Owner.

10. SYSTEM ALTERATION AND CONVERSION

10.1 CONVERSION OF EXISTING SYSTEM

All relocations and/or alterations of existing overhead and underground lines and equipment will be accomplished at the expense of the Owner initiating the request on an estimated cost basis. The Owner will be required to provide all necessary easements and right-of-way without cost to RMU. The request must be submitted allowing ample time for RMU to investigate, engineer, schedule, and construct the alterations. All relocation and/or alteration requests should be made to RMU. The Owner will pay the actual cost for completion of the work.

10.1.1 CONVERSION OF SINGLE RESIDENTIAL OVERHEAD SERVICE TO UNDERGROUND - In the event that a Owner requests conversion of the service conductor from overhead to underground, the Owner must convert his service entrance equipment from overhead to underground and install his service lateral conductor. This conversion must be approved by the appropriate inspection authority.

RMU will place a pedestal within five (5) feet of an RMU pole, remove the overhead service and install underground secondary conductor to the pedestal. The Owner, at his own expense, is responsible for digging the ditch from his service equipment to the new pedestal site. The Owner will place the conduit, ells, and conductor from the Owner's service equipment to the pedestal. The Owner will be responsible for closing the ditch and re-landscaping. The Owner will assume all costs incurred in conjunction with conversion including replacing fences, sod, trees, shrubs, other landscaping items, and the repair of damages to, or the remodeling of, building structures.

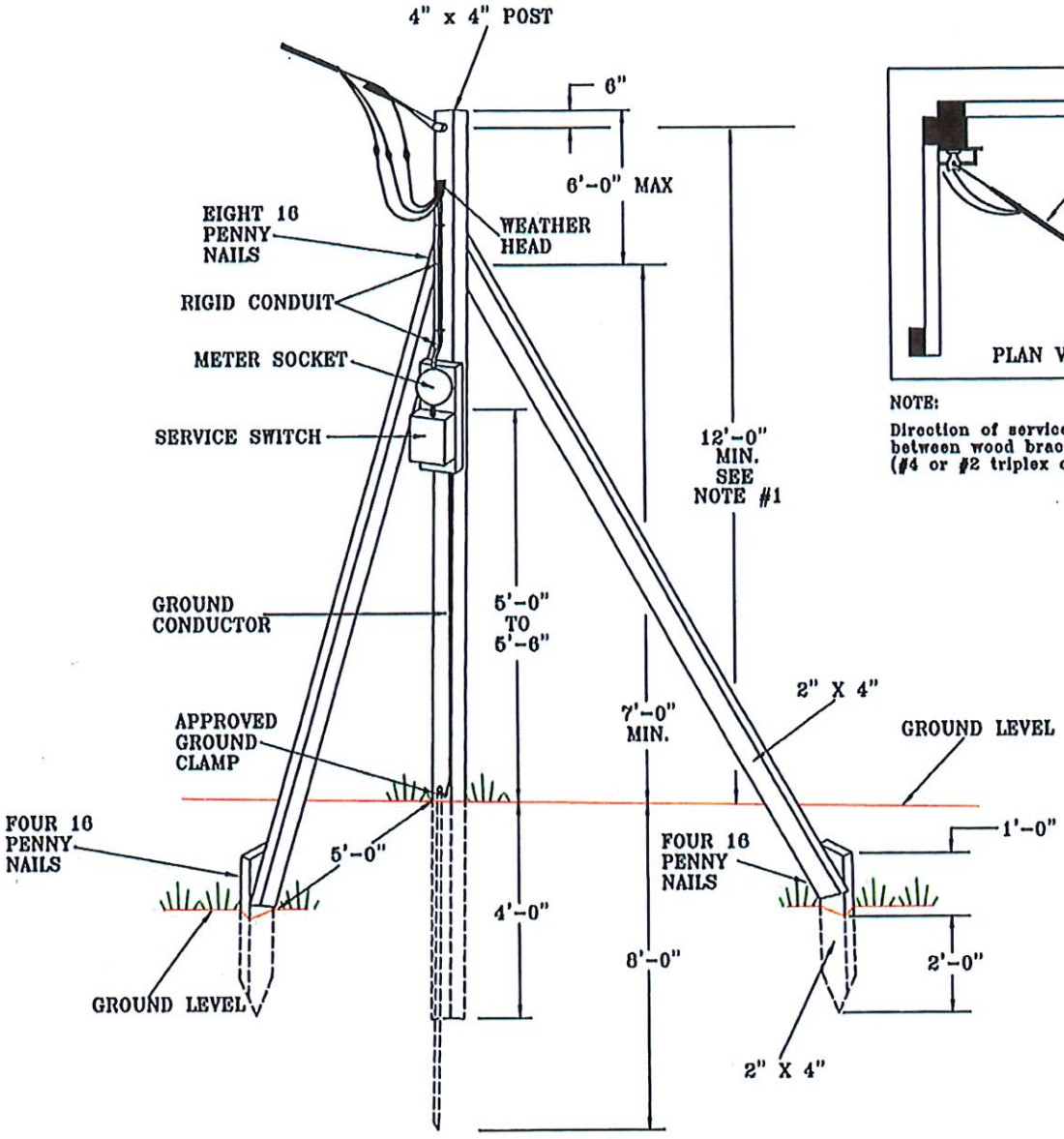
10.1.2 SINGLE-PHASE TO THREE-PHASE CONVERSIONS - RMU will rebuild its single-phase facilities to accommodate a three-phase service under the following conditions:

a. Revenue generated from the addition of the three-phase load will justify the cost of rebuilding the facilities to three-phase.
b. Owners who request three-phase service pay the cost of rebuilding the facilities to three-phase.
c. A combination of the above conditions.

10.2 LINE EXTENSION REQUIREMENTS
Extension of distribution or transmission facilities to a point of delivery to the Owner will be made subject to the current RMU scheduling and RMU Staff availability.

11. DIAGRAMS

The Detail Sheets contained herein illustrate items of text and some typical service and meter arrangements. Further detail on these and other types of service arrangements may be obtained from RMU. All installations must comply with these specifications, local ordinances, current NEC, and other requirements. Where the term "approved ground" is used, refer to Section 6.6.



NOTE:

Direction of service pull must run in angle between wood braces. RMU service drop- (#4 or #2 triplex cable)

Notes:

1. Clearance and meter pole provided by customer for anchorage of RMU service drop and installation of RMU meter.
2. Service drop cable must exceed all clearances required by the NESC.
3. Where practical, the service to the temporary connection should be installed in a manner suitable for transfer to the permanent location.
4. Minimum of four 16 penny nails to be used at each joint.
5. Temporary pole shall be located between 5 ft. and 75 ft. away from RMU pole.

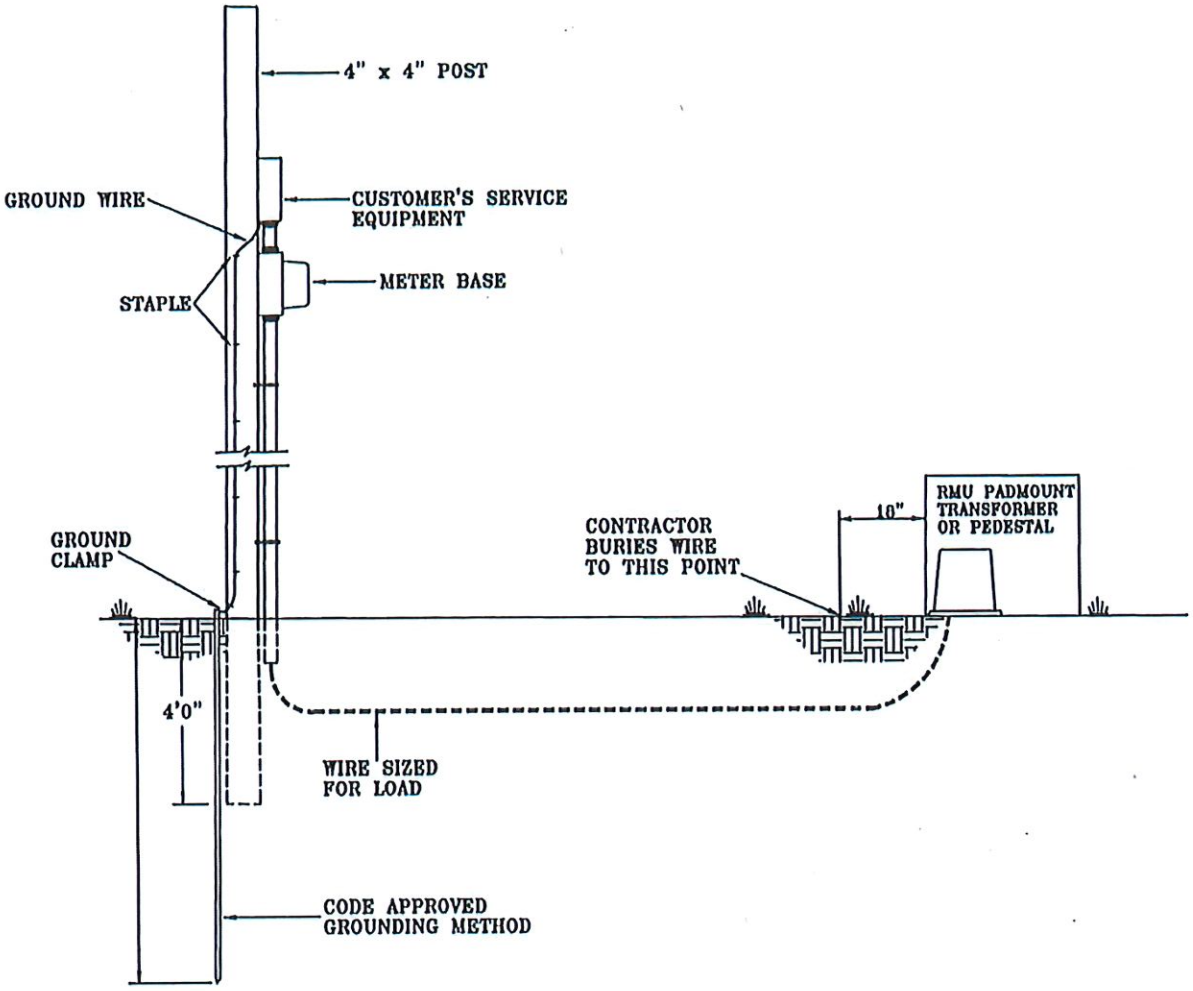
ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

