INFORMATION AND

REQUIREMENTS FOR

ELECTRIC SERVICE

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Issued by SHELD

2001 Edition

SOUTH HADLEY
ELECTRIC LIGHT DEPARTMENT
85 MAIN STREET
SOUTH HADLEY, MA 01075
(413) 536-1050

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TABLE OF CONTENTS

ARTICLE 100

GENERAL INFORMATION

101 - Purpose. "Information and Requirements for Electric Service," is issued to provide information to South Hadley Electric Light Department Customers, Electrical Contractors, Architects and Engineers, in order that electrical installations, to be connected to the Department's system may be made in a standard, uniform and proper manner. The requirements contained herein are supplementary to the Department's Schedule of Rates and Terms and Conditions filed from time to time with the Department of Telecommunications and Energy.

It is not intended that this booklet give complete coverage for wiring details and other lawful requirements. It has been prepared as a guide and is supplementary to the applicable National, State and Local Electrical Codes, Safety Code, OSHA requirements, and to ordinances passed by authorities having jurisdiction. The issuance of this booklet by the Department, shall not be construed as relieving the customer and/or his contractor from the responsibility of installing wiring in accordance with the Rules and Regulations published by authorities having jurisdiction, nor shall the Department be deemed thereby to have accepted any responsibility for the condition of the customer's wiring and equipment.

103 - Scope. The information contained in this booklet applies primarily to electric service requirements for installations at voltages not exceeding 600 volts. Certain parts of these requirements refer to voltages above 600 volts. However, service installations at higher voltages are subject to and governed by other requirements.

105 - Effective Date and Revisions. This issue of "Information and Requirements for Electric Service" is effective at once for all new construction, with reasonable allowance for the completion of work in progress or already under contract.

Revisions of this information will be made when necessary and the Department reserves the right to make such revisions. The Department cannot guarantee to give notice of revisions to persons who may have received this book.

107 - Enforcement of Rules. The Department requires that all wiring intended for connection to its electric system shall be installed in accordance with the rules of the applicable National, State and Local Electrical Codes and with the laws and ordinances of State and Town authorities having jurisdiction over the area in which the work is located, and with the requirements set forth in the succeeding pages of this booklet.

All connections to the Department's system shall be designed, installed and operated in a manner that will not cause undue disturbance to other customers, and shall not handicap the Department in maintaining proper system conditions.

The Department reserves the right to refuse to connect and/or the right to disconnect a service where the customer's installation does not comply with the provisions and requirements outlined above.

109 - Access to Department Installations. The Department requires the right, at reasonable times, to enter the premises of the customer for the purpose of erecting, removing, operating or maintaining its facilities, including the reading and testing of its meters.

111 - Advisory Service. The Department offers an advisory service to all customers, architects, contractors and engineers, to assist them in obtaining installations, which conform to the requirements of the Department.

All persons are encouraged to avail themselves of the advisory services of the Department with respect to applications of power, electric heating, lighting, water heating, etc. Such advice may avoid delays and result in greater satisfaction and more efficient use of electrical service.

Although the Department endeavors to keep informed of conditions under which customers use electricity, it is expected customers will check their use against available rates, or request the Department to do so, as the Department does not guarantee any particular rate to be the most favorable.

However, neither by inspection, nor by the rendering of an advisory service, nor in any other way, does the Department give any warranty, expressed or implied, as to the adequacy, safety, or other characteristics of any equipment, wires, appliances, or devices owned, used or maintained by customers.

113 - Excavations in Roads and Highways. All contractors, municipal departments and other utility companies who may have the necessity to excavate in roads or highways and where the possibility exists that there may be underground electric cables in the area should provide a minimum of two working days notice to the Department of their intent to excavate.

Upon request, drawings will be made available that show the approximate location of underground ducts and cables, if present.

The Department is also a participant in the "DIG SAFE" Program (Utility Underground Plant Damage Prevention System).

Prior to any excavation work, the "DIG SAFE" call-center should be contacted at their toll-free number in Massachusetts, 1-888-344-7233. Refer also to Chapter 82, Section 40A of the General Laws of Massachusetts included in Appendix.

115 - Construction in the Proximity to Overhead Conductors. General contractors, electrical contractors, electricians, their employees, and other persons performing work in proximity to the Department's overhead lines, must take the precautions and observe the prohibitions prescribed by federal and state law when working or using any tools, machinery, or construction equipment near these lines.

The applicable federal provisions, regarding minimal approach distances, are set forth in the regulations of the Federal Occupational Safety and Health Administration (OSHA) at 29 CFR 1926.550(a)(15) and 29 CFR 1910.333(c), which are reproduced in the back of this booklet.

In addition to these federal regulations, Massachusetts General Law, Chapter 166, Sections 21A-21G prohibit anyone from performing any type of work "*within six (6) feet of any overhead high voltage lines*" without having promptly notified and made satisfactory arrangements with the appropriate utility company. These laws apply only to persons or entities not covered under OSHA jurisdiction.

In every case in which work needs to be performed near electrical lines, the Department must be contacted prior to the beginning of the work.

117 - Diversion of Electrical Energy. A diversion of electrical energy is any method or device used by any person to unlawfully and intentionally prevent or interfere with an electric meter from duly registering the quantity of electricity supplied by the Department and/or any unlawful or intentional taking of any electrical current from any wire of the Department without the consent of said Department.

Where there is evidence of meter tampering or theft of electrical energy, such person or persons responsible shall be liable for prosecution under penalty of law.

The applicable laws in Massachusetts are as follows:

Massachusetts General Laws Annotated: (As Amended)
Chapter 164, Section 127 & 127A
Chapter 266, Section 30
Chapter 266, Section 127

Excerpts from the above General Laws are printed in the Appendix of this booklet.

119 - Use of Electricity. The Department shall not be liable for damage to the person or property of the Customer or any other persons resulting from the use of electricity or the presence of the Department appliances and equipment on the Customer's premises.

121 – Safety – The First Priority. South Hadley Electric Light Department (SHELD) is dedicated to making safety its top priority. While the items listed below require particular attention, customer safety, property and the safety of employees, will always be our first concern.

A. Any contact with our wires may cause serious injury or death. Treat all downed, hanging or burning wires as though they are "LIVE" – energized – and stay away from them. Do not regard the covering, which may be observed on our wires, as insulation.

B. Report any downed, hanging or burning wires to SHELD at 413-536-1050 or the police or fire department.

C. Massachusetts state law requires contacting "DIG SAFE" three (3) full working days prior to doing any excavation, digging holes, or driving posts regardless of whether it is within the street or on private property. Obtain information by calling 1-888-344-7233.

D. Equipment, such as ladders, scaffolding, etc., regardless of what they're made of, can become electrified if brought in contact with wires. Use extra caution when installing siding, painting, cleaning gutters or other reasons to work near our facilities.

E. Swimming pools and spas must not be installed beneath our overhead facilities or above our underground facilities in accordance with code.

F. Proper installation of generators is essential to avoid electrical source feeding back into our lines and endangering unsuspecting utility workers.

G. Antennas, banners, customer lighting, signs or similar customer equipment shall not be attached to our poles.

123 – Working Clearances Around Padmounted Equipment. – Clearances around padmounted equipment shall be maintained in accordance with *Figure* 1. These clearances are required in order to be able to operate and maintain the equipment. Obstructions can cause delays when restoring electric service.

NON-TEXT PAGE

ARTICLE 200

APPLICATION FOR SERVICE

201 - Where and When to Apply. Application forms for requesting electrical service in the Town of South Hadley can be obtained at the South Hadley Electric Light Department, 85 Main Street, South Hadley, MA 01075. These forms are required to be filled out for temporary services, permanent services or changes to existing services. A sample of this form is attached at the end of Article 200. *See Article 217 for an electric service checklist.*

It is essential that an application for new or additional service, or notification of changes in the present service be made as early as possible so that engineering and construction details, when required, may be arranged and construction for the new or changed facilities may be completed on the date required.

203 - Availability of Service. Before ordering any electrical equipment, or starting any electrical construction preparatory to connection to the Department's electrical system, the customer should check with the Department to make sure that the desired service and/or additional capacity is available.

The Department does not accept responsibility for information given orally relative to the type of service available at specific locations unless such information is confirmed in writing by an authorized representative of the Department.

205 - Additional Loads and/or Alteration of Service. Department facilities are designed to meet the customer's initial requirements at the time the service is installed. When an

additional load is contemplated, the Department should be notified as early as possible so that proper provisions can be made to furnish the additional service. Failure to notify the Department of an increase in load, may result in improper billing, burning out of apparatus, or serious interruption to service.

Whenever changes are made in existing service installations involving relocation, replacement or additions, the entire service installation may require rebuilding to conform with the present requirements of the Department and of the applicable Electrical Codes. Decision as to the actual changes required in any specific case, will be determined by consultation with the Department and with the Municipal Inspector.

In some instances, there may be a charge by the Department for a service relocation. Contractors requesting these charges for bidding purposes shall submit necessary information at least three weeks prior to date charges are required.

207 - Customer Cost. Information relating to the portion of the service construction cost, if any, to be paid for by the customer will be supplied by the Department. Customers should request this information before ordering equipment or starting construction.

209 - Rates. The Department, as noted in *Section 111*, is prepared to assist in the selection of the available rate or rates best suited to the customer's use or uses of electricity. It is strongly urged that the customer take advantage of this assistance before starting any wiring.

Copies of the Department's Schedule of Rates are available upon request at the Department's office.

211 - Inspection Certificates. The Department is not allowed to energize wiring until approval has been issued by the Municipal Wiring Inspector.

213 - Temporary Service and Installation Charges. "Temporary Service" is any service for a construction project, temporary display, etc. that is not expected to continue in use for a period long enough to justify a permanent service installation. For Temporary Service, the customer will pay an amount equal to the cost of installing and removing the Department's service facilities, plus the cost of non-salvageable material used. Estimates of these charges will be furnished by the Department on request. The final bill rendered for the work will be the actual cost unless prior arrangements are made to use the estimated cost. The customer shall contact the Department for estimated temporary service charges.

215 - Condition of Service. The Department shall not be liable for, or in any way in respect of, any interruption, abnormal voltage, discontinuance or reversal of its service, due to causes beyond its immediate control whether by accident, labor difficulties, condition of fuel supply, the attitude of any public authority, or failure to receive any electricity for which in any manner it has contracted, or due to the operation in accordance with good utility practice of any emergency load reduction program by the Department or one with whom it has contracted for a supply of electricity, or inability for any other reason to maintain uninterrupted and continuous service; provided, however, that if the Department is unable for any of the causes enumerated above to supply electricity for a continuous period of two days or more, then upon request of the Customer, the Demand Charge, if any, shall be suspended for the duration of such inability.

217 – Request for Electric Service Checklist. – When we receive the "Request for Electric Service", we will determine the type of service, based on your location and the size and character of the proposed load.

Reminder Lists for Upgrades and New Services

Have you:

- Submitted a "Request for Electric Service" via phone, internet, fax or in person and received a Customer Request System confirmation number
- Provide us with an existing meter number (if applicable)
- Obtained all local permits
- Received approval for custom, combination or instrument transformer metering equipment
- Discussed the routing and location of the service with a technician
- Discussed the need for steel sweeps in the conduit system (if applicable)
- Coordinated with other utilities
- Received an approved meter location
- Paid all applicable charges, if required
- Notified Dig Safe
- Installed service entrance equipment
- Installed an approved meter socket with optically clear cover
- For a conduit system, install UL listed slip joint, sweeps, and ¼" pulling line or MULETAPE®
- Permanently marked each meter socket and load disconnect with its unique identification
- Established a safe work space in front of each meter location
- Called the local inspecting authority for inspection/approval
- Confirmed that service locations and meter locations meet requirements of this booklet

REQUEST FOR ELECTRIC SERVICE

SOUTH HADLEY ELECTRIC LIGHT DEPARTMENT
85 MAIN ST , SOUTH HADLEY, MA. 01075
TEL 413-536-1050 FAX 413-538-6067

THIS FORM MUST BE COMPLETED AT LEAST 7 DAYS PRIOR TO START OF WORK

JOB LOCATION

BUILDING NO.	LOT NO.	POLE/PAD/H.H.	EXISTING METER NO(S).	METER NO.	METER NO.

STREET	CROSS STREET

JOB DESCRIPTION

SERVICE TYPE ☐ CHANGE ☐ NEW ☐ TEMPORARY ☐ OTHER	PERMIT NO.	TYPE OF BUILDING ☐ NEW ☐ EXISTING ☐ ADDITION

TYPE OF USE ☐ COMMERCIAL ☐ INDUSTRIAL ☐ RESIDENTIAL ☐ SUBDIVISION	EXISTING SERVICE OR PROPOSED SERVICE ☐ OVERHEAD ☐ UNDERGROUND

SWITCH SIZE (AMPS)	NO. OF METERS REQ.	DESCRIPTION OF WORK:

CONTRACTOR INFORMATION

FIRST NAME	MI	LAST NAME	MA ELECTRICAL LIC. NO.	TYPE ☐ A ☐ E

BUSINESS NAME	TELEPHONE NO.	FAX NO.

ADDRESS (NO. & STREET)	CITY/TOWN	STATE	ZIP CODE

CUSTOMER INFORMATION

FIRST NAME	MI	LAST NAME	EXISTING METER NO.

BUSINESS NAME	TELEPHONE NO.	FAX NO.

ADDRESS (NO. & STREET)	CITY/TOWN	STATE	ZIP CODE

BILLING ADDRESS - IF DIFFERENT THAN CUSTOMER INFORMATION ABOVE

ADDRESS (NO. & STREET)	CITY/TOWN	STATE	ZIP CODE

SERVICE DATA

PRIMARY HEAT ☐ OIL ☐ GAS ☐ ELEC ☐ OTHER	CENTRAL AC ☐ YES ☐ NO	WATER HEATING ☐ OIL ☐ GAS ☐ ELEC ☐ OTHER

PHASE	WIRE	VOLTAGE	CONDUCTOR SIZE & NO. OF SETS

LOAD BREAKDOWN		KW CONNECTED
Lighting		
Motors (Except AC)		
Air Conditioning		
Electric Heat		
Electric Heat Pump		
Largest Motor	HP	

*** NOTE ***

ALL WORK TO BE DONE IN ACCORDANCE WITH SHELD SPECIFICATIONS REFERENCE "INFORMATION AND REQUIREMENTS FOR ELECTRIC SERVICE"

SAMPLE
REQUEST FOR ELECTRIC SERVICE FORM

NON-TEXT PAGE

ARTICLE 300

SERVICES

301 - General. Alternating current, 60-Hertz (cycles per second) service is supplied by the Department. The nominal voltages supplied are described in Section 303.