OVERHEAD TEMPORARY SERVICE POLE

Rolla Municipal Utilities RMU People You Know. Service You Trust

ELECTRIC SPECIFICATIONS
DETAIL # 01

SCALE N/A REVISION DATE 02-21-2006



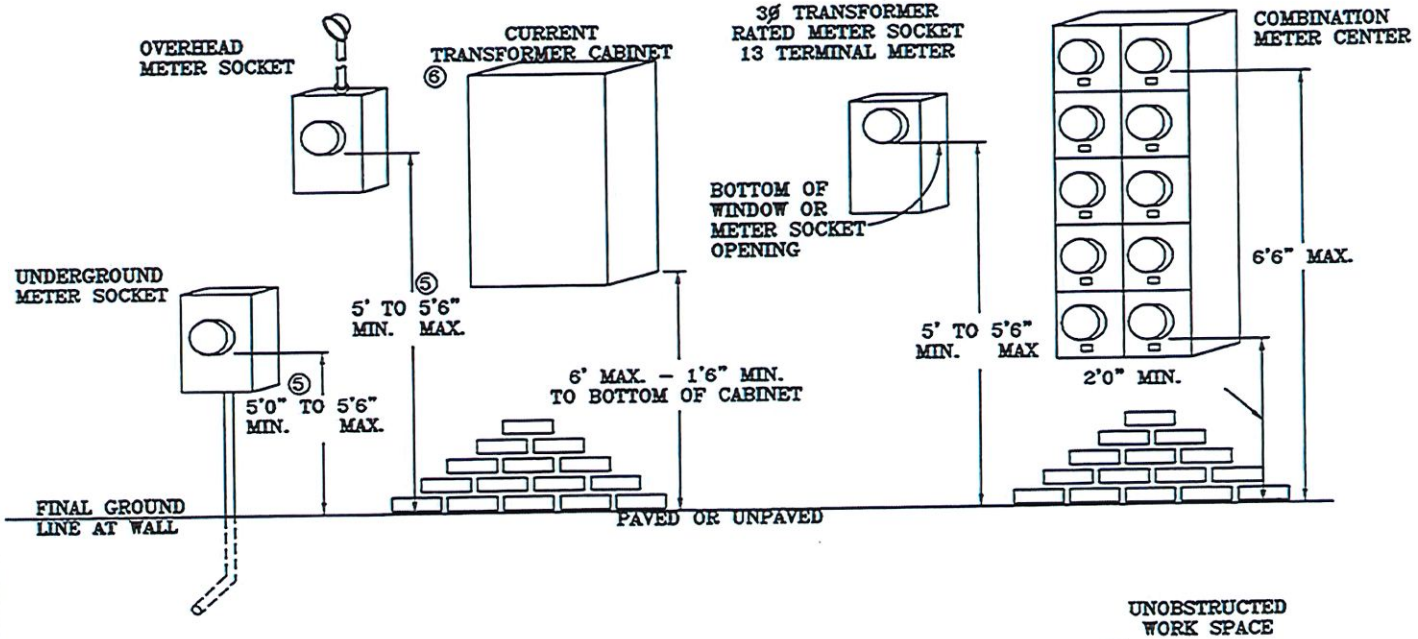
Notes:
1. Customer to install 3-wire direct burial cable from meter base to transformer pad or pedestal and leave sufficient length for RMU to attach.
2. Customer's service equipment may be mounted below meter base but base must be mounted 5'0" to 5'6" above grade.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

UNDERGROUND TEMPORARY SERVICE

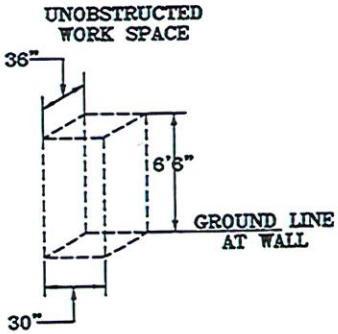
ELECTRIC SPECIFICATIONS
DETAIL #02

SCALE N/A REVISION DATE 02-21-2008



Notes:

1. IMPORTANT: General service (Non–Residential) rate meter sockets shall be mounted no higher than 5'6" from bottom of meter opening to final grade. (See Note 2 below)
2. If meter is subject to mechanical damage, vehicular traffic, or presents hazard to the public, the customer/contractor shall install protective barrier. See DETAIL #04.
3. Ground slope at wall shall not exceed 4 inches in 12 inches in any direction.
4. Meters shall be mounted outdoors unless special permission has been granted by RMU for indoor mounting.
5. Residential service rate only. This dimension shall be 6'6" if meter socket is located over abutting walkways 36" or less in width and driveways.
6. Residential service rate C.T. cabinets shall be located outdoors.