303 - Standard Service Characteristics. The characteristics and nominal voltages of the various forms of service commonly supplied by the Department are as follows:

A. 120/240 volts, single-phase, three-wire.
B. 208/120 volts, three-phase, four-wire wye.
C. 480/277 volts, three-phase, four-wire wye.
D. 120/208 volts, single-phase, three-wire.

Voltages other than the above, including primary voltages, may be available at the option of the Department.

305 - Number of Services Per Building. Generally, one service will be installed to a building. Two or more services may be installed at the option of the Department, and if approved by the inspection authority having jurisdiction.

307 - Electricity Delivered Through More Than One Meter. Where electricity is delivered through more than one meter, the cost of service delivered through each meter will be computed separately.

309 - Customer Requirements. Customers requiring in excess of 75 KVA of transformer capacity may be required to supply space for electrical equipment on private property.

311 - Unbalanced Load. The Customer shall at all times take and use energy in such a manner that the load will be balanced between phases to within 10%. The Department reserves the right to require the Customer to make necessary changes at his expense to correct the unbalanced condition.

312 – Unusual Conditions. We may refuse to supply electric services to loads, which have characteristics, which might adversely affect the supply to other customers, such as harmonic distortion, voltage fluctuations, noise or low power factor.

313 - Department Warranty Statement. For all voltages and services, the Department will cooperate with its customers or their representatives. However, neither by inspection, nor by the rendering of advisory service, nor in any other way does the Department give any warranty, expressed or implied, as to the adequacy, safety, or other characteristics of any equipment, wires, appliances, or devices owned, used or maintained by customers.

315 - Customer's Emergency Stand-By (Non-Parallel) Generator. The Customer must notify the Department in advance of installing stand-by generating equipment and obtain approval for the method of connection. Where the Customer installs a stand-by generator for the purpose of supplying all or part of the load in the event of an interruption in the supply of Department service, the Customer's wiring shall be arranged so that no electrical connection can occur between the Department's service and the Customer's other source of supply. This will require the installation of a double-throw switch that has a visual opening. This transfer scheme must meet the non-parallel requirements established by the Department. See *Figure* 2 in Section entitled "Illustrations".

Where automatic throw-over switching is installed, the Customer shall provide a load-break isolation switch in combination with each automatic transfer switch. The isolation switch shall provide a visible, lockable means for manually isolating the emergency generator. The Department will tag the isolation switch in a locked open position during maintenance or repair of the Department's supply lines.

Arrangements utilizing interlocking of single-throw devices are not acceptable.

Customer’s on-site generator and fuel storage are often located adjacent to Department padmounted transformers for ease in using the same trench to the electrical room. The Department requires protection between the transformer and the generator fuel storage unit, by either a twenty (20) foot separation or a masonry wall. This wall should be erected parallel to and located three (3) feet from one side of the padmounted transformer foundation. The wall should be six (6) feet high and extend approximately three (3) feet beyond each end of the transformer foundation. See *Figures 2 and 3*. Exact details for such application shall be supplied to the Department for approval.

317 - Customer's Auxiliary Generation. Prior to the installation of solar, wind turbine, fuel cell or other auxiliary generation intended to operate interconnected with the Department, customers shall notify the Department to ensure proper interfacing. There are precautions that must be taken to maintain adequate safety and quality of service to other customers. The Customer will be required to provide protective and synchronizing equipment.

Customers wishing to sell electric energy shall consult with the Department regarding its purchase policy.

319 - Customer's Cogeneration. A cogeneration facility is defined as a facility that produces electric energy and steam or forms of useful energy (such as heat), which are used for industrial, commercial, heating or cooling purposes. Prior to the design and installation of any equipment, a Customer considering a cogeneration installation shall consult with the Department regarding its policy.

321 - Final Connections. The Department will connect the customer's wiring to Department facilities for permanent or temporary services and it will not permit or tolerate unauthorized persons to connect to Department conductors or equipment. Exception No. 1, the Department will permit electrical contractors and electricians (herein jointly called "electricians") holding an Electrician's license issued by the Commonwealth of Massachusetts to cut and reconnect residential services in order to expedite work requested by customers. **Homeowners are not authorized to cut and re-connect electric services.**

SCOPE: Services to be cut and reconnected are limited to two-wire 120 volt or three-wire 120/240-volt single-phase overhead residential service, 200 amps or less.

PROCEDURE:

1. The electrician shall complete the Department's form, Request for Electric Service, and note: "This Work Involves Cut and Reconnect". To avoid possible code violations or non-conformance with Department requirements, the electrician must contact the Department at least seven (7) days prior to starting work.

2. The electrician shall obtain a wiring permit from the local authority.

   Failure to work steps 1 and 2 may result in additional corrective work and expense for the electrician.

3. The Department will:
   - designate the new service and meter location
   - furnish socket meter cover
   - furnish and install necessary service connectors

4. The electrician shall install the new service entrance.

5. The electrician shall have the new service entrance inspected by the local electrical inspector.

6. Following the inspector's approval, the electrician shall install jumpers and cover the meter socket(s).

7. The electrician shall connect the new service to the live ends of the Department’s service drop using appropriately sized split-bolt connectors.

8. The electrician shall advise the Department within one business day of the job's completion.

9. The electrician shall be responsible for the careful removal and must either (a) return the old meter(s) to the Department within fifteen (15) days or (b) leave the meter outside near the new service entrance.

10. The Department shall visually inspect the work and install the necessary meter(s).

11. The Department will take the following action when any of the foregoing steps are not followed.

    First Violation. The Department will send a warning letter to the electrician describing the violation with a copy to the local town or municipal authority having jurisdiction.

    Second Violation. The Department will send a letter to the State Licensing Board advising them of the problems with this particular electrician.

The Department will connect the Customer's wiring to Department facilities for permanent or temporary services and it will not permit or tolerate unauthorized persons to connect to Department conductors or equipment.

323 - Secondary Surge Arresters. Secondary surge protective devices may be installed by and at the expense of the Customer. For protection to be effective, such devices should be connected to the service-entrance conductors and bonded to the metallic water-piping system, the raceway system, the grounded service conductor at the service-entrance equipment, and any metallic drainage system.

Where the service is 750 volts or less, the surge arrester may be mounted on the service-equipment enclosure.

The Customer shall be responsible for providing and installing any secondary surge protective devices and for operating, maintaining, and inspecting any such installations. The Department will not be responsible for the operation, maintenance or inspection of a Customer's installation or for damage to a Customer's equipment resulting from voltage surges, which may occur on the Customer's wiring.

325 - Short-Circuit Currents. So that architects, engineers, and contractors may select proper service equipment to meet Code requirements for short-circuit ratings, the following will apply to new installations served:

A. Residential - supplied at 120/240 volts from overhead or URD single-Phase transformers.

   Fault currents available at residential service equipment will generally be more than 5,000 amperes, but less than 10,000 amperes.

B. Commercial, Industrial and Apartment Complexes - Available fault currents will vary with each installation. Inquiries for a particular location should be directed to the Department.

NON-TEXT PAGE

ARTICLE 400

SERVICE INSTALLATIONS FROM DEPARTMENT FACILITIES

401 - Secondary Services - Overhead. In cases where overhead services of 400 amperes capacity or less are supplied from a transformer(s) on a pole, the service drop will be supplied and installed by the Department.

Customers requiring secondary overhead services larger than 400 amperes capacity, are responsible for all secondary wiring and transformer bus wiring including any necessary transformer lugs and/or connectors starting at the secondary terminals of the transformers. Transformer lugs and connectors shall be as specified by the Department and shall be installed by the Department.

403 - Maximum Spans for Service Drops. The maximum distance the Department will run a single-phase, #2 or 1/0 aluminum (100 ampere or 200 ampere) service-drop is 125 feet. This distance is measured from the Department's designated pole to the point of attachment on the building. For single-phase services larger than 200 amperes and all three-phase services, the Department should be consulted.

Conditions at a particular location may alter the maximum permissible span.

405 - Point of Attachment and Clearance. The service-drop shall be attached to the building or other structure at a suitable point, determined by the Department. The service-drop shall be accessible from a ladder without climbing on a roof and shall be at a height to permit the following minimum clearances.

A. Vertical Clearances From Ground. All wiring for service-drop conductors, including the drip loop, when not in excess of 600 volts, shall have the following clearance from final grade.

10 Feet - At the electric service entrance to buildings, measured from final grade or other accessible surface only for service-drop cables supported on and cabled together with a grounded bare messenger and limited to 150 volts to ground.

12 Feet - For those areas listed in the 15-foot classification when the voltage is limited to 300 volts to ground.

15 Feet - Over residential property and driveways, and those commercial areas not subject to truck traffic.

18 Feet - Over public streets, alleys, roads, parking areas subject to truck traffic, driveways on other than residential property, and other land such as cultivated, grazing, forest, and orchards traversed by vehicles. See *Figures 4 and 5.*

B. Clearance Above Roofs. In general, secondary service-drop conductors shall not pass over roofs. When this is unavoidable, conductors shall have a vertical clearance of not less than 8 feet from all points of roofs above, which they pass. The following reduced clearances shall be permitted where the voltage between the conductors does not exceed 300:

3 Feet - Above a roof that has a slope of not less than 4 inches in 12 inches.

18 Inches - Above only the overhanging portion of the roof if not more than 4 feet of service-drop conductors pass over the overhang and they are terminated at a through-the-roof raceway or approved support.

C. Clearance from Building Openings - Service conductors shall have a clearance of not less than 3 feet from windows, doors, porches, fire escapes, or similar locations. However, conductors run above the top level of a window shall be permitted to be less than 3 feet. Refer to *Figure 5.*

D. Whenever the type of building will not provide these clearances and the building is within a normal service span, the Customer will be expected to provide an approved support or attachment or install an underground service. In the event a mast-type riser is required to attain the required height, it shall be of such construction and so supported that it will withstand the strain imposed by the service-drop. A typical service entrance mast installation is shown in *Figure 6.*

E. Overhead Conductor Clearances from Swimming Pools - The following parts of pools shall not be placed under existing service-drop conductors or any other open overhead wiring; nor shall such wiring be installed above the following: (1) pools and the area extending 10 feet horizontally from the inside of the walls of the pool; (2) diving structure; or (3) observation stands, towers, or platforms. However, structures listed in (1), (2), and (3) above shall be permitted under insulated supply or service-drop cables, 0-750 volts to ground, supported on and cabled together with an effectively grounded bare messenger, where such installations provide the following clearances:

18 Feet - Clearance in any direction to the water level, edge of water surface, base of diving platform or permanently-anchored raft.

14 Feet - Clearance in any direction to the diving platform or tower.

Horizontal limit of clearance measured from the inside wall of the pool -- not less than 10 feet. This limit shall extend to the outer edge of the structure listed in (1) and (2) above. *See Figure 7.*

407 - Public Grants, Special Permits and Easements. Before wires can be run over, under or across public ways, the Department must obtain public grants and, in many cases, must obtain special permits. These grants and permits can be issued, in some instances, only after public hearings are held.

Where it is found necessary that the Department's wires and equipment must be installed over, under or across the property of a second party or a multi-customer installation such as a shopping center, the Department must be provided with an acceptable easement for said property.

Under such circumstances, delays to service connections can be avoided by applying for service at the earliest possible date. Any questions or details pertaining to the required easement should be clarified with the Department.

409 - Overhead Single-Phase Residential Line Extensions. When an extension of an overhead line is necessary to provide service to a permanent residence, the length of the extension along the public street and/or the length of the extension over private property shall be determined. If this length exceeds the limit set forth in paragraph A and/or B below, a contractual agreement will have to be negotiated with the Department to

compensate for the cost of all construction in excess of these limits. The length of the extension shall be measured from the last pole carrying the circuit with the required voltage from which a customer can be served.

If the extension involves both public streets and private property, the negotiated contract will cover the entire extension and any deposits required will be the sum of the deposits required under paragraphs A and B below.

Transformer installations and one permanent service drop per customer shall be furnished at no charge.

All construction will be owned and maintained by the Department.

The Department will begin construction of a line under this policy when the customer to be supplied has signed the necessary contract. If no contract is required, construction under this policy will begin when the customer to be supplied has completed most of the wiring of the premises to be supplied. Construction will not commence or continue during periods of inclement weather or other abnormal conditions.

A. Extension Along a Public Highway - The Department will, at no charge to the customer, extend an overhead single-phase residential line up to 2,000 feet in length, along an accepted public street, having a minimum acceptable right-of-way width of 50 feet when normal construction, as defined by the Department, can be used.

   For extensions in excess of 2,000 feet, the customer must negotiate a contractual agreement to provide for either of the following at the option of the Department:

1. A guaranteed monthly bill for a period of time not to exceed five (5) years to insure sufficient revenue to cover the cost of construction of the extension over 2,000 feet. The minimum monthly bill shall be computed by determining the cost of the construction and dividing by sixty (60).

2. A deficiency in revenue deposit equal to the cost of the construction of the extension over 2,000 feet. The deposit shall be returned to the customer at the rate of one-third of his monthly bill for a period of time not exceeding five years or until the total deposit is returned, whichever occurs first. Any portion of the deposit remaining with the Department at the end of five (5) years will be retained by the Department. No interest will be paid on this deposit.

For extensions in areas with abnormal conditions such as unpaved roadways or undefined roadways requiring excessive tree clearing, surveying, etc., the excess cost will be treated the same as cost of an extension in excess of 2,000 feet.

Tree trimming along public highways will be done by the Department at its expense.

B. Extension Over Private Property - The Department will at no charge to the customer extend an overhead single-phase residential line up to one pole section per customer service over private property providing the Department is granted an acceptable right-of-way.