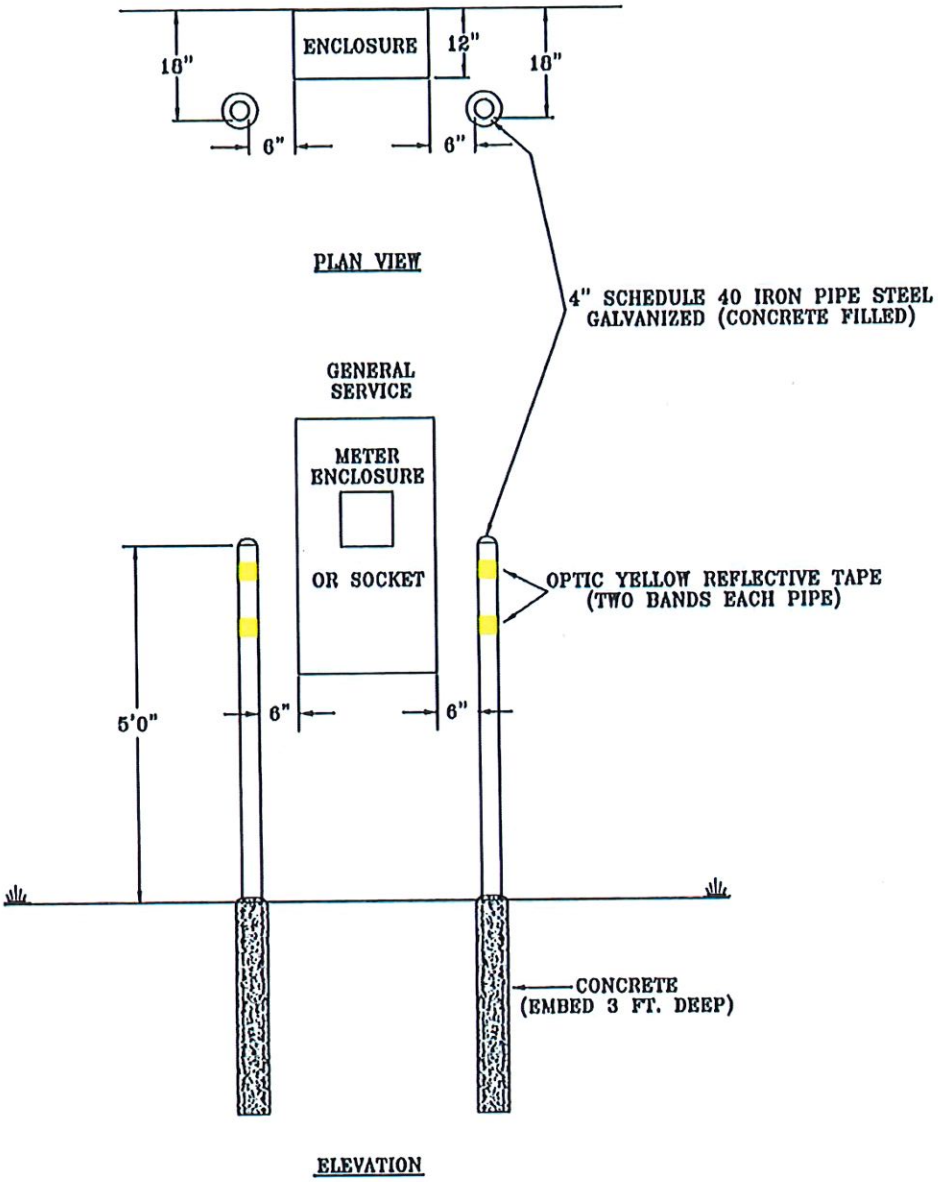


ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

METER MOUNTING HEIGHTS

ELECTRIC SPECIFICATIONS
DETAIL #03

SCALE N/A REVISION DATE 05-28-12



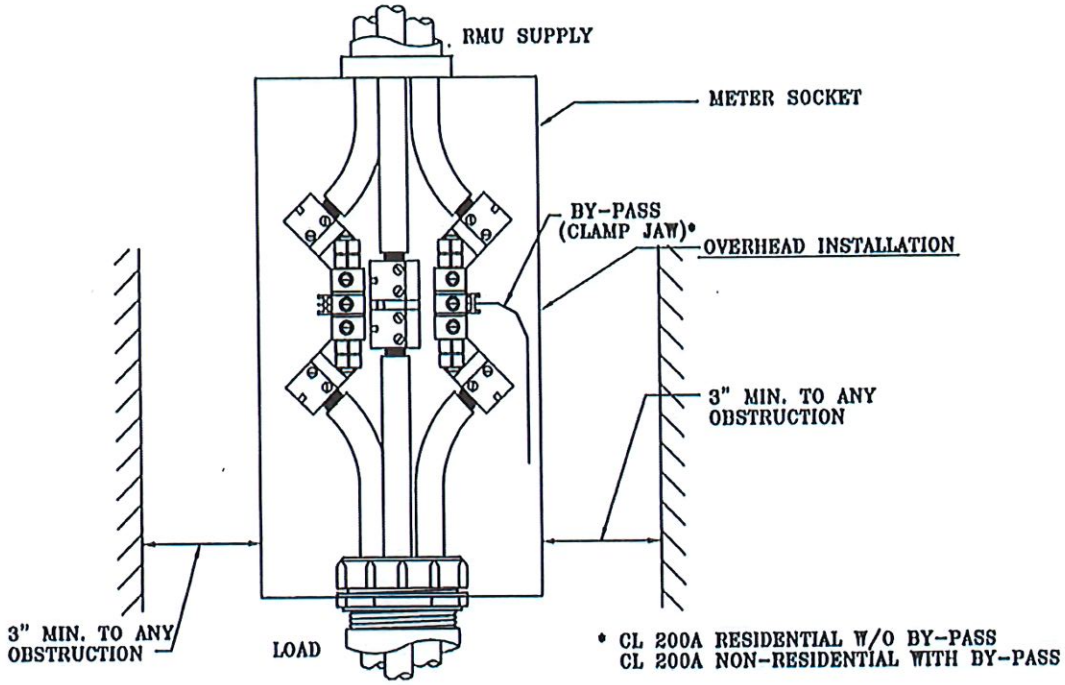
Notes:
1. Meter enclosures shown, other devices shall be similar.
2. Alternative barriers include:
   A. Wall supported brackets for public safety.
   B. Concrete curbs for vehicular traffic.

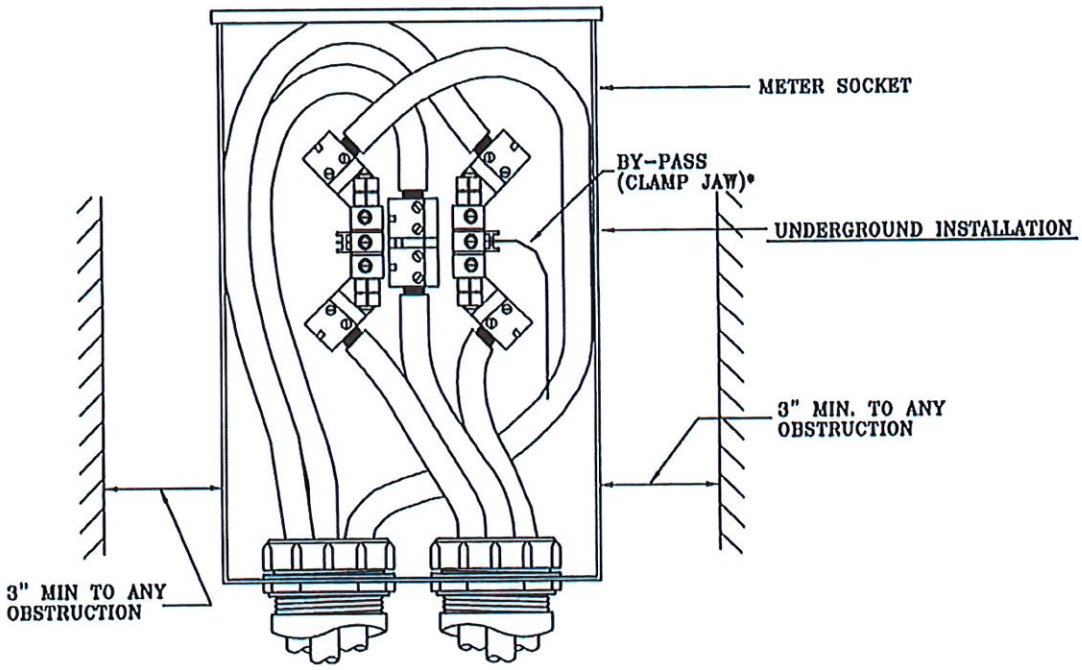
ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

METER EQUIPMENT PROTECTIVE BARRIER

ELECTRIC SPECIFICATIONS
DETAIL #04

SCALE N/A REVISION DATE 02-21-2006





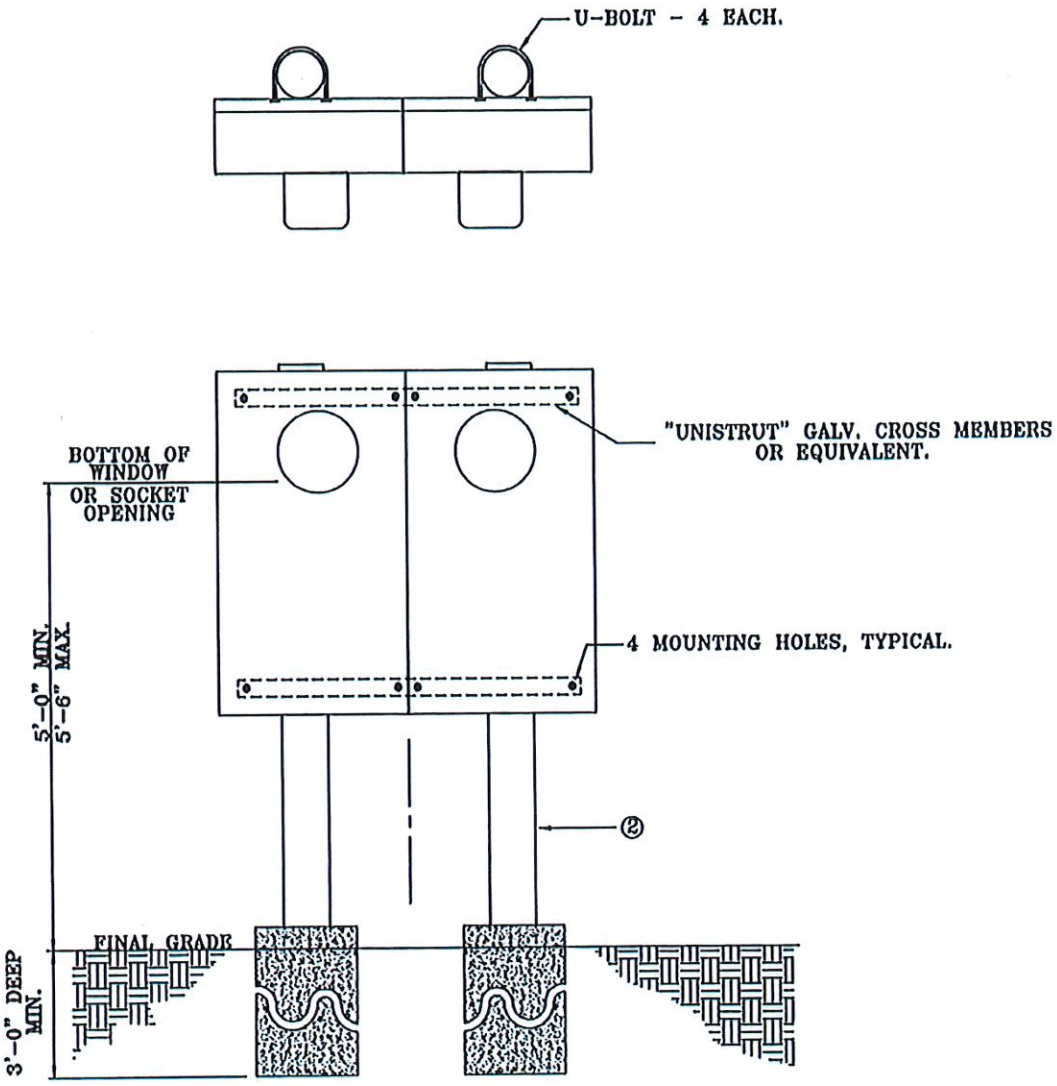
ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

SINGLE PHASE INSTALLATION

UP TO 200 AMPERES RESIDENTIAL AND NON-RESIDENTIAL
120/240 VOLTS 3 WIRE A.C. OVERHEAD OR UNDERGROUND

ELECTRIC SPECIFICATIONS
DETAIL #05

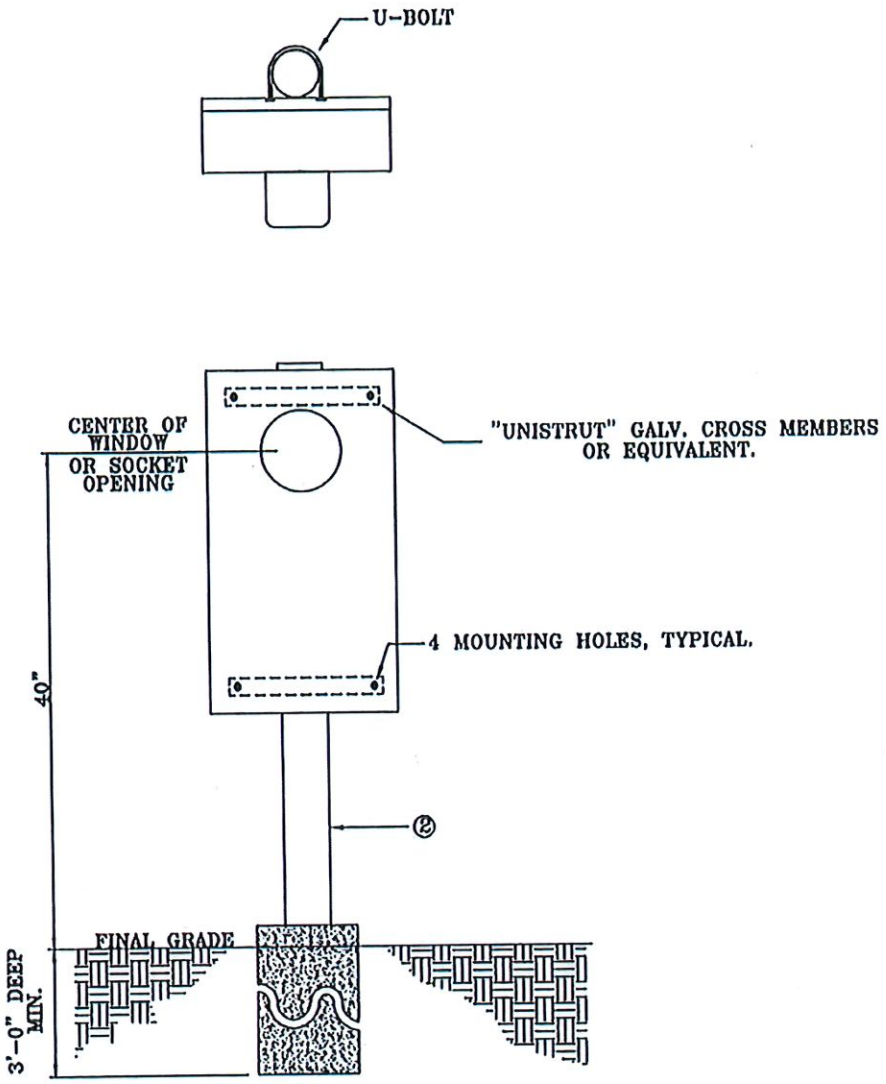
SCALE N/A REVISION DATE 02-21-2006



Notes:

1. Use 1" rigid metallic conduit for meter loop wiring (no LB's). Provide #8 AWG ground wire.
2. For posts use 3", Schedule 40, galvanized iron pipe. Set 3' deep in 12" cast in place concrete footing. Cap posts or concrete fill.
3. Support is customer owned and maintained.
4. Locate only on customer property.
5. Refer to RMU prior to installation for location approval on locations away from building.

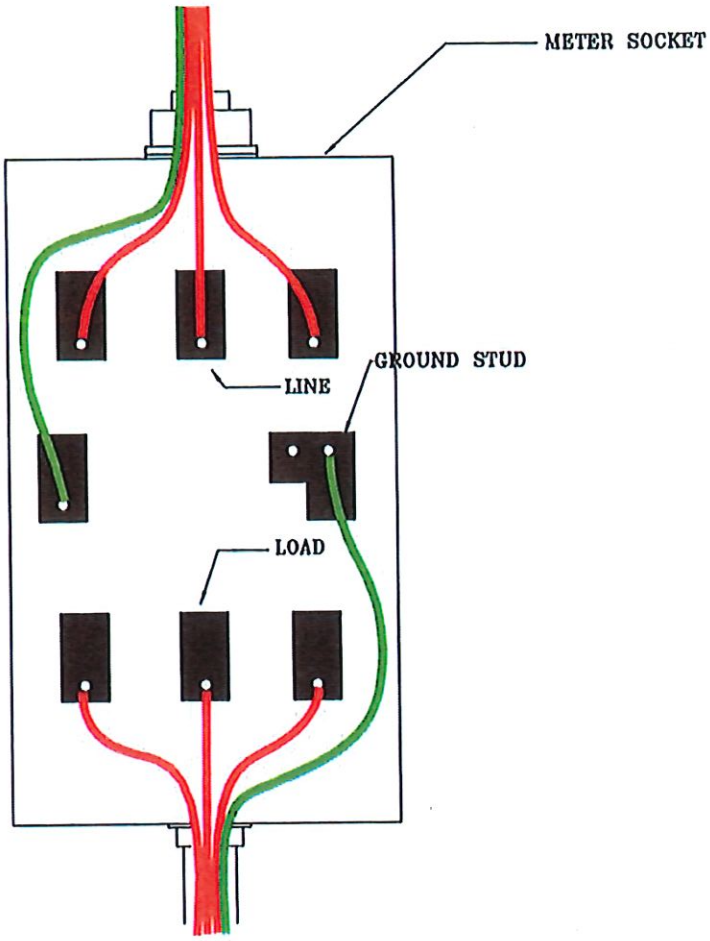
ROLLA MUNICIPAL UTILITIES 102 WEST 9TH STREET ROLLA, MISSOURI 65401	
METER SUPPORT METER SOCKET 13 TERMINAL	
Rolla Municipal Utilities - RMU - People You Know, Service You Trust	ELECTRIC SPECIFICATIONS DETAIL #06 SCALE N/A REVISION DATE 02-21-2008



Notes:

1. Use 1" rigid metallic conduit for meter loop wiring (no LB's). Provide #8 AWG ground wire.
2. For posts use 3", Schedule 40, galvainized iron pipe. Set 3' deep in 12" cast in place concrete footing. Cap posts or concrete fill.
3. Support is customer owned and maintained.
4. Locate only on customer property.
5. Refer to RMU prior to installation for location approval on locations away from building.

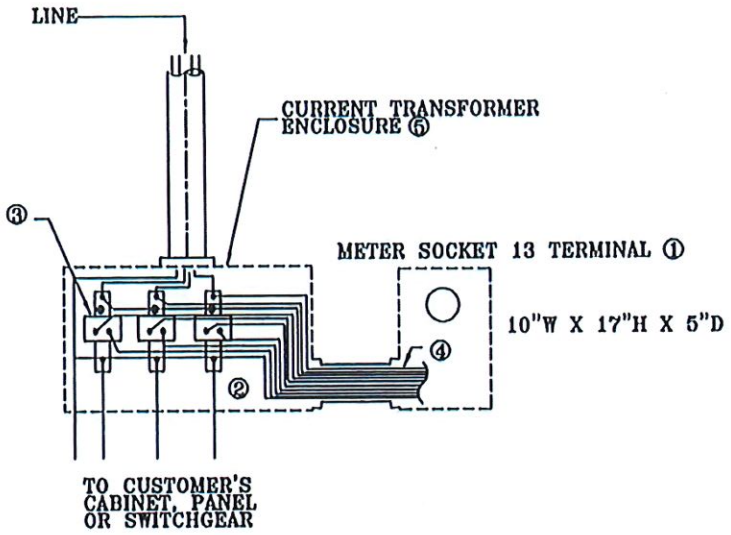
ROLLA MUNICIPAL UTILITIES 102 WEST 9TH STREET ROLLA, MISSOURI 65401	
METER SUPPORT METER SOCKET LOCATED AT PAD MOUNT TRANSFORMAER	
Rolla Municipal Utilities RMU People You Know, Service You Trust	ELECTRIC SPECIFICATIONS DETAIL #07 SCALE N/A REVISION DATE 04-24-2016



TO CUSTOMER'S CABINET,
PANEL OR SWITCHGEAR

Notes:
See Detail #03 for mounting heights requirements.