For extensions in excess of one pole, the customer must negotiate a contractual agreement to provide for a contribution towards the cost of the construction of the extension beyond the first pole based on the following:

1. Unit cost for each pole.
2. Unit cost for each guy.
3. Unit cost for each foot of extension.
4. Full cost of abnormal construction such as long span, extra large conductor or ledge.

Tree trimming on private property will be done by the customer at his expense.

411 - Overhead Line Extension to More Than One Customer. Where a line extension on a public highway or on private property is necessary to service more than one Customer, consult the Department. Information about the overhead line extension plan and Customer construction payment policy is available.

413 - Ownership of Private-Property Overhead Construction. The arrangements described in the above Sections will be contingent upon the property owner transferring ownership of private-property construction to the Department. If the Customer does not elect to do so, the entire service installation on private property will be owned and maintained by the Owner or Customer. In the latter case, the Customer will contract with other parties for all private-property construction, provided such construction is carried out in accordance with the standard specifications furnished by the Department.

415 - Underground Service from Department Overhead System – 600 Volts and Below. The customer will furnish and install the conduits, riser, conductors, and handholes in accordance with either Section A or Section B below.

A. Department's Pole Line Located on Same Side of Street as Customer's Premises.

The customer shall furnish and install a Department approved handhole approximately two (2) feet inside the property line and adjacent to the riser pole identified by the Department.

From this handhole, the customer shall install conduit to the riser pole terminating in a rigid galvanized steel bend having a radius of not less than twenty-four (24) inches. The conduit shall continue up the pole vertically to a minimum of 10 feet 6 inches above finished grade in order to provide mechanical protection for the conductors. The conduit shall not be less than three (3) inch trade size. The Department will furnish and install that portion of the riser above the conduit supplied by the customer.

The customer shall furnish and install underground service lateral conductors of sufficient length to reach the handhole, including a loop of at least eight (8) feet for connecting to the Department's conductors.

The Department will provide and install the conductors from the handhole to the top of the pole including the connectors in the handhole and at the top of the pole. The Department will own and maintain the conductors and conduit from the handhole to the pole. The customer will own and maintain the service lateral from the handhole to the premises.

B. Department's Pole Line Located on Opposite Side of the Street from the Customer's Premises. - The customer shall furnish and install a Department approved handhole approximately two (2) feet inside his property line at a location identified by the Department.

From the handhole, the customer shall install conduit under the road to the riser pole (identified by the Department) terminating in a rigid galvanized steel bend having a radius of not less than twenty-four (24) inches. The conduit shall continue up the pole vertically to a minimum of 10 feet 6 inches above finished grade in order to provide mechanical protection for the conductors. The conduit shall not be less than three (3) inch trade size. The customer shall install a pulling line in the conduit from the handhole to the riser pole.

The customer shall be responsible for obtaining any required construction permits for street/highway crossings. The construction shall be in accordance with any town or Commonwealth requirements. The customer shall turn over ownership of all underground equipment in the public way up to a point two (2) feet inside his property line to the Department at no cost.

The Department will furnish and install that portion of the riser above the conduit supplied by the customer. The customer shall furnish and install underground service lateral conductors of sufficient length to reach the handhole including a loop of at least eight (8) feet for connecting to the Department's conductors.

The Department will provide and install the cable from the handhole to the riser pole, including the connectors in the handhole and at the top of the pole.

The Department will own and maintain the conductors and conduit from the handhole to the pole. The customer will own and maintain the service lateral from the handhole to the premises.

The installation of poles to avoid the underground crossing of the roadway will not be allowed under any circumstances. Poles, installed by the Department to limit the length of overhead service drops to acceptable distances, shall not be used as riser poles.

417 - Underground Residential Distribution (URD) for Developments.

A. The Town of South Hadley requires that all new residential developments be served by underground electrical systems. In order to maintain the highest level of service reliability, the Department's underground residential distribution (URD) systems employ the use of a conduit system (manholes, handholes and ducts) and padmounted transformers.

B. Developer Requirements - The developer shall sign an agreement covering the following items for the installation of underground residential distribution in the entire development. This agreement shall be executed at least 120 days (material acquisition may dictate a longer lead time) before the first electric service is required.

1. Provide the Department with two (2) copies (one of which is reproducible) of a recorded plan approved by the municipality showing the complete layout of the development including:

   (a) lot lines
   (b) street grades
   (c) curbs and sidewalks
   (d) locations of water mains, hydrants, gas mains, sewer mains, storm drains, catch basins and all other under-ground facilities

2. Grant or furnish an easement for all electric and telephone facilities. The easement requirement will be outlined by either the Electric Department or the Telephone Company and will consist of three (3) parts: (a) a ten (10) foot wide strip, (or cable easement) in the street or in front of and along all front (or street) property lines, (b) a five (5) foot wide street crossing from front property line to front property line wherever cable crossings are required, (c) a ten (10) foot square equipment easement at each front lot corner and located five (5) feet on each lot. These minimum requirements may be supplemented as required by the design of the development. The transformers, handholes and appurtenances will be installed where required on the equipment easement.

3. At the discretion of the Department, it may be necessary to design the primary electric system as a loop configuration in order to establish two sources of supply to the development.

4. Plan the development so that the lots are developed consecutively. This will insure a continuous source of electric supply to all locations within the development.

5. Plan and install other utilities so as not to interfere with the installation and operation of electric and telephone cables and appurtenances and make arrangements for installation of these utilities prior to the electric and telephone installation.

6. Carry out the following prior to the installation of the URD system:

   (a) Install surveyed lot corner bounds
   (b) Mark the points of curvature and tangency for all street front property line curves
   (c) Install curbs and bring sidewalks to subgrade
   (d) Install grade stakes showing final grade as requested at manholes, trench locations, transformers and handholes

7. Provide the excavation and backfilling required for the installation of manholes, handholes, transformer box pads and conduit in accordance with the Department's specifications.

8. Supply and install all manholes, handholes, and transformer box pads in accordance with the Department's specifications.

9. Prior to any paving, supply and install all primary and secondary conduit (including concrete encasement where required) in accordance with the Department's specifications. Provide and install an acceptable pull wire in all ducts to facilitate the installation of cable.

10. Provide and install all secondary cable in accordance with the Department's specifications.

11. Supply and install the service lateral cable between all buildings and the Department's facilities (handhole or manhole). The Department will make the final connection to its facilities.

12. Supply and install one or more Department-approved meter mount devices. These shall be located on the outside of single-family residences and in an approved location for multi-family residences.

13. Assume financial responsibility for:

    (a) Any discrepancy or change in final grade or plans which require an alteration of installed URD facilities.

    (b) Damage to the URD system during and after installation, caused by the Developer and/or his agent or servants.

14. Provide for any requirements that may be peculiar to a specific development.

C. Electric Department's Responsibilities - The Electric Department will perform the following

AT THE EXPENSE OF THE DEVELOPER:

1. Prepare a layout of the underground electrical system together with the location of manholes, street crossings, cables, transformers, handholes, services and streetlights. This layout will be based on the Developer's definitive plan submitted to and approved by the Municipal Planning Board.

2. Provide and install all primary cable and transformers.

3. Provide and install all secondary terminal lugs and secondary connector systems (squids).

D. The Developer shall install streetlights in accordance with the Department's design.

E. The Department will own, operate, and maintain the underground distribution facilities, including primary and secondary systems, cables, transformers, handholes and streetlights but excluding service laterals.

F. General Method of Installation - The following design criteria will be followed:

1. Primary cable will be installed in concrete encased PVC conduits.

2. While not required, it is recommended that service laterals be installed in Schedule 40 PVC conduit.

3. Where possible, the Electric Department and Telephone Company will utilize a common trench for installation of their cables.

4. Primary conduit systems will have not less than 36 inches of cover.

5. Secondary conduit systems will have not less than 24 inches of cover.

6. The cable will be located within the ten (10) foot cable easement (see Article B2 above).

7. The standard transformer installation will be a padmounted transformer located on the equipment easement.

8. Handholes will be installed within the equipment easement, as required.

9. Temporary service will be available to a builder for a charge. *See Figure 11* for the method of installation.

419 - Underground Service from an Underground System (Excluding URD Developments). In areas where the Department maintains an underground distribution system, service will be furnished, installed and maintained by the Department provided the total length of the service conduit and cable on private property is not in excess of two (2) feet. This work shall not include cutting through or restoration of the foundation, floors or partitions. When a new building is being constructed, an opening shall be provided through the foundation wall suitable for the conduit entrance. If additional service conduit and cable are required on private property to complete the service installation, they shall be installed in

accordance with one of the following:

A. Customer Installation of Service – The customer will install the underground service on private property from a handhole located at the two (2) foot line as follows:

Before proceeding with the work, the customer shall consult the Department as to the location of the service conduit at the property line. The customer shall install a handhole two (2) feet inside the property line, at the location of the Department's service conduit, to provide means for connection to the Department's cable. The handhole shall be constructed in accordance with the Department's specifications. Service conduit and cable required beyond this point to the customer's building shall be installed by the customer. At least eight (8) feet of cable shall be left in the handhole by the customer for proper jointing purposes.

Upon completion of the work, the Department will make the final connection between the customer's cable and the Department's cable without charge. Underground service cable installed by the customer shall be single conductor, copper or aluminum with extruded dielectric insulation and shall be approved the Department before installation.

B. Department Installation of Service – If a handhole cannot physically be installed at the two-foot line, the Department will install the service conductors in a customer-installed conduit, at the customer's expense, up to the first handhole, terminal box, or the first disconnecting point on private property.

Approximate prices for this work will be quoted in advance for the customer's consideration. All service conduits and handholes installed on private property, subsequently to be used by the Department for installation of service conductors, shall be constructed in accordance with the Department's specifications. All plans shall be submitted to the Department for approval.

All underground conduit construction beyond the first two (2) feet on private property will be installed, owned and maintained by the customer. Service conductors beyond the first two (2) feet on private property up to the first handhole or disconnecting device, will be owned by the customer, but maintained by the Department. Maintenance of service conductors will be at the customer's expense.

C. Cable Termination – All terminations to cable installed by the Department will be made by the Department using squid-type connectors. A minimum length of thirty-six (36) inches for each service-entrance conductor shall be left at the terminal box to provide for connection to the Department's service conductors.

421 - Service to Mobile Homes and Trailers. Overhead or underground service is available to mobile homes and trailer parks under the same arrangements as provided for other individual residences with the following considerations:

1. The meter facilities and service equipment shall be grouped and installed on a permanent support not physically attached to the mobile home or trailer.

2. An approved rain-tight disconnecting means having a capacity of not less than 100 amperes shall be provided at the meter location. Pre-wired combination meter and service pedestal may be used subject to advance approval by the Department.

423 - Service to Commercial and Industrial Customers. The customer or his agent shall consult the Department for information regarding the availability of service, the appropriate rate and specific details dealing with overhead or underground construction costs to supply the required service. Customers may be required to supply space for the Department's equipment on private property.

Customers whose services require an ultimate transformer capacity of 300 KVA or less may be served with either an overhead or a ground-level transformer installation.

Customers whose services require an ultimate transformer capacity of more than 300 KVA will be served from a ground-level transformer installation.

Some overhead installations and all ground-level installations will be installed on the customer's property.

Ground-level transformer installations may be of the padmounted transformer type or of the fenced or walled enclosure type. The customer will be required to furnish, install, own and maintain all fences, walls, oil containment systems, transformer pads, doors, gates, grounding, conduit and secondary wiring as specified and required by the Department subject to the provisions of the applicable Electrical Codes. It is the responsibility of the customer to maintain his facilities in a safe and operational condition.

In addition, adequate protective guards, such as six (6) inch diameter galvanized steel conduit filled with concrete shall be installed three (3) feet below grade and four (4) feet above grade in areas where the transformer is subject to vehicular damage. Additional protection may be required for the metering facilities if the meter is subject to vandalism.

The customer will be responsible for all costs associated with the installation with the exception of the replacement of poles on a public way. The Department will be responsible for the operation of the equipment and any maintenance will be carried out by the Department at the expense of the customer.

425 – Location of Padmounted Equipment.

1. CLEARANCE FROM BUILDINGS

A. Air Insulated Equipment – Air insulated equipment shall have a three (3) foot minimum clearance from buildings.

B. Oil Insulated Equipment – In the absence of industry accepted requirements, it is recommended that the equipment be located with the minimum clearances indicated on *Figure 10*. The building owner's and/or tenant's fire insurance carrier or local inspection authority may restrict the proximity of the equipment to doors, windows, or combustible materials. It is the customer's responsibility to determine the acceptability of the proposed location of the equipment.

2. ACCESSIBILITY – Equipment shall be located within ten (10) feet of a way open to vehicular traffic and a minimum distance from any structure such as poles, fences, etc. to permit accessibility for installation and maintenance. A minimum of ten (10) feet of clear space shall be provided in front of the transformer.

3. MECHANICAL PROTECTION – Whenever possible, equipment should be located so it is not subject to vehicular damage. If this is not feasible, adequate guards such as concrete filled pipe shall be placed to protect the equipment.

4. NOISE LEVEL – When locating transformers or other equipment, consideration should be given to the effect of noise on adjacent occupancies.

ARTICLE 500

SERVICE ENTRANCE
GENERAL

501 - Size of Conductors. The minimum size of service entrance conductors shall be 100 ampere for overhead services and 200 ampere for underground services.

503 - Service Equipment. One or more service switches or circuit breakers shall be installed as part of the permanent wiring for each service entrance. These devices shall conform to the following:

A. All service switches or circuit breakers shall meet the requirements of all applicable Electrical Codes and be of a type listed by the Underwriters' Laboratories, Inc. or approved by both the Department and local municipal authorities. All equipment shall be installed in accordance with all applicable Electrical Codes.

B. Any service equipment located on the line side of meters must be of the enclosed type, with facilities for sealing by the Department. Fuse replacement or breaker reset must be possible without disturbing the enclosure seal.

C. Where multiple service equipment is provided for either commercial or dwelling occupancy, each disconnecting means shall be marked in a conspicuous, legible and permanent manner to indicate which portion of the installation it controls.

505 - Location of Service Disconnect. In general, the service disconnect shall be located on the load side of the meter (hot sequence metering). The service disconnecting means may be installed either inside or outside the building wall.

Exception No. 1 - At any location where more than six-meter sockets are required, the service disconnects shall be installed on the line side of the metering equipment.