ROLLA MUNICIPAL UTILITIES 102 WEST 9TH STREET ROLLA, MISSOURI 65401	
THREE PHASE INSTALLATION 600 AMPERES SELF CONTAINED METER 120/208 OR 277/480 VOLT – 4 WIRE A.C.	
Rolla Municipal Utilities · RMU · People You Know. Service You Trust	ELECTRIC SPECIFICATIONS DETAIL #08 SCALE N/A REVISION DATE 01-24-2015



EQUIPMENT FURNISHED BY RMU:

1. Meter socket, 13 terminal. Select from Section 4 of specifications. Socket is mounted by customer.
2. Current Transformers, mounted by customer.
3. (X) Polarity marks, should always be on the line side.
4. See Section 4 of specifications for meter loop wire pack.

EQUIPMENT FURNISHED BY CUSTOMER:

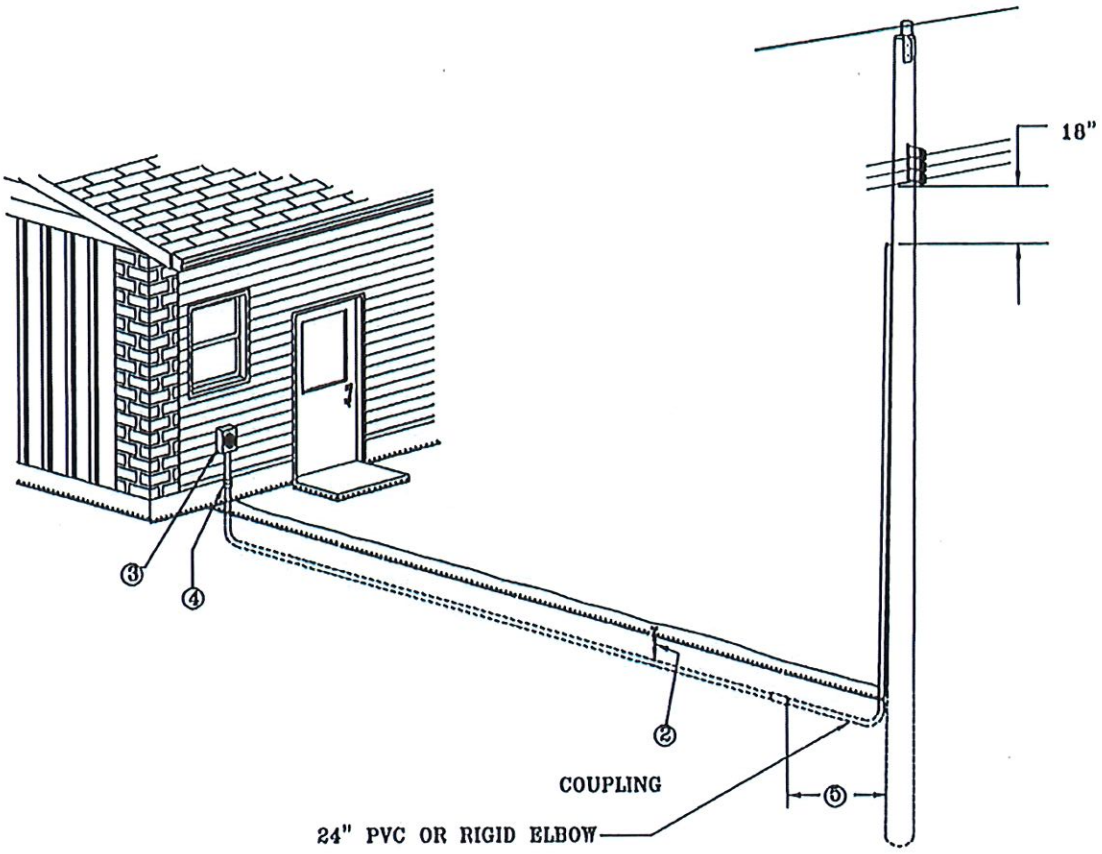
5. Current Transformer Enclosure, for size refer to Section 4 of specifications. No connections in this compartment except for metering.
6. Approved ground and connection for grounding to lug or strip.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

THREE PHASE 4 WIRE INSTALLATION
OVER 600 AMPERES METERED WITH CURRENT TRANSFORMERS
120/208 OR 277/480 VOLTS A.C. SERVICE

ELECTRIC SPECIFICATIONS
DETAIL #00

SCALE N/A REVISION DATE 04-24-2015



Notes:

1. Customer shall supply all materials necessry for underground service with the exception of the meter socket, including wire and the conduit up the pole. All exposed conduit, on utility poles, shall be rigid galvanized steel. Conduit attached to the pole shall rise to a point which will be determined by RMU.
2. Minimum burial depth is 24". In rock or untrenchable soil depth may be reduced to 18". Between 18" and 12" cover with 2" of concrete. Depths less than 12" are not permitted.
3. For meter socket mounting height see DETAIL #03.
4. See DETAIL #13 for installation instruction and material requirements.
5. Service conduit shall terminate a nominal distance from the terminal pole. The riser bend between this point and the pole shall be rigid conduit.
   A. The location where the riser will be located on the pole (quadrant and height) shall be obtained from RMU.
   B. Where customer is to extend riser bend to a pole location requiring pole setting, or alteration by RMU, such extension shall not be made until pole work is completed by RMU.
   C. Conduit seals on customer service conduit are his responsibility and should be accomplished at the building wall.
6. There shall be a maximum of 3-90°, minimum 24-inch radius rigid or Schedule 40 PVC bends for any installation.
7. All material and installation shall be in accordance with Rolla City Codes. RMU will make final connection at the pole after applicable building/wiring inspection is made.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

RESIDENTIAL UNDERGROUND LINES

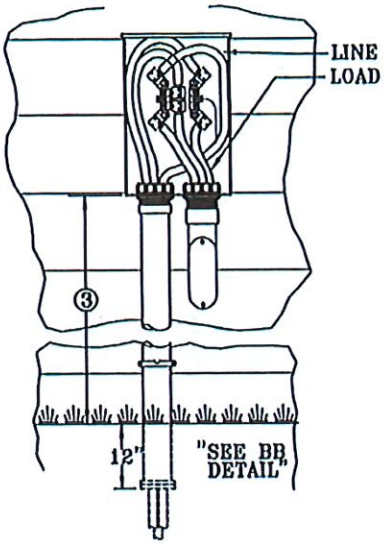
CUSTOMER OWNED AND INSTALLED
SERVICE CONDUIT CONNECTION TO OVERHEAD

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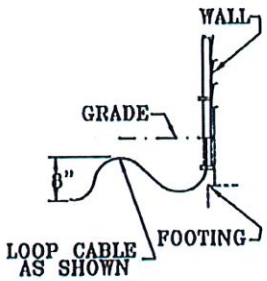
ELECTRIC SPECIFICATIONS
DETAIL #10

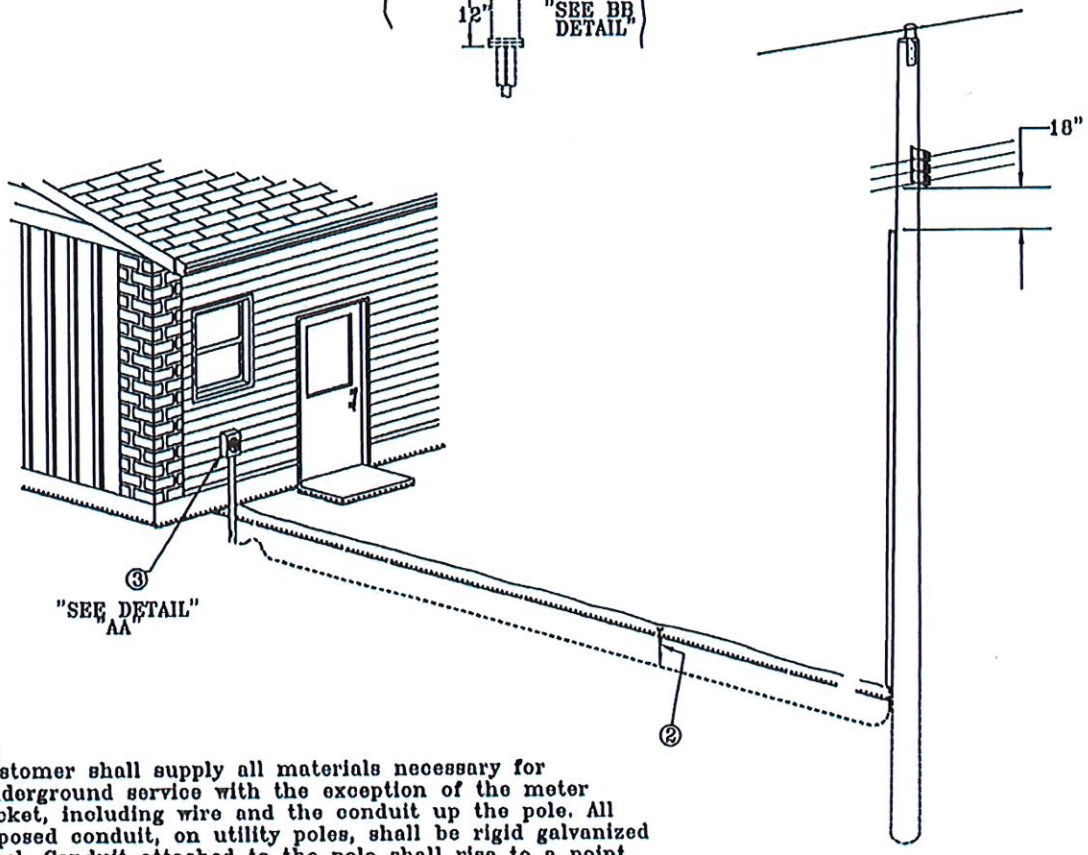
SCALE N/A REVISION DATE 04-24-2015

"AA DETAIL"