The Department may give special permission to install a 2-wire service when supplying limited loads such as traffic signals, telephone booths, fire alarms systems, individual spotlights, small signs or other small loads.

507 - Main Switches and Disconnecting Means. It is recommended that services be equipped with a main disconnect in order to be able to completely disconnect all of the conductors in the building from the service-entrance conductors.

On all services supplied from the Department underground systems, main disconnects are recommended. They shall be located in a readily accessible place as near as possible to the point of entrance of the service conductors into the building and be of a type approved by Underwriters' Laboratories, municipal authorities and the Department.

509 - Assigning Location of Service and Metering Equipment. The locations of the service and metering equipment shall be assigned by the Department. No wiring dependent upon service-entrance and meter locations shall be started until these locations have been definitely assigned and approved by the Department. The customer or his agent will notify the Department in accordance with *Section 201 of Article 200*.

511 - Unmetered Conductors. Unmetered conductors on customer's premises shall not be installed in the same raceway or conduit with metered conductors.

When unmetered conductors are run through private basements or other private areas not containing Department equipment, they shall be enclosed in a continuous length of exposed, rigid metal raceway. The installation of pull boxes or other similar devices is not permitted in such raceways, except where bends exceed those permitted by the applicable Electrical Codes.

In a block of stores, the unmetered conductors shall be enclosed in a rigid metal raceway.

513 - Fuses. All fuses shall be supplied by the customer. It is recommended that spare fuses be available at each point of utilization.

On installations where special types of fuses, such as high-interrupting capacity or current-limiting fuses are used, it is very important that the customer maintain a stock of replacement fuses. Where a new service is to be supplied from the Department's underground system, or from a high capacity transformer bank, the Department should be consulted as to the available short-circuit current.

For the safe and proper operation of the customer's equipment, it is recommended that fuse types and sizes be selected to achieve proper coordination.

OVERHEAD

515 - Anchorage for Service-Drop Conductors. Anchorage for service-drop conductors will be provided by the Department as follows:

A. Installation of Service Bolt - A service bolt or other suitable support is required on all buildings constructed of tile, brick veneer, stucco, concrete, concrete block, cinder block, asbestos shingle, sheet iron, plywood, insulating board or other materials which make it difficult to obtain a suitable anchorage for the service-drop conductors.

   The customer shall install such bolts or other suitable support. Where a service bolt is adequate, it may be obtained from the Department at no cost to the customer.

B. Location of Service Bolt - The service bolt shall be located below the service head or weather cap.

C. Low Buildings - Refer to Section 405 for ground and roof clearances. A typical service-entrance-mast installation is shown in *Figure 6*.

D. Temporary Service - The customer shall provide a service entrance, which meets the requirements of a permanent installation with respect to service-drop clearances, metering, grounding and safety. The service entrance may be installed on a guyed or braced 4 inch x 6-inch timber structure that meets the specifications and installation requirements of the Department. Where a laminated 4-inch x 6 inch structure is to be assembled using two 2-inch x 6-inch planks, these planks should be bolted together at intervals not exceeding four (4) feet. The temporary service drop span shall not be more than 100 feet. Refer to *Section 213* for charges. *See Figure 13*.

517 - Service Facilities Requirements

A. Single-Family Residence - Meters shall be mounted on the outside of the building in an approved 100 ampere or larger meter socket supplied by 100 ampere or larger service-entrance conductors.

B. Multi-Family Residences - Meters shall be mounted on the outside of the building except where meters may be installed in a common location accessible to all occupants. The recommended minimum capacity of service-entrance conductors is as follows:

- 2-Family Dwelling - 150 amps.
- 3 or more Family Dwelling - 200 amps.

519 - Building Alterations Affecting the Electric Service. To insure continuity of service, the customer should notify the Department before starting alterations to a building, which might affect the electrical service. This will give the Department time to inspect the service-drop attachment and advise the customer of any metering or service problems that could result from the

alterations. It will be the responsibility of the Department, at no cost to the customer, to remove from the building temporarily the service-drop attachment to permit the alterations. When notified, the Department will reattach this equipment to the building. It will be the responsibility of the customer to have the service entrance equipment detached from the building and reattached when the work has been completed. It will also be the responsibility of the customer to install a permanent service bolt or hook for the service drop.

521 - Aluminum or Other Siding to be Installed on Existing Building. To ensure continuity of service, the Customer should notify the Department ten days before installation is started. This will give the Department time to inspect the service-drop attachments and advise the Customer of any metering or service problems that could result from the installation of the siding. The Customer should check with the inspection authority having jurisdiction over service requirements for aluminum siding.

523 - Connection to Department's Overhead Conductors. A minimum length of three (3) feet for each conductor shall be left at the upper end of the service entrance to provide for connection to the Department's service-drop conductors. Connections to the Department lines will be made by the Department.

525 - Wiring Methods. Service-entrance cables and conduit shall normally be exposed for their entire length, except when they pass through building walls or are encased in two inches of concrete. The service disconnecting means shall be installed either inside or outside of a building or structure at a readily accessible location nearest the point of entrance of the service-entrance conductors.

UNDERGROUND

527 - Connection to Department's Underground Conductors. A minimum length of three (3) feet for each service entrance conductor shall be left at the junction box or hand hole to provide for the connection to the Department service conductors. This wire should extend three (3) feet above the top of the junction box or hand hole. The Department will provide and install squid-type connectors in the customer's hand hole. If the customer's entrance conductors are other than the Department standard, a suitable adapter must be provided for the Department's connectors.

529 - Hand Holes and Junction Boxes. On underground services, hand holes and/or junction boxes will be furnished and installed, by an electrician, as covered by *Sections 417 and 419*.

NON-TEXT PAGE

ARTICLE 600

WIRING AND VOLTAGE REQUIREMENTS

GENERAL

601 - Single-Phase Service. The service-entrance equipment for single-phase 3-wire services shall be suitable for 120/240-volt operation, except as provided in Section 507. The loads on all 3-wire services shall be balanced.

603 - Three-Phase Service. The Department shall be consulted to ascertain the type of service and voltage available.

605 - Fluctuating Loads. Electric welders, furnaces, boilers, x-ray equipment, compressors, pumps, molding machines or similar equipment with load fluctuations at a frequency greater than four times per hour should not be installed except under conditions specified by the Department. Voltage dips caused by load fluctuations, regardless of their frequency, shall not cause undue disturbance to other customers nor hinder the Department in maintaining proper voltage conditions. The Department reserves the right to withhold and/or remove connection to loads that are considered detrimental to the service of other customers.

607 - Grounding. All grounding shall be done in accordance with the National Electrical Code or any other applicable Code enforced by the inspection authority having jurisdiction. The Department shall not be liable for damage to the property of the Customer resulting from unbalanced voltage conditions due to the opening of a grounding neutral service conductor.

609 - Grounding Secondary AC Service. Where the secondary system is grounded at any point, the grounded conductor shall be run to each individual service. Services having a grounded conductor shall have that conductor and the service equipment grounded on the customer's premises by connecting the grounding electrode conductor to the grounded service conductor of the distribution system on the supply side of the service disconnecting means. This connection should be made within the service-entrance-equipment enclosure.

An underground metallic water pipe, either local or supplying a community, shall always be used as a part of the grounding electrode system where such pipes are available. It shall be supplemented by one or more acceptable grounding electrodes as required by the Massachusetts Electrical Code or any other applicable Code for other grounding electrodes and equipment grounding. To minimize the hazard of electrical shock, all metallic water-piping systems inside a building shall be bonded to the grounding electrode. Where extensive metal in or on buildings may become energized, adequate bonding to the grounding electrode shall be provided.

Three-phase, 3-wire, 240-volts or greater, delta service conductors shall be insulated from the service equipment and shall not be grounded. The service equipment shall be grounded by an equipment grounding conductor connected to the grounding electrode.

611 - Insulating Transformer. Where lighting or other reduced-voltage equipment is permitted from three-phase, 3-wire, delta services, insulating transformers having adequate primary and secondary windings are required. The secondaries of these insulating transformers shall be properly grounded. The minimum number of single-phase transformers that may be used to serve the reduced-voltage load on a three-phase, 3-wire service is shown in the following table:

Reduced-Voltage Load in Kilowatts or % of Total Demand on Service (Whichever is the Larger)	**Minimum Number of Transformers**
Less than 5	1
5 to 10 inclusive	2
Over 10	3

The Department should be consulted prior to buying insulating transformers for this type of installation.

Since auto-transformers do not provide insulation between primary and secondary windings, they shall not be used on three-phase, 3-wire, ungrounded-delta service except to supply reduced voltage for motor starting. Auto-transformers used to supply other branch circuits shall be supplied only by a grounded system as outlined in the National Electrical Code or of any other applicable Code.

613 - Power Factor. Maintenance of a high power factor is of the utmost importance to both the customer and the Department in the operation of their distribution systems. Department rates are, in general, based on an average power factor not lower than 90 percent. The Department should be consulted in advance regarding all installations likely to develop low power factors in order that such conditions may be rectified by measures adapted to each proposed installation.

615 - Power Factor Correction Capacitors. When a customer desires to install capacitors for the purpose of power factor correction, the Department should be consulted prior to the ordering of such equipment.

Approval by the Department for all capacitor installations is required so service to other customers will not be adversely affected by the manner in which such equipment is installed and operated.

617 - Power Supply to Voltage Sensitive Equipment. Customers who install computers, x-ray equipment, emergency devices or other voltage sensitive equipment are advised that auxiliary devices should be employed to filter out voltage spikes and to adjust for voltage variations. The Department is not responsible for voltage variations, which may be caused by switching, lightning surges, automobiles hitting utility poles or other conditions beyond its control.

ARTICLE 700

METERS

701 - General. All energy supplied by the Department shall, in general, be measured by appropriate meters for billing purposes. The installation of meters and metering equipment shall comply with the requirements set forth in this Article. The Department shall furnish and install all meters required for billing purposes.

Definitions: Only definitions of terms pertinent to this Article are included:

Delivery-point (service-point) is the point of connection to the facilities of the Customer and the terminus of the Department's ownership of lines or equipment.

Metering-point is the location of the meter or metering equipment such as instrument transformers.

Rates as now filed provide that the metering location; i.e., primary or secondary, is an option of the Department. In general, it is Department policy to locate the meter on the secondary side of the transformer.

Note: Delivery-point and metering-point are not necessarily at the same location. For example, where the Customer owns the complete substation, the "delivery-point" is that point where the Department's high-voltage line terminates on the Customer's structure.

703 - Meter Tampering. WARNING --. Do not tamper with meter, instrument transformers, metering devices or Department wiring under penalty of law. Any unmetered electric service is unlawful and can result in termination of service. See excerpt from General Laws in the back of this booklet.

Meter sealing rings, locking devices and meter seals shall not be cut or removed. Property of the Department shall not be moved, removed or altered in regard to wiring or connections by other than authorized employees of the Department. Written permission must be obtained from the Department for each specific job that requires cutting or removal of a Department seal.

705 - Standard Meter Installations. The following are standard meter installations normally specified for the various types of service installations:

A. Metering equipment shall be installed on the line side of the service disconnecting means (hot sequence).

B. The meter socket shall have an approved single handle operated manual bypass.

C. For Single-Phase Services, where the loadside capacity is 320 amperes or less, self-contained socket-type meters will be installed. Where the capacity is in excess of 320 amperes, socket-type meters with current transformers will be installed. All sockets shall be furnished by the customer and have U.L. labels.

D. For Three-Phase Services, the customer or his contractor shall always consult with the Department to ascertain whether socket-type or bottom connected meters will be used.

E. A switch will normally be required on the load side of the meter in three-phase services.

F. On services with more than one metering installation, the disconnecting devices must be arranged so that each customer may be disconnected without affecting the other.

707 - Meter Locations. Outdoor meter locations are required for all single occupancy installations. Each location shall be readily accessible to Department representatives for meter reading, testing, and maintenance. Service will not be provided if reaching the meter requires Department employees to use adjacent property, climb fences or other obstructions, or cause damage to the Customer's shrubbery or flower beds in gaining access to the meter. The meter socket shall not protrude over the sidewalk or driveway. Meters on garages shall be so located that they will not be damaged by motor vehicles.

At and directly in front of each meter location, a clear, safe work space shall be maintained. Such work space shall be at least four (4) feet wide, shall extend out from the meter at least three (3) feet, and up to a height of at least six (6) feet. In addition, the meter socket must be located at least three (3) feet, measured horizontally, from a gas meter, regulator or propane cylinder. *See Figures 4 and 8.*

Meters will be installed on buildings, not on pedestals, except for service to mobile homes, temporary services or by arrangement with the Department.

Metering equipment shall not be installed on Department-owned poles, except for metered power supplies for communication companies. In areas subject to vandalism or damage, permission may be granted for indoor meters in single occupancy buildings

for commercial and industrial accounts. All such indoor meters shall be in a readily accessible location next to the service-entrance equipment. Where premises are closed for long periods or where there is no indoor location, as at outdoor signs, meters shall be located within a Company-approved lockable enclosure furnished and installed by the Customer.

In multiple occupancy buildings, for residential or commercial use, meters may be installed indoors in one common location accessible to all occupants. Additional meter rooms may be provided where requirements are in excess of six meters per location or the service capacity is in excess of 600 amperes per location. The meter socket must be located at least three (3) feet, measured horizontally, from a gas meter, regulator or propane cylinder. The meter socket must be located at least three (3) feet measured horizontally from a gas meter, regulator, or propane cylinder.

709 - Meter Height.

A. Outdoor Meters - Outdoor meter sockets or troughs should be mounted so that the face of the meter is five feet above the final grade. In no instance will any meter be installed with the top of the meter more than six feet nor the bottom of the meter less than three feet above the final grade. A clear area of three feet is required in front of each meter.

EXCEPTION: Meters for cable television power supplies or amplifiers must be installed above the normal height. *See Figure 35.*

B. Indoor Meters - Multiple meter centers installed indoors shall be mounted so that the face of the meter is 60 inches maximum and 30 inches minimum above the floor level. A clear area of three feet is required in front of each meter.

711 - Voltage Drop. Meter locations and feeder sizes should be so chosen that the voltage drop between the point of service entrance and the meter will not exceed one percent at full load of the feeder.

713 - Mounting. Meter sockets and meter/breaker centers shall be mounted plumb and firmly secured to supports. Where supports are attached to masonry or concrete walls, expansion bolts or anchors shall be used. Wood plugs driven into holes in masonry, concrete, plaster or similar materials are not acceptable.

717 - Identification of Meter Sockets and Customer Disconnecting Means. All meter sockets and customer disconnecting means shall be plainly and permanently marked for proper suite, floor, office, etc. by the electrical contractor or owner. Service will not be provided to a building that has unidentified meter sockets.

Where suites, offices, apartments or other areas are not assigned numbers by the building owner, the electrical contractor shall clearly designate the location of each tenant's premises, such as: "Basement Front," "1st Floor right," or "2nd Floor rear". Such locations shall be determined from a position facing the front of the building from the outside.

719 - Unmetered Conductors. Unmetered conductors shall not be installed in the same raceway with metered conductors.

Where unmetered conductors are run through Customer's premises, they shall be enclosed in a continuous run of rigid metal conduit or service bus way. The installation of pull boxes or other similar devices is not permitted on unmetered raceways on the Customer's premises per electric code.

Where unmetered plug-in type armor-clad bus way is used to serve customers in the same building, all plug-in access openings shall be provided with a steel hasp assembly for padlocking the hinged hood in the closed position.

The sealing of unmetered raceways with lead-wire or padlock type meter seals is not acceptable to the Department.

721 - Four-Wire Delta (Non-Standard) Service. On extensions of three-phase, 4-wire, delta connected services, the phase conductor having the higher voltage-to-ground shall be identified by an outer finish that is orange in color, or by tagging, or other effective means. This "high leg" service-entrance conductor shall be identified at the delivery point, as well as inside the service disconnect enclosure.

Where meter sockets are installed, the identified service-entrance conductor, connected to the higher voltage-to-ground service-drop conductor, shall be connected to the right-side line and load terminals of the 7-terminal meter socket as shown in Figure 15.

723 - Demand and kVA Meter Wiring. Commercial and industrial installations may require kW and kVA demand metering. Contractors should obtain specific information from the Department for each such installation.

725 - Combined Billing. The Department will not combine two or more meter registrations at the same location for billing purposes. Load totalization of two or more electric services on the same premises, where permitted by the Department, will be at the expense of the Customer.

727 - Security. All cabinets, switches, circuit breakers and other enclosures giving access to unmetered wiring, shall be equipped with approved locking provisions.

The service switch or circuit breaker, when installed on the line side of the meter, shall be so designed that the unmetered wiring is inaccessible without removing the locking device, even during the renewal of fuses.

For authority to remove meter seals, see *Section 703*.

729 - Moving or Removing Metering Equipment. Meters, instrument transformers, and other metering devices are the property of the Department and must not be moved, removed or altered in regard to wiring or connections by other than authorized employees of the Department, except when written specific permission is obtained from the Department. Violators will be prosecuted.

METER SOCKETS

731 - Meter Sockets for Self-Contained Meters. For each service with self-contained metering, the Customer shall furnish and install an approved meter socket that shall have the U.L. label and conform to Department requirements as follows:

1. Automatic by-passes are never permitted.

2. All meter sockets installed on commercial and industrial services, shall be equipped with a safety arc shield and an approved visual, single-handle-operated manual by-pass. *See Figures 15 and 17*.

3. Sockets shall have a manual by-pass and must meet the following requirements:

   (a) Have a single-handle-operated mechanism.

   (b) Have a ringless cover.

   (c) The non-by-passed, in-service position of the operating mechanism must be visible when the meter is installed.

   (d) It must not be possible to replace the meter socket cover when the operating mechanism handle is in the by-passed position.

   (e) All sockets shall have a mechanism, which locks the meter blades in the socket jaws.

(f) After the meter socket has been installed, it is the Contractor's responsibility to protect the interior of the socket by installing an optically clear cover obtained from the Department.

Warning: Do not use a manual by-pass as a disconnect to open or close a circuit carrying load.

733 - Cover Plates. After the wiring has been completed, the interior of the socket shall be protected. Socket covers will be furnished by the Department for unused socket meter positions. Sealing rings will be furnished by the Department.

735 - Installation of Sockets. Meter sockets must be mounted plumb and level, using wood screws of sufficient length and size to hold the socket securely, independent of conduit or cable connections. Rust-resisting screws shall be used outdoors and in damp locations. Standard expansion bolts or anchors shall be used for masonry walls.

The threads on conduit, fittings or sealing plugs screwed into the hubs of meter sockets located outdoors shall have joint compound applied to prevent the entrance of water.

737 - Clearance. The minimum clearance between the sides of multi-station troughs. or single-position sockets and the building wall is 4 inches.

739 - Meter Connections. The service or line-side conductors are always connected to the top terminals of meter sockets or troughs and the load-side conductors to the bottom terminals. A number of typical connections for socket meter installations are shown in *Figures 15 and 17*.

741 - Grounding of Meter Sockets.

A. Grounding Services

1. Where the socket is installed on the load-side of the service disconnecting means, it shall be permissible to ground the socket by connection to the grounded (neutral) conductor on the load-side of the service disconnect if:

(a) No service ground-fault protection is installed, and

(b) All meter sockets are located near the service disconnecting means.

The grounded (neutral) conductor may be insulated from the grounded parts of the socket.

B. Ungrounded Delta Services

The meter socket shall be bonded by means of an equipment-bonding conductor if a metal raceway is not used to enclose the service conductors. The terminal and jaw of the middle phase conductor must be insulated from ground.

743 - Meter Pedestals. In general, these devices are only used for mobile homes and temporary services. However at the discretion of the Department, they may be approved for certain other appropriate applications. Meter pedestals are free-standing units intended to be mounted outdoors on a concrete pad in conjunction with underground wiring. If a free-standing meter pedestal is used, it must extend a minimum of 34 inches above the finished grade or ground line. The pedestal shall have a stabilizing means extending below the frost line to insure that the meter mounting stays in a plumb position. (See Figure 39).

Meter pedestals for self-contained metering must be listed devices and shall incorporate circuit breakers, but these are not intended to replace the service disconnecting means required at the building. The neutral strap in a meter pedestal is bonded to the enclosure, and must be provided with a terminal for a grounding conductor.

INSTRUMENT TRANSFORMER INSTALLATIONS

745 - Instrument Transformers and Enclosures. For all installations requiring instrument transformers, the transformers (current and voltage transformers) will be supplied by the Department. Transformer cabinets shall be supplied by the customer. The customer will install the transformer cabinet and provide and install the raceway (as required). *Figure 27* shows typical primary connections.

747 - Meter Sockets and Test Switches. Meter sockets and test switches for use with instrument transformers will be furnished by the Customer. Meter socket enclosures shall be installed by the Customer and wired by the Department.

749 - Instrument Transformer Secondaries. A metal raceway shall be provided between the transformer cabinet and the meter test switch cabinet for instrument transformer secondaries as follows:

1. Provide 1-1/4 inch raceway for secondary conductor runs that are less than 20 feet in length.

2. Provide 1-1/2 inch raceway for secondary conductor runs that are 20-50 feet (100 conductor feet) in length. The maximum distance between meter and instrument transformer shall be 50 feet.

Secondary wiring will be furnished and installed by the Department.

751 - Use of Instrument Transformer Cabinets. Instrument transformer cabinets shall not be used as junction boxes or for branch circuit wire-ways. Service conductors shall enter and leave the cabinet as one circuit with no branches regardless of number of conductors per phase. Line-side connections to other meters shall not be made in the transformer cabinet or enclosure.

753 - Multiple Conductors. Where multiple conductors are used or where conductor size is greater than 250 MCM, the Customer shall furnish and install a rigid mounting securely fastened to the transformer enclosure for connecting the conductors to the primary terminals of the current transformers.

755 - Primary Metering. Where primary metering equipment is requested by the Customer, he shall pay the difference between primary and secondary metering costs.

757 – Customer Request for Metering Pulses. Upon written request from a Customer, the Department will install at the Customer's expense, as part of its metering facilities at the metering point, a source of kWh pulses to the Customer so that the Customer may monitor load/demand for the purpose of load control. The following conditions apply:

A. The Customer's load is presently being measured with a watt-hour meter with pulse initiation equipment; or

   If there is no pulse initiating equipment or if the output does not meet the Customer's requirements, the Customer will pay for the installation of the necessary additional equipment to furnish the pulses, including isolation relays where necessary.

B. The installation, operation, and maintenance of any equipment, other than that provided by the Department, shall be the responsibility of the Customer.

C. The point of connection of Department and Customer equipment shall be designated by the Department and the connection made by the Department.

D. The Customer will be required to pay the Department for subsequent installation and maintenance charges and any alterations necessitated by a change to the existing meter installation.

E. The Department agrees to furnish the pulse data, but makes no representation as to the accuracy or actions resulting from its use, more specifically, but not limited to, its affect on bills for service rendered by the Department to the Customer.

Please contact the Department to request load data and/or installation of pulse metering equipment.

759 – Approved Metering Equipment.

General Requirements

1. Safety will be the number one consideration when approving any metering equipment.

2. All meter sockets must have a UL label. Any modification of a meter socket will void the UL listing and the manufacturer's warranty, making it non-compliant with the Department's approved standards.

3. All self-contained meter sockets must be rated for 600 volts or less.

4. All self-contained meter sockets must have a lever operated manual bypass, with a receiver bracket and a ringless cover with a 7/16" knockout to accept a Brooks S1000 barrel lock or equivalent.

5. The lever operated manual bypass is required to be single-handle operated:
   - 100 ampere may be supplied with non-jaw release
   - 200 ampere and 320 ampere must be supplied with jaw release

6. The non-bypassed, in-service position of the operating mechanism must be visible when the meter is installed. Auxiliary straps or jumpers are not acceptable as bypass devices. It must not be possible to override the bypass by replacing the cover when the operating mechanism handle is in the bypassed position.

7. A safety flash shield is required on all self-contained meter positions.

8. Horn-type bypasses are not permitted.

9. Sliding-type bypasses are not permitted.

10. Automatic bypasses are not permitted.

11. Basic catalog numbers may have different or additional prefix or suffix numbers or letters indicating variations in hubs, sealing rings, addition of fifth terminal, left or right wiring extensions.

12. Meter sockets for use on three-wire 120/208-volt network must have a fifth terminal located at left in the 9 o'clock position, connected to neutral.

13. Custom-made meter channels and modular metering panels may be used for groups of meters such as in apartment houses. Prints of these panel arrangements must be submitted to the Department for approval prior to installation. Line-side panels must be sealable.

14. All underground, residential, single-position sockets must be a minimum 16"W x 22"H x 5"D, 200 amp, ringless with line side lugs capable of accepting 350 KCMIL conductors with lever operated jaw release bypass. Sockets will also have a minimum 3-inch knockout to accept a 3-inch slip joint. If a service run is greater than 200 feet, contact the Department.

15. All group metering units must have sealing provisions and meet minimum and maximum height requirements.
    a. Maximum height (top of meter) is 72 inches.
    b. Minimum height above floor 24 inches (bottom of meter) indoor, 36 inches outdoor.
    c. All meter positions must have individual covers and barriers between each meter position.
    d. All meter positions must have lever operated manual bypass.
    e. Each meter position must have a receiver bracket and ringless cover with a 7/16" knockout to accept a Brooks S1000 barrel lock or equivalent.

16. All OH/UG 320-amp meter sockets must have 4-inch knockouts, jaw release lever operated manual bypass, with a receiver bracket and a ringless cover with a 7/16" knockout to accept a Brooks S1000 barrel lock or equivalent.

17. All underground hubs or knockouts must be a minimum of 3 inches diameter.

18. Hot sequence metering (6 socket positions or less) is required for single-phase 120/240-volt service.

19. New Equipment from manufacturers not listed in this book will be considered for approval. Samples must be submitted to the Department for approval.

20. All meter sockets and switchgear must be properly identified with approved catalog numbers listed in this book.

NON-TEXT PAGE

ARTICLE 800

UTILIZATION EQUIPMENT

801 - General. The Department should be consulted regarding the voltage and capacity available at each location. All installations must conform to the requirements of local or state authorities and to pertinent sections of the applicable Electrical Codes.

802 – System Disturbances. Certain electronic equipment, such as computers and microprocessors, and some manufacturing processes are extremely sensitive to and can be damaged by disturbances, which are inherent in all supply systems. Therefore, it is the Customer's responsibility to furnish, install, own and maintain equipment needed to protect his operations.

803 - Single-Phase Motors. Single-phase motors will be supplied at one of the nominal voltages indicated below. If the use of equipment with locked-rotor currents listed below causes flicker in illumination or dips in voltage, which would be objectionable to other customers, the locked-rotor current must be reduced. *Refer to Table No. 1.*

A. <u>120 Volt Supply</u>

Motors with ratings of 1/2 horsepower or less and window-type air conditioning units whose full-load running current does not exceed 7-1/2 amperes, with not more than four starts per hour and with a locked-rotor current not exceeding 50 amperes, may be connected to a 120 volt supply.

Motors having a full-load running current of more than 7-1/2 amperes but less than 12 amperes, and conforming to the above locked-rotor current limitations, may be connected to a 120 volt branch circuit only if such branch circuit supplies the one unit and does not supply lighting units or other appliances. It is strongly recommended that units drawing more than 7-1/2 amperes full-load running current be connected to 240 or 208 volt circuits.

B. 208 or 240-Volt Supply

Motors with ratings larger than 2-1/2 but less than 6-1/2 horsepower will normally be supplied at 208 or 240 volts, provided the locked-rotor current does not exceed the values given in Table No. 1. In predominantly residential areas, and for small commercial installations, the Department should be consulted before installing motors with ratings over five horsepower.

805 - Maximum Locked-Rotor Currents for Single-Phase Motors. Single-phase motors supplied from combined light and power secondary systems shall not have locked-rotor current in excess of those shown in Table No. 1. Motors having locked-rotor current in excess of those shown in the Table shall be equipped with starters which will limit the current to the values specified.

Motors that start more than four times per hour are an exception to the above and may cause interference to other customers. Automatically (frequently) started motors for general use, such as motors for refrigerators, oil burners and similar devices shall not have a locked-rotor current exceeding 23 amperes at 120 volts or 29 amperes at 240 volts.