"BB DETAIL"





Notes:

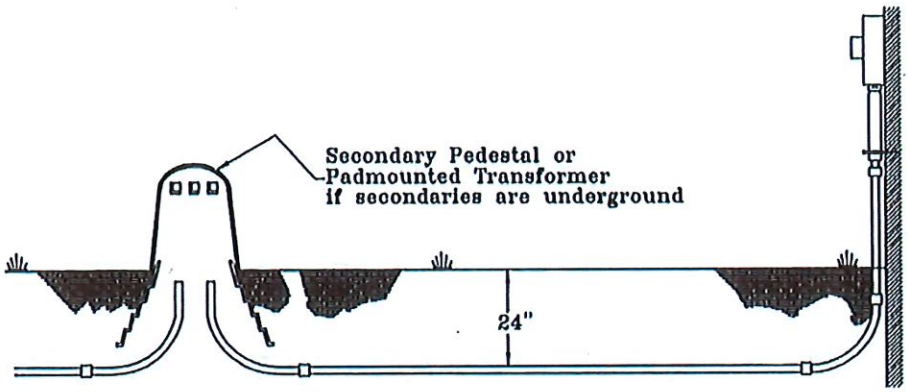
1. Customer shall supply all materials necessary for underground service with the exception of the meter socket, including wire and the conduit up the pole. All exposed conduit, on utility poles, shall be rigid galvanized steel. Conduit attached to the pole shall rise to a point which will be determined by RMU.
2. Minimum burial depth 24", See National Electric Code Table 300.5 for exceptions.
3. For meter socket mounting height see DETAIL #03.
4. All service cable is to be provided by the customer and installed from the meter base to a point on the riser pole which will be determined by RMU. Cable shall be of sufficient length to allow connection to RMU secondary.
5. Sizes determined by service capacity installed.
6. Approved ground required.
7. All material and installation shall be in accordance with Rolla City Codes. RMU will make final connection at the pole after applicable building/wiring inspection is made.
8. See DETAIL #13 for required meter socket and riser attachment.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

RESIDENTIAL UNDERGROUND LINES
CUSTOMER OWNED AND INSTALLED
DIRECT BURIED SERVICE CABLE CONNECTION TO OVERHEAD

ELECTRIC SPECIFICATIONS
DETAIL #11

SCALE N/A REVISION DATE 04-24-2015



Notes:

1. Customer installed conduit shall be installed along the shortest route and the number of bends shall be dept to a minimum. There shall be a maximum of three (3) 90°, 24-inch radius bends for any installation. All sections shall be securely fastened together using standard grade cement. Minimum burial depth is 24". In rock or untrenchable soil, depth may be reduced to 18". Between 18" and 12" the conduit shall be covered with 2" of concrete. Depths less than 12" are not permitted.
2. The trench bottom shall be undisturbed, firm and uniform for its entire length. If it is impossible to achieve uniformity in the trench bottom it must be over-excavated 4 to 6 inches and the bottom refilled with good quality, properly compacted bedding material. Approved materials: sand, limestone screenings, concrete slurry, concrete.
3. Minimum bend radius is 24".
4. Conduit seals on customer service conduit are his responsibility and should be accomplished at the building wall.
5. See DETAIL #13 for required meter socket and riser attachment.
6. For meter socket mounting height see DETAIL #03.
7. If RMU installed equipment is not in place, the location where it will be installed shall be obtained from RMU. The end of the customer installed conduit shall be sealed.
8. Approved ground required.
9. Expansion couplings shall be installed installed so that the inner sleeve is on the bottom of the expansion coupling.
10. All material and installation shall be in accordance with Rolla City Codes. RMU will make final connection after applicable building/wiring inspection is made.

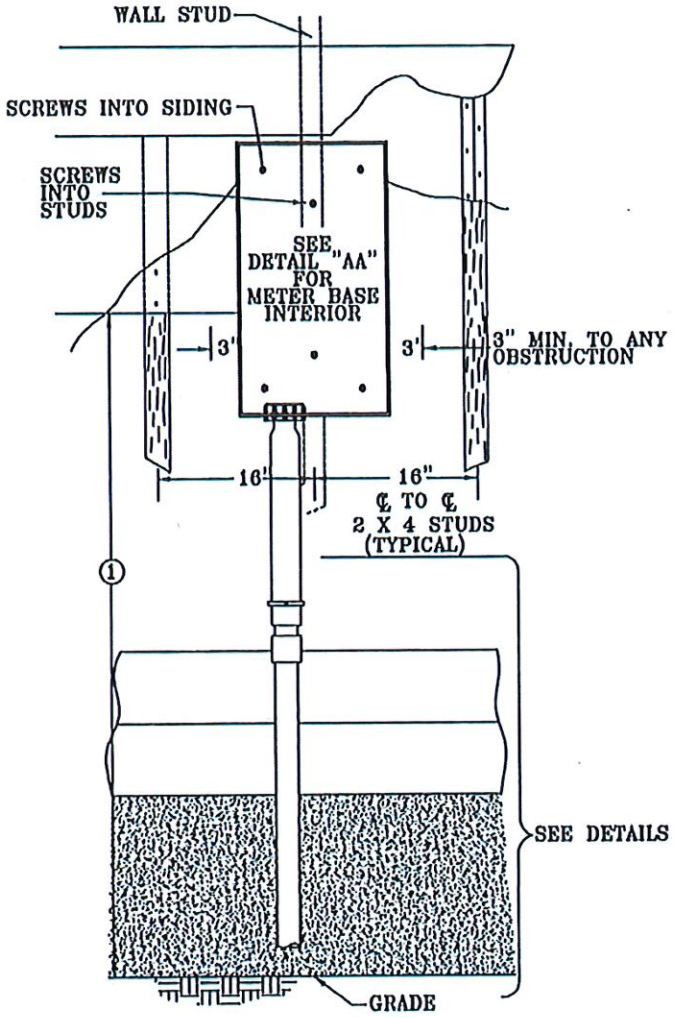
ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

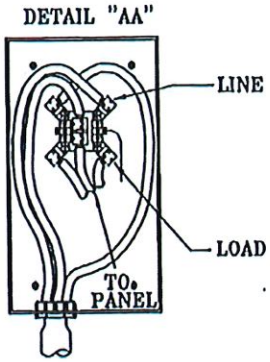
RESIDENTIAL UNDERGROUND LINES
CUSTOMER OWNED AND INSTALLED
SERVICE CONDUIT CONNECTION TO PEDESTAL OR TRANSFORMER

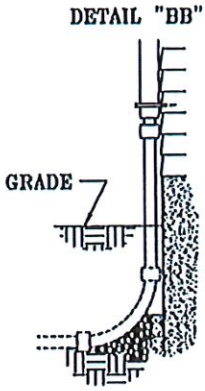
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ELECTRIC SPECIFICATIONS
DETAIL #12

SCALE N/A REVISION DATE 04-24-2015







Notes:

1. All materials except the meter base shall be furnished, installed and connected by the customer.
2. See DETAIL #03 for meter mounting height.
3. Where subject to mechanical damage, provide protection.
4. To properly secure the meter socket use #14x3" wood screws. In brick use expansion shields and lag screws.
5. See DETAIL #10, #11 and #12 for additional service conduit instruction.
6. The conduit hanger shall be secured by a lag screw into the floor joist. If attached to the foundation, a lead expansion shield shall be used. An alternative to the expansion shield is a stud shot into the foundation.
7. Expansion coupling, bends and couplings shall be used. The expansion coupling shall be installed so that the inner sleeve is on the bottom of the expansion coupling. When backfilled, expansion coupling shall be fully closed.
8. The area underneath the bend shall consist of good qualtiy fill material and dirt free of debris. The area shall be compacted to a density in excess of 90% of the soil density outside the disturbed area around the foundation wall. Acceptable fill materials: sand, limestone screenings, concrete slurry, concrete.
9. All exposed conduit shall be rigid galvanized steel, or schedule 40 PVC.
10. Approved ground required.
11. All materials and installation shall be in accordance with Rolla City Codes. RMU will make final connection after applicable building/wiring inspection is made.