For multi-motored devices arranged for starting of motors one at a time, the locked-rotor current limits shall apply to each individual motor.

TABLE NO. 1
SINGLE-PHASE MOTORS

Maximum Locked-Rotor Current Values in Amperes

This table is based on not more than four starts per hour with long periods of continuous operation under maximum load conditions. Consult the Department where these conditions cannot be met, or where equipment rating and/or starting characteristics exceed the following:

A - Equipment with Motors Rated in Horsepower

Rated At	**Maximum Locked-Rotor Current**
120 volts	50 amp
240 or 208 volts, single phase	
2 hp or less	60 amp
2.5 to 6.5 hp	Residential Use – Consult Department Commercial Use – 60 amp plus 20 amp per hp in excess of 2 hp

B - Air Conditioning or Heat Pump Equipment Rated in Btu per Hour

240 or 208 volts, single phase	
20,000 Btu/hr or less	60 amp
21,000-30,000 Btu/hr.	60 amp plus 3 amp per 1000 Btu/hr. in excess of 20,000 Btu/hr.
Over 30,000 Btu/hr.	Consult Department

807 - Single-Phase Motors on Three-Phase Service. Where single-phase motors are supplied from a three-phase service, they shall be properly balanced across the three phases.

809 - Three-Phase Motors. Three-phase motors shall not have locked-rotor currents in excess of those shown in Table No. 2. Starting compensators are ordinarily required for three-phase motors 10 horsepower and larger. Exception to this practice will be allowed to the extent local distribution facilities will permit. Motors having locked-rotor current in excess of that shown in the Table shall be equipped with starters that will limit the currents to the values specified. Increment-start motors must have not less than a one-half second interval between steps.

The Department should be consulted in regard to the installation of three-phase motors larger than 10 horsepower.

TABLE NO. 2
THREE-PHASE MOTORS

Maximum Locked-Rotor Current Values in Amperes

This table is based on not more than four starts per hour with long periods of continuous operation under maximum load conditions. Consult the Department where these conditions cannot be met, or where equipment rating and/or starting characteristics exceed the following:

A - Equipment with Motors Rated in Horsepower

Rate At	**Maximum Locked-Rotor Current**
230 volts, three-phase*	
2 hp or less	50 amp
2.5 to 10 hp	50 amps plus 14 amp per hp in excess of 2 hp
Over 10 hp	Consult Department

B - Air Conditioning or Heat Pump Equipment Rated in Btu Per Hour

230 volts, three-phase*	
20,000 Btu/hr.	50 amp
21,000 to 50,000	50 amp plus 2.5 amp per 1000 Btu/hr. in excess of 20,000 Btu/hr.
Over 50,000 Btu/hr.	Consult Department

* Normally three-phase supply is not available for residential service.

PROTECTIVE DEVICES

811 - General. The customer's equipment shall be equipped with devices that protect against over-current, short-circuit and ground faults. Such devices shall conform to the requirements of the applicable Electrical Codes. The Department strongly recommends that all motor installations be adequately protected to prevent improper operation, equipment damage and personal injury which might result from abnormal conditions occurring in the Department's facilities or the customer's wiring system.

813 - Protection Against Single-Phase Operation. As required by the Massachusetts Electric Code, three-phase motors shall be protected against the possibility of the failure of any one phase of the supply circuit. Three over-current (overload) units shall be used on all motors unless the motor is protected against single-phase operation by other approved means.

815 - Undervoltage Protection. Motors that cannot be safely subjected to full voltage at starting, or motors the starting of which on return of normal voltage after an interruption would endanger life or property, should be provided with automatic under-voltage protection. Such protective device should insure that with either no voltage or under-voltage, the motor will be disconnected from the line or the starter will be returned to the "off" position.

The Department recommends the use of time delay under-voltage protection because instantaneous under-voltage protection will operate on momentary fluctuations of voltage.

817 - Overload Protection. All motors should be protected against overload by the installation of adequate over-current thermal protective devices or their equivalent, which will operate so as to prevent excessive motor winding temperatures.

819 – Protection Against Phase Reversal. On motors for passenger and freight elevators, cranes, hoists, and other equipment, where reversal of direction of rotation might cause property damage or injury, a reverse-phase relay should be installed so the motor circuit will be opened in the event of a phase reversal or the loss of any phase.

The operation of this relay and associated circuit breaker should be instantaneous and should be such that the circuit cannot be re-energized until the normal phase relations are restored.

821 - Water Heaters. Electric water heaters for domestic use in an individual private dwelling or an individual private apartment must be wired to Department specifications for the applicable service voltage and domestic rate. Information regarding application of domestic water-heating rates and approved types of water heaters may be obtained from the Department. For wiring, see *Figures 31 and 33*.

823 - Electric Space Heating. Service for space heating is available on different rates and application should be made through the Department. From an economic and comfort standpoint, electric space heating is most satisfactory when properly engineered and correctly installed.

ARTICLE 900

COMMUNICATIONS

901 - Operation. The operation of radio and television transmitting apparatus shall be such as not to cause undue disturbance to other customers and as not to handicap the Department in maintaining proper system conditions. Where necessary, suitable eliminators or traps shall be installed by the customer in such a manner as to prevent radio, telephone and television interference by way of the supply circuit.

903 - Attachments to Poles are Prohibited. The attachment of antenna systems to electric service masts or poles carrying the Department's conductors is strictly prohibited due to possibility of serious results from accidental contacts. Such attachments will be removed immediately upon discovery by the Department and the removal will be at the Customer's expense.

905 - Clearances from Department's Conductors. Outdoor antenna, counter-poise and lead-in conductors shall not cross over electric light or power circuits and shall be kept well away from all such circuits so as to avoid the possibility of accidental contact.

907 - Carrier Equipment. If a Customer's wiring is used for carrying current or a carrier system for remote control of power, communications, or signaling purposes, there must be installed suitable filter equipment approved by the Department to keep the Department's distribution system free of any high-frequency component produced by the Customer's equipment. The Customer is also responsible for correction of any interference caused to other Customers.

909 - Community Antenna Television (CATV) Systems. Requests to install coaxial cable on poles for the distribution of high-frequency signals employed in CATV systems shall be referred to the Department. All construction shall conform to Department Standards, the Massachusetts Electrical Code, and any other regulations for CATV pole-line attachments.

911 – Communications Wires. Requests to install communications wires on Department poles shall be referred to the Department. All construction shall conform to Department standards, the National Electrical Code, the National Electrical Safety Code, and any other regulations for communications pole-line attachments. All new and upgraded communications power supply services must be inspected by the authority having jurisdiction and shall be commercially metered.

1. General – All installations shall be made in compliance with all applicable codes, wiring inspector requirements and the Department's "*Information and Requirements for Electric Service" (I* & R) book. The communications company shall contact the Department and shall also obtain agreements from all other occupants of the pole selected.

2. Location – Poles selected for communications metered power supplies shall be relatively clear poles, free of any other major devices. Poles with airbreak or loadbreak switches, line reclosers, any type of riser, major communications equipment or fire alarm box, etc., shall be avoided.

WARNING

KEEP OUT

Electrical Equipment Inside

If opened or damaged notify:

SHELD
413-536-1050

(Consult local telephone directory)

UNDERGROUND ELECTRIC CABLE

Call Before Digging!

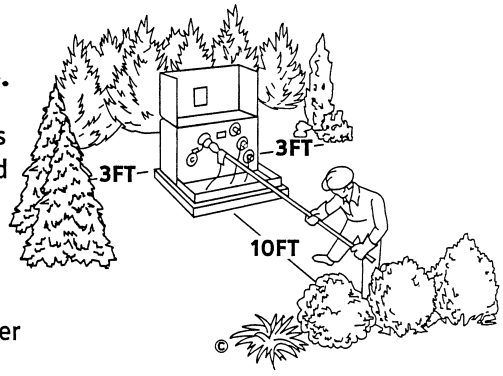
Toll Free Statewide:
888-344-7233

Call 72 hours ahead

Obstructions can cause delays when restoring electric service.

No shrubs, fences, or permanent structures can be placed within 10 FT of the front and 3 FT of the sides and back. Your power company has the right to remove these obstructions without notice to owner.

For more information call telephone number listed above.



SHD003-S-2A-X82

Electromark 9/01

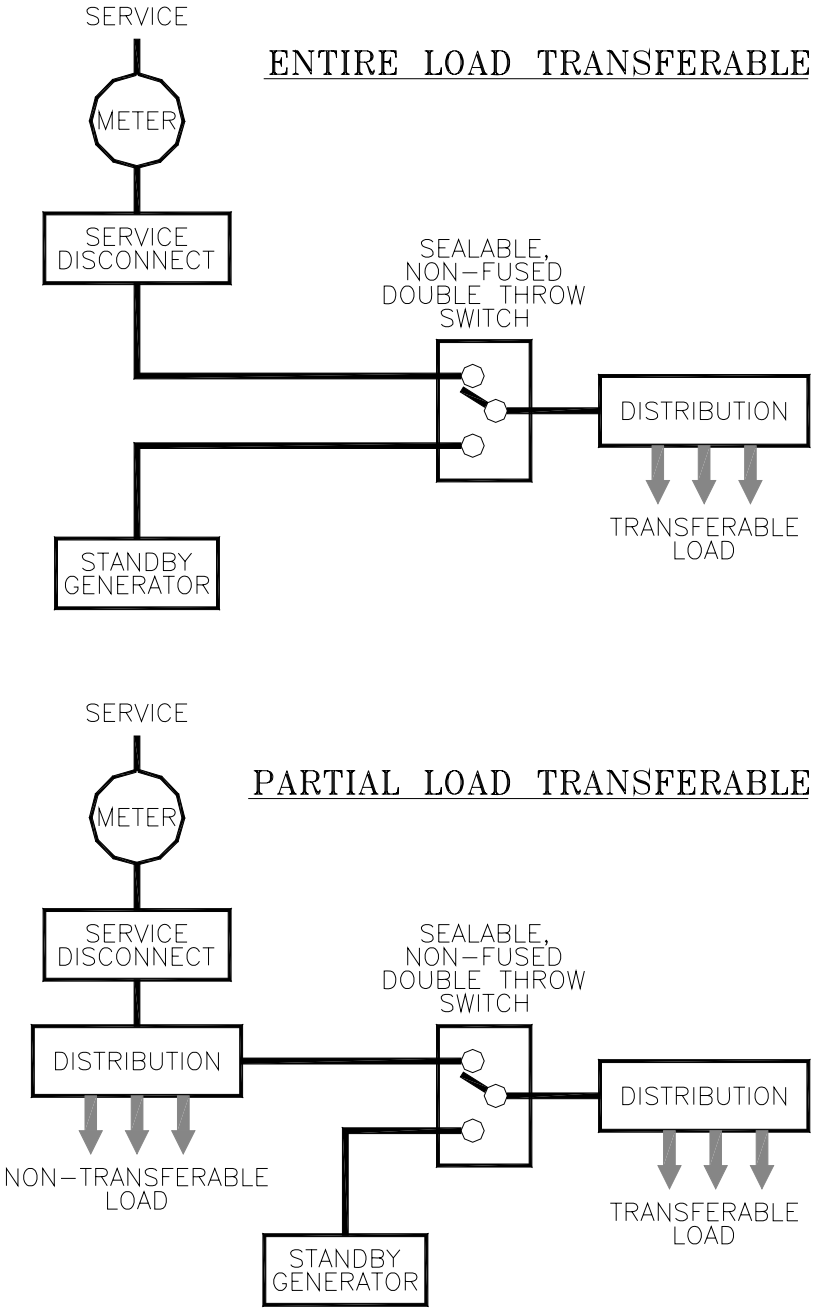
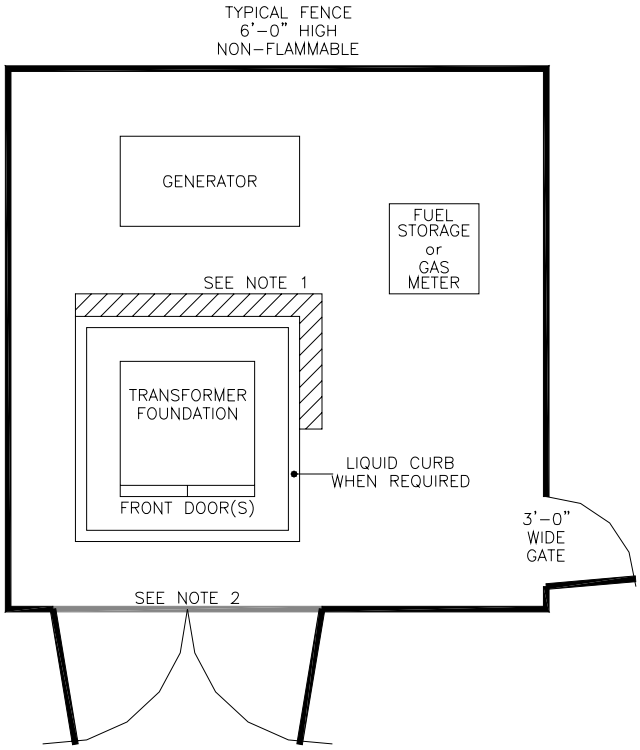


FIGURE 2

TYPICAL SWITCHING OF CUSTOMER'S EMERGENCY SUPPLY



NOTES: 1. If less than 20' feet separation between transformer and generator or fuel storage, customer to construct masonry wall.
Height above grade: 6'–0" minimum
Depth below grade: 2'–0" minimum

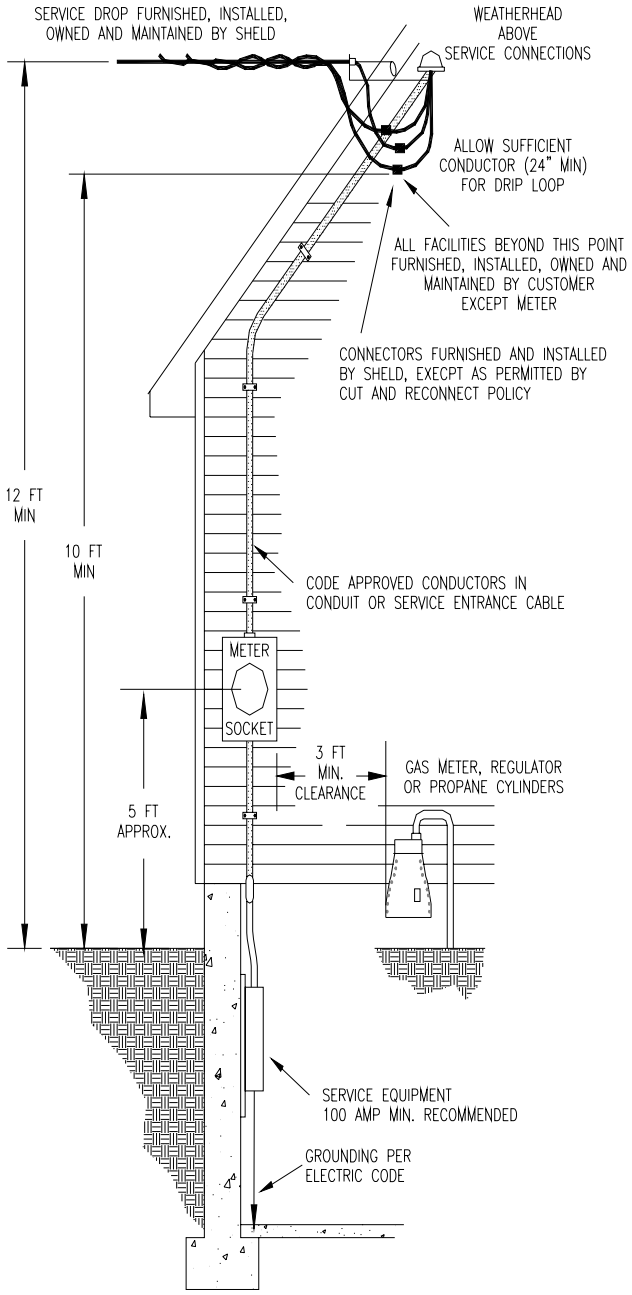
2. Fence, when installed in front of transformer doors shall have operable gate(s) for access

3. A minimum of 10'–0" working clearance MUST be maintained from the front of all equipment doors

4. A minimum of 3–0" clearance MUST be maintained from all sides of equipment

FIGURE 3

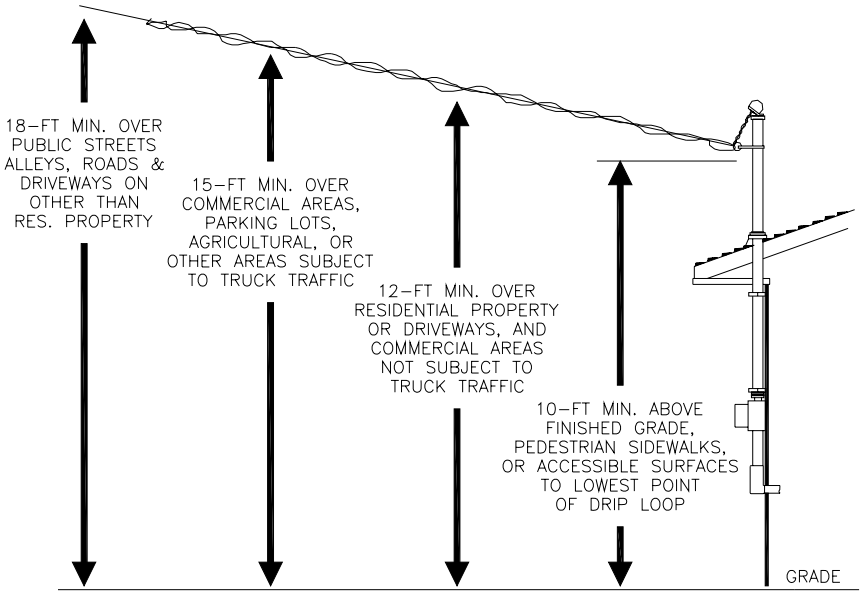
TYPICAL TRANSFORMER ENCLOSURE



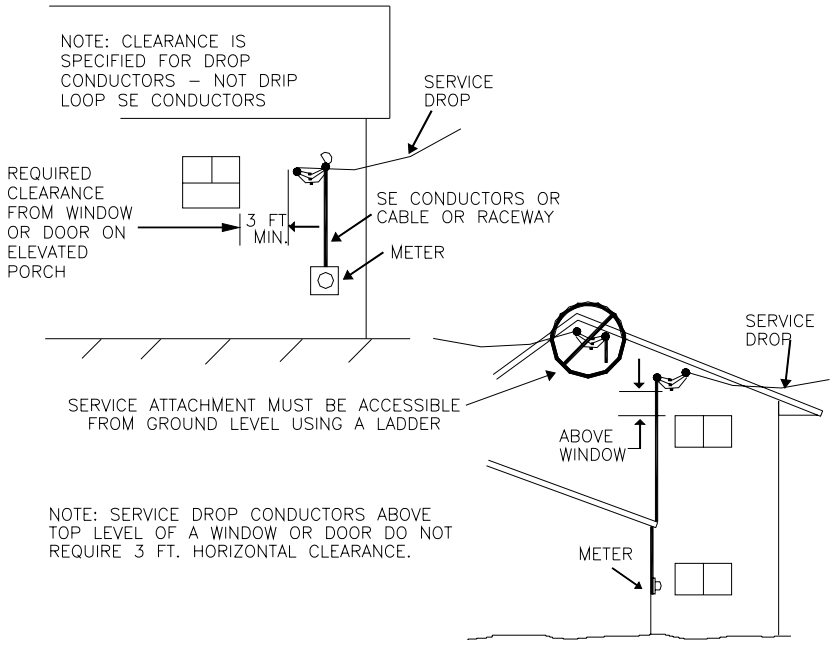
NOTES: 1. Electrician shall mark stud location for SHELD service attachment on homes with vinyl or aluminum siding

FIGURE 4

OVERHEAD SERVICE ENTRANCE FACILITIES



SERVICE DROP CLEARANCE TO GROUND



SERVICE DROP CLEARANCE TO BUILDING OPENINGS

FIGURE 5

SERVICE DROP CLEARENCE REQUIREMENTS

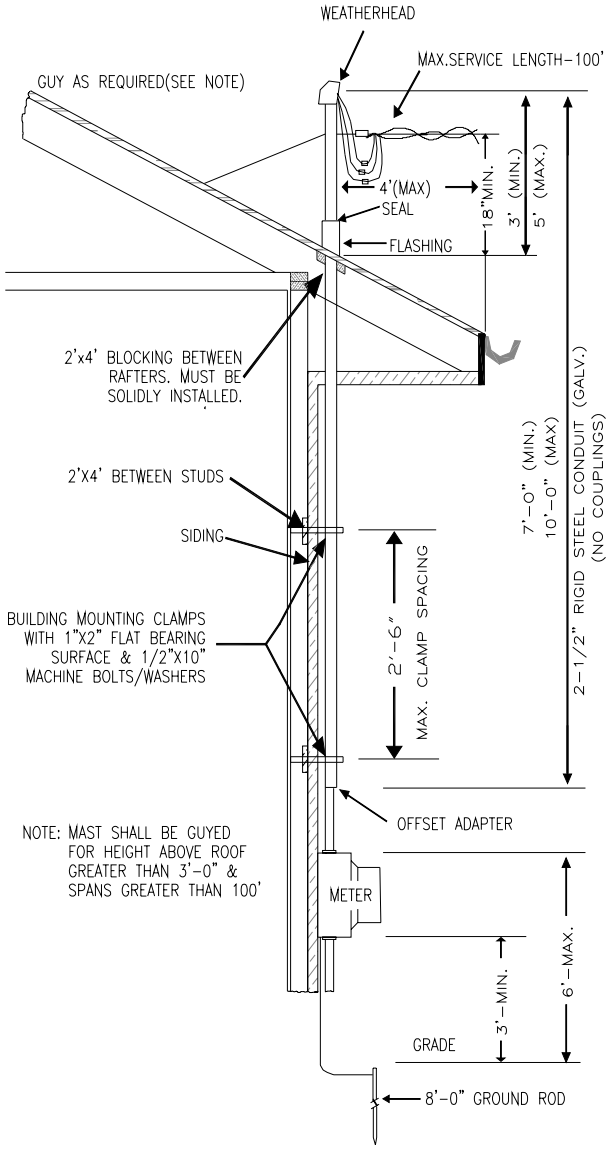


FIGURE 6

TYPICAL SERVICE MAST CONSTRUCTION
(SERVICE DROPS TO LOW BUILDINGS)

	INSULATED SUPPLY OR SERVICE DROP CABLES, 0–750 VOLTS TO GROUND. SUPPORTED ON AND CABLED TOGETHER WITH AN EFFECTIVELY GROUNDED BARE MESSENGER
A. CLEARANCE IN ANY DIRECTION TO THE WATER LEVEL, EDGE OF WATER SURFACE, BASE OF DIVING PLATFORM OR PERMANENTLY ANCHORED RAFT	18 FEET
B. CLEARANCE IN ANY DIRECTION TO THE DIVING PLATFORM OR TOWER	14 FEET
C. HORIZONTAL LIMIT OF CLEARANCE MEASURED FROM INSIDE WALL OF THE POOL	NOT LESS THAN 10 FEET TO WALLS OF POOL OR OUTER EDGE OF DIVING STRUCTURE

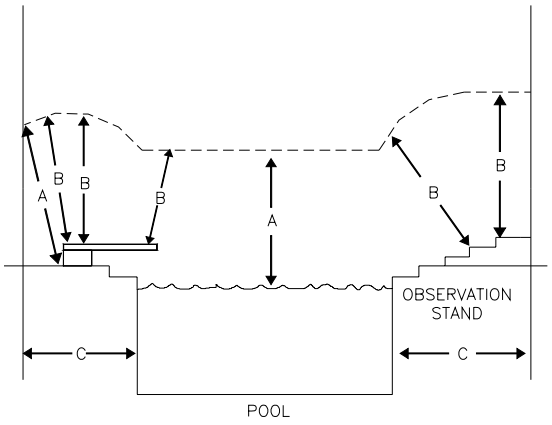


FIGURE 7

OVERHEAD CONDUCTOR CLEARANCES FROM SWIMMING POOLS

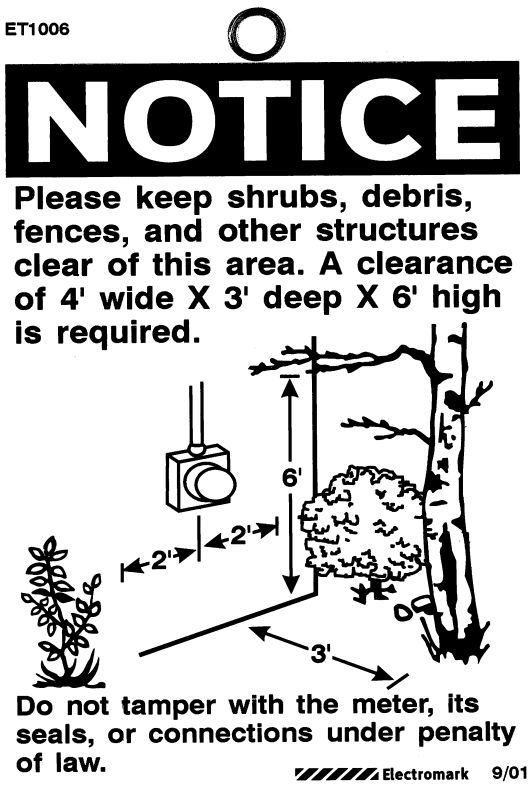


FIGURE 8
WARNING AND CLEARANCE DIAGRAM

NOTES: 1. All equipment, except watthour meter, shall be furnished and installed by the customer, unless specifically noted

2. SHELD will furnish and install wire from Department secondary conductors down to customer handhole

3. SHELD will make all service connections and disconnections

4. 24"x36"x15" fiberglass w/ steel cover & ground lug pentahead bolting, as manufactured by ITT Blackburn

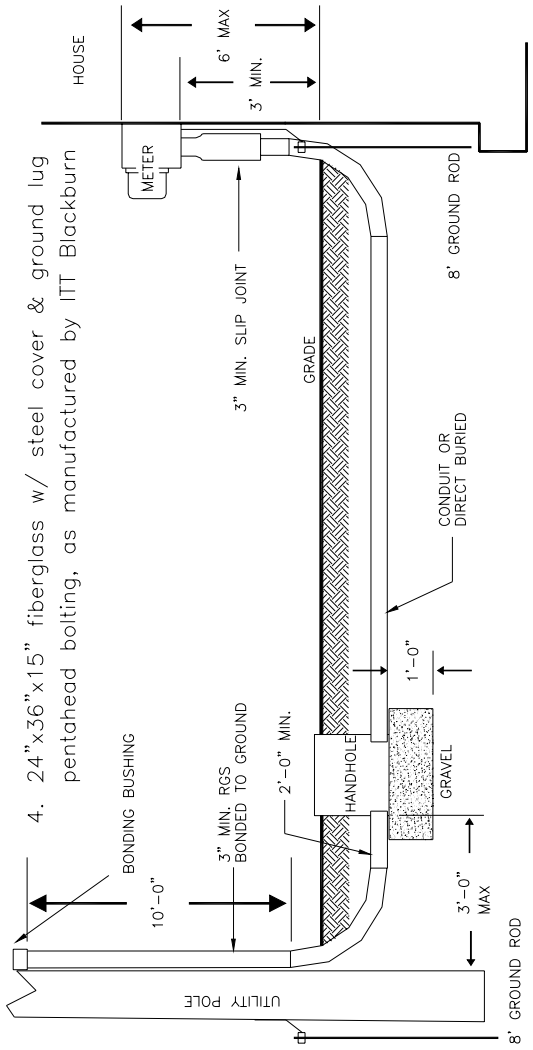


FIGURE 9

CUSTOMER SECONDARY RISER AND SERVICE LATERAL
600 VOLTS & BELOW

LEGEND

Ⓐ Equipment, oil insulated

Ⓑ Door

Ⓒ Window, operable

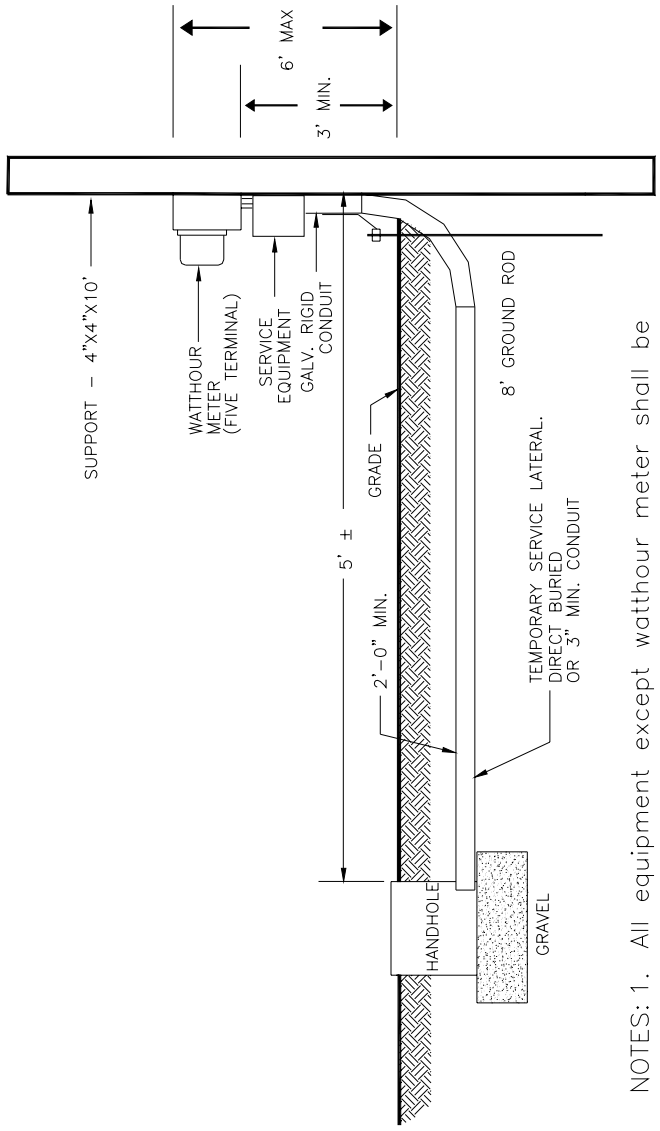
Ⓓ HVAC duct

NOTES:

1. Noncombustible material is defined as a meterial that will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. (NFPA 220–1979)
2. Building or any element of a building structure shall not overhang any part of the pad–mounted equipment.
3. When minimum required distances cannot be met, a noncombustible barrier, of minimum 6' height, shall be constructed
4. The minimum clearance of 10' shall be increased to 25' for exits from places of public assembly, such as an auditorium.

FIGURE 10

LOCATION OF PADMOUNTED EQUIPMENT



NOTES:
1. All equipment except watthour meter shall be furnished and installed by customer
2. SHELD will make all service connections and disconnections
3. Install eight foot (8') loop of service wire around handhole for SHELD connections

FIGURE 11

TEMPORARY SERVICE
UNDERGROUND DISTRIBUTION

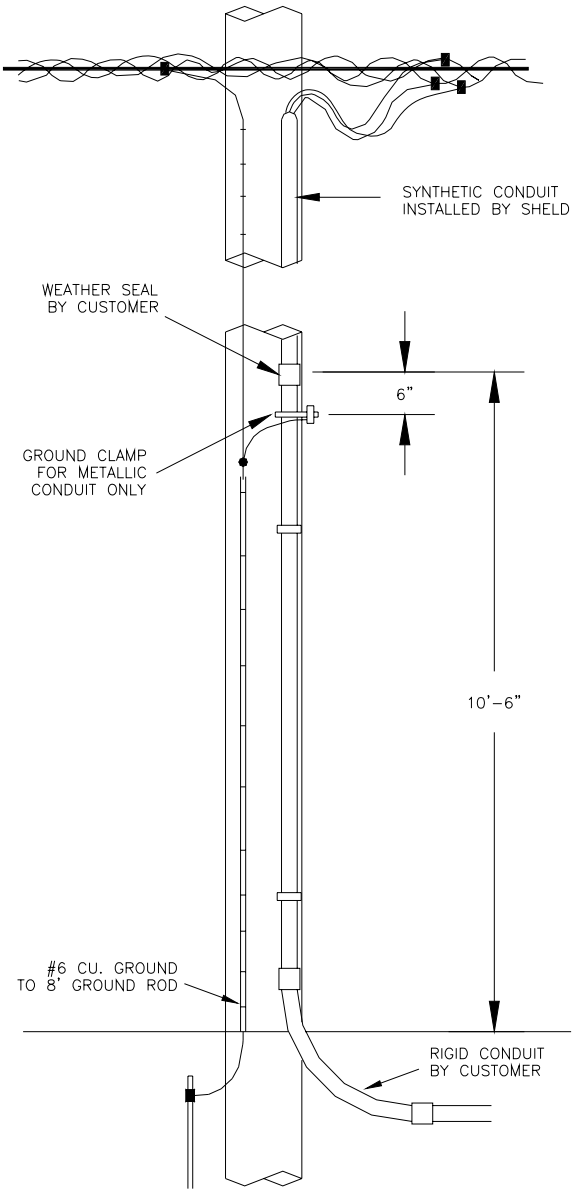
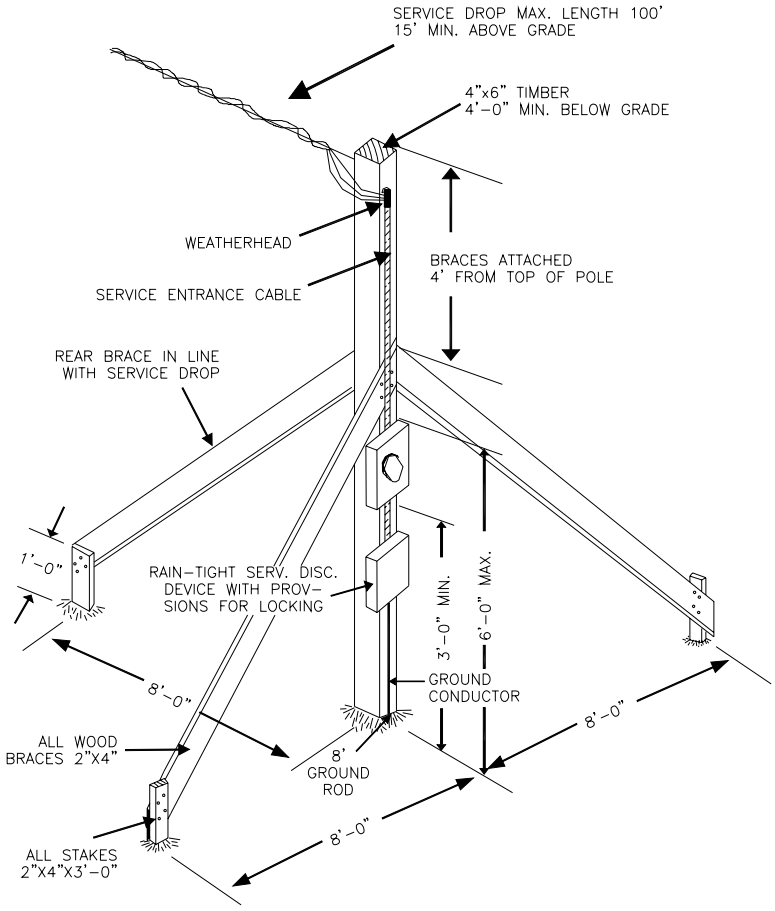


FIGURE 12

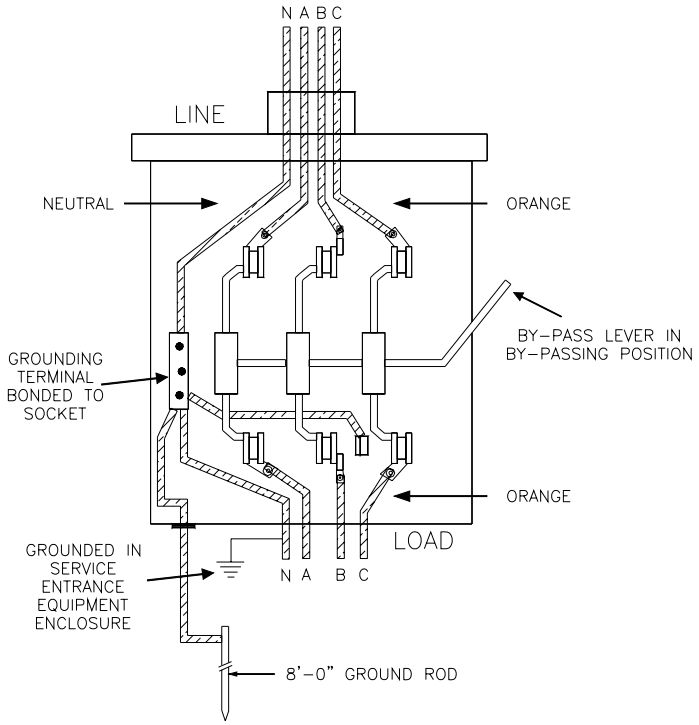
CUSTOMER SECONDARY RISER
600 VOLTS AND BELOW



NOTES: Ground fault protection where required.
Refer to applicable code.

FIGURE 13

TEMPORARY SERVICE STRUCTURE
OVERHEAD DISTRIBUTION

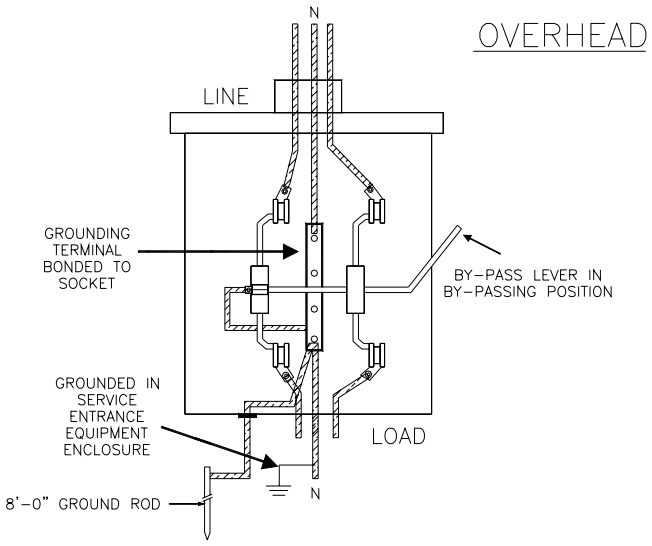


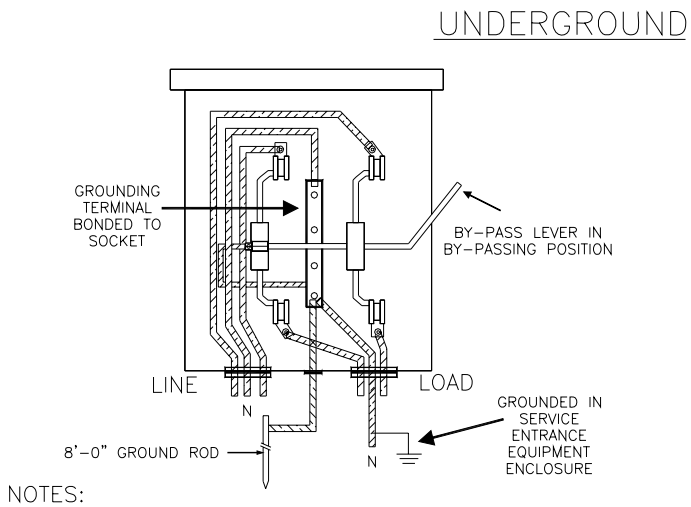
NOTES:

1. For installation on the following four–wire services
   A. 208/120 VOLT WYE
   B. 240/120 VOLT DELTA
2. For underground service, the supply must be connected to top terminals of meter socket
3. For 240/120 Volt Delta service, "C" phase conductor shall be the higher voltage–to–ground conductor, and be marked orange in color

FIGURE 15

3ø–4W SERVICE
7 TERMINAL METER SOCKET
200 AMP MAXIMUM



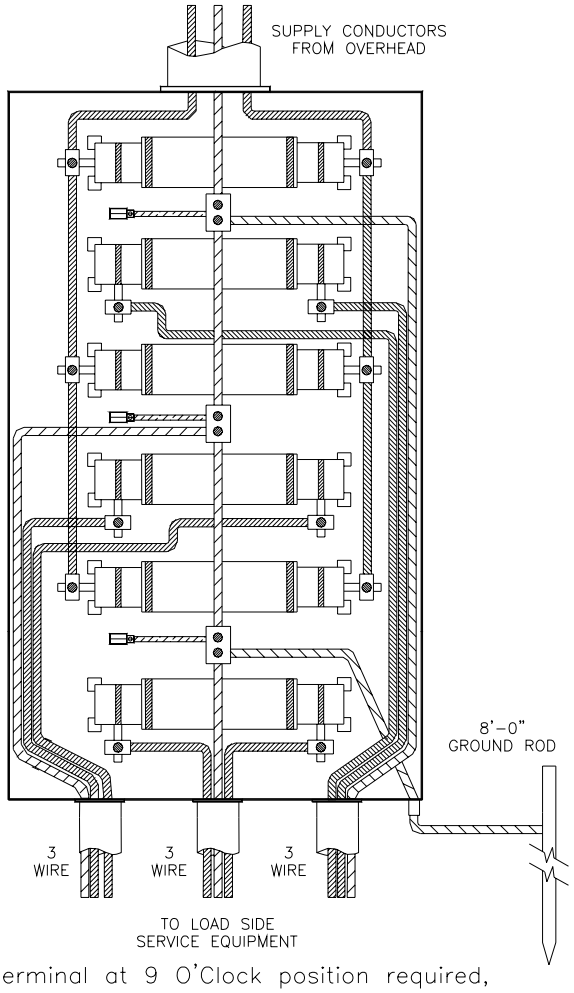


NOTES:

1. Fifth terminal at 9 O'Clock position required,
2. All meter sockets shall have a lever operated manual bypass