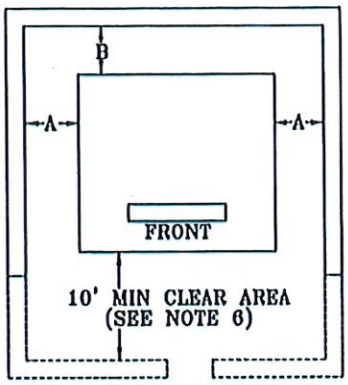
ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

EQUIPMENT CONNECTIONS
SERVICE CABLE AND METER CONNECTIONS
SINGLE FAMILY DWELLINGS

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ELECTRIC SPECIFICATIONS
DETAIL #13

SCALE N/A REVISION DATE 04-24-2015



KVA	A	B
0-167, 1Ø DEADFRONT	30"	30"
112 1/2 THRU 300, 3Ø	30"	35"
500 & 750, 3Ø	45"	43"
1000 THRU 2500, 3Ø	44"	56"

Notes:

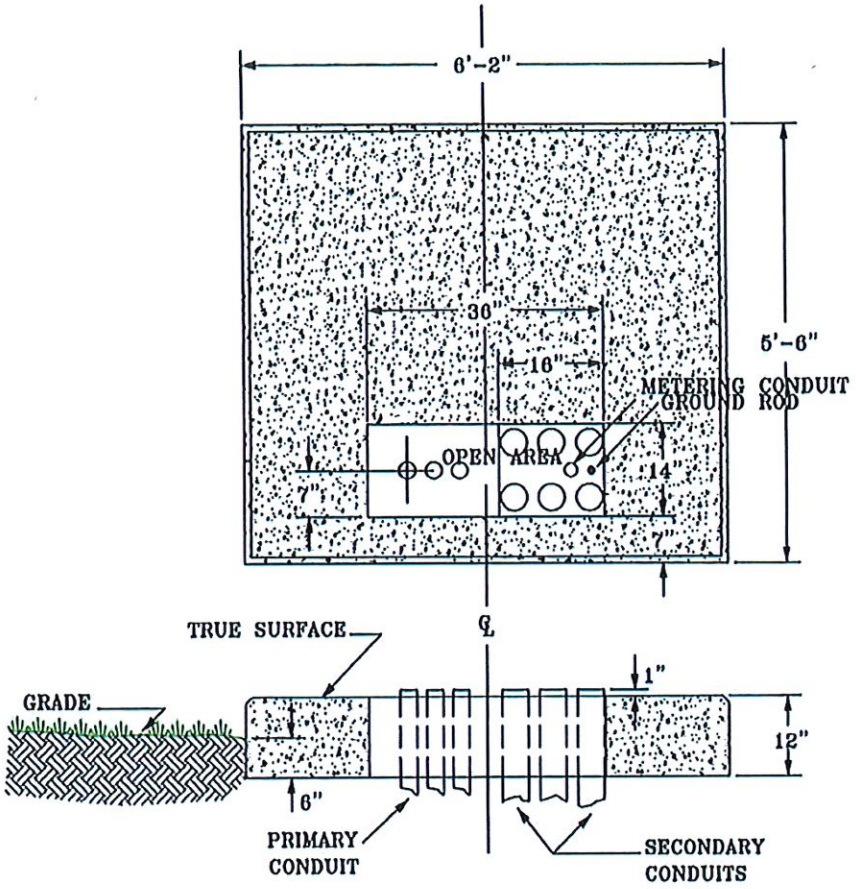
1. This drawing covers clearances for pad mount transformers installed at ground level.
2. Developer to provide drainage away from enclosed areas to prevent oil and/or water from standing.
3. If a 4 sided enclosure is used, an opening or doorway shall be provided. If a lock is required, provisions shall be made to provide RMU access.
4. If a 4 sided enclosure is used, a minimum of 10 square feet of venting space in the form of 50% effective louvers of 5 square feet of openings shall be provided, to be located along the bottom of each wall. If a 3 sided wall is used, wall venting space is desireable, but not required.
5. If pad mount is enclosed on all sides, 10' minimum clearance from the front of the transformer to inside of wall must be maintained for hot stick operations.
6. The 10' distance between the front of the pad and the wall may be reduced to 48" if an opening or gate is provided. The opening or gate should be centered on the front of the pad and should provide for a minimum opening of 3½' for 1Ø and 9⅓' for 3Ø installation. A 10' clear area in front of the pad must still be available with the opening or when the gate is open for hot stick operations.
7. Location must be accessible for installing or replacing transformer with lifting equipment.
8. To provide for transformer replacement, enclosed area is to be free of overhangs or overhead obstructions. Wall height not to exceed 6' unless the above mentioned gate or opening is provided or an easily removable wall is used.
9. Should upgrading be required, the dimensions as shown provide adequate ventilation and space for one size larger transformer.
10. Walls shown in drawing, but clearances are required for any obstruction, i.e. switchgear, dumpsters, etc.
11. For pad dimensions refer to DETAIL #15 and #16.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

PADMOUNTED TRANSFORMER CLEARANCE REQUIREMENTS

ELECTRIC SPECIFICATIONS
DETAIL #14

SCALE N/A REVISION DATE 04-24-2015



Notes:

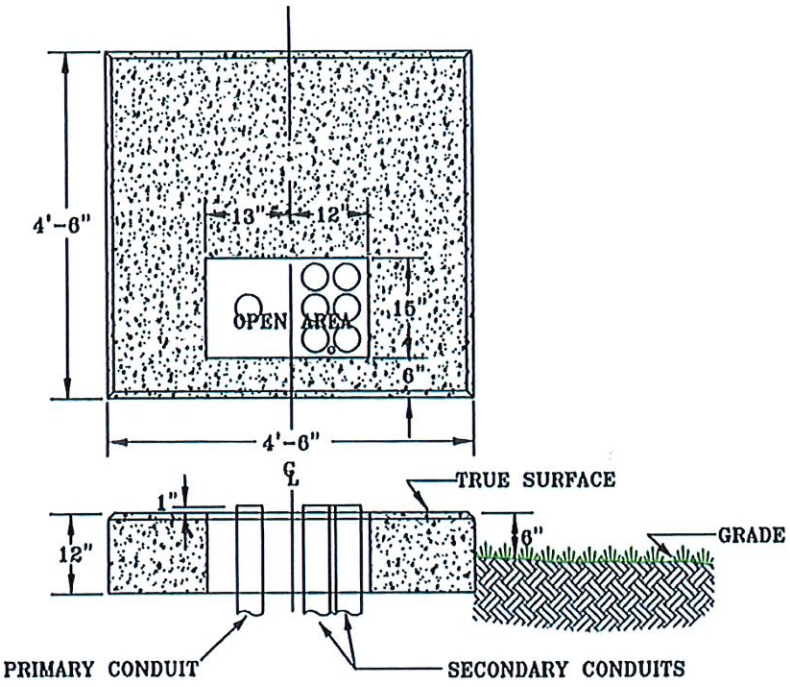
1. Primary conduits shall be 2-1/2" or 3" Rigid Galvanized Steel (RGS), or Schedule 40 PVC, using elbows of the long sweep (36") variety unless otherwise specified by RMU. Conduits will run directly to the riser pole and shall be buried at a depth sufficient to provide 48" of cover. Attach to pole with Unistrut and clamps.
2. All conduits above grade, on utility poles, shall be RGS.
3. Secondary conduits shall be symmetrically located within the 14"x16" area.
4. Reinforcing shall consist of a minimum of 1/2" (#4) reinforcing rods on 6" centers, each direction, 2" clear of the bottom.
5. Each metering conduit (1 per meter) shall be 1" rigid steel using elbows of the sweep variety. No LB type of elbow will be permitted. Meters shall be located on the outside of the building at a point approved by RMU.
6. Before concrete is poured or conduit is buried, approval by RMU must be obtained through inspection.
7. When so specified by RMU, bollard posts shall be installed.
8. Contractor shall be responsible for providing and installing the ground rod into undisturbed soil within the secondary area of the pad opening.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

THREE PHASE TRANSFORMER PAD
112 1/2 KVA THRU 750 KVA

ELECTRIC SPECIFICATIONS
DETAIL #15

SCALE N/A REVISION DATE 04-24-2015



Notes:

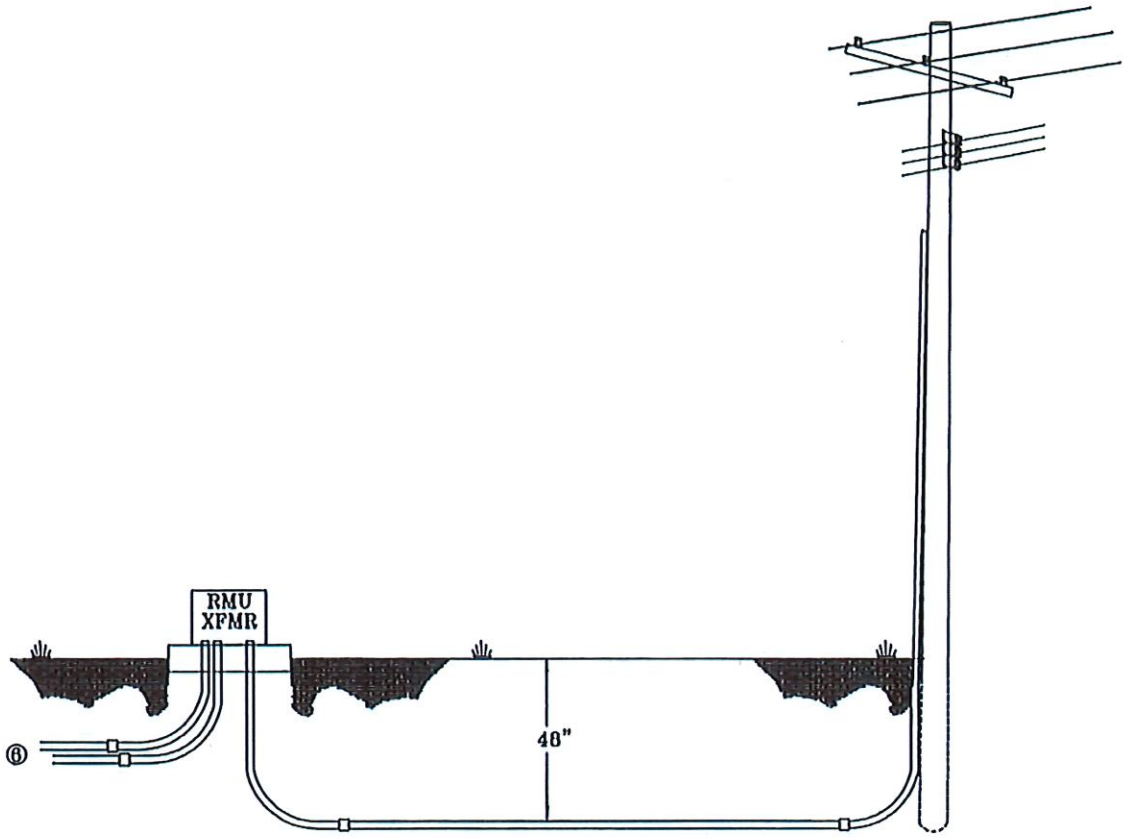
1. Primary conduit shall be 3" Rigid Galvanized Steel (RGS) or Schedule 40 PVC. All elbows shall be of the long sweep (36") variety. No LB type elbows will be allowed. Conduits shall be buried at a depth sufficient to provide 48" of cover.
2. All conduits above grade, on utility poles, shall be RGS.
3. Secondary conduits shall be symetrically located within the 12" x 15" area.
4. Reinforcing shall consist of a minimum of ½"(#4) reinforcing rods on 8" centers, each direction, 2" clear of the bottom.
5. Each metering conduit (1 per meter) shall be of rigid steel using elbows of the sweep variety. No LB type elbows will be allowed. Meters shall be located on the outside of the building at a point approved by RMU.
6. Before any concrete is poured or conduit is buried, an inspection by, and approval of RMU must be obtained.
7. When so specified by RMU, bollard posts shall be installed.
8. Contractor shall be responsible for providing and installing the ground rod into undisturbed soil within the secondary area of the pad opening.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

SINGLE PHASE TRANSFORMER PAD
15 KVA THRU 167 KVA

ELECTRIC SPECIFICATIONS
DETAIL #16

SCALE N/A REVISION DATE 04-24-2015



Notes:

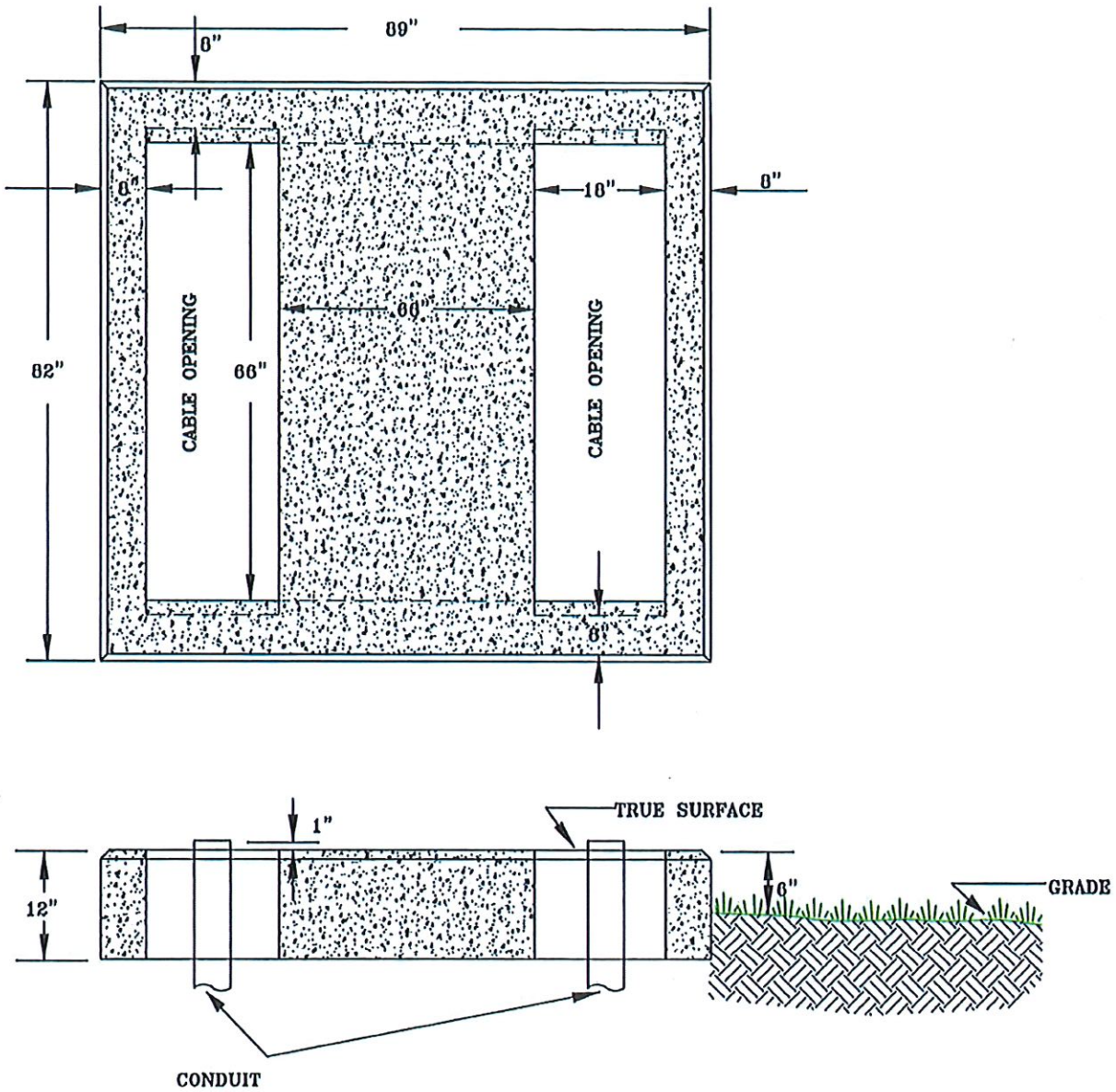
1. Customer shall supply transformer pad, see DETAIL #15 or #16, and primary conduit including the conduit up the pole. Primary conduit shall be 2-1/2" or 3". All conduit above grade, on utility poles, shall be Rigid Galvanized Steel (RGS). Conduit attached to the pole shall rise to a point which will be determined by RMU.
2. All elbows shall be of the (36")long sweep variety. No LB type elbows will be allowed.
3. Minimum burial depth is 48".
4. Conduit shall run directly to riser pole.
5. Before concrete is poured or conduit is buried, approval by RMU must be obtained through inspection.
6. Refer to DETAIL #12 for secondary requirements.

ROLLA MUNICIPAL UTILITIES
102 WEST 9TH STREET
ROLLA, MISSOURI 65401

UNDERGROUND PRIMARY LINES
CUSTOMER INSTALLED
CONDUIT TO OVERHEAD CONNECTION

ELECTRIC SPECIFICATIONS
DETAIL #17

SCALE N/A REVISION DATE 04-24-2015



Notes:

1. Reinforcing shall consist of a minimum of ½" (#4) reinforcing rods on 8" centers, each direction, 2" clear of the bottom.
2. Before any concrete is poured or conduit is buried, an inspection and approval by RMU must be obtained.
3. When so specified by RMU, bollard posts shall be installed.

ROLLA MUNICIPAL UTILITIES 102 WEST 9TH STREET ROLLA, MISSOURI 65401	
VFI-9 15/25 KV SWITCHGEAR PAD	
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	SCALE N/A REVISION DATE 04-24-2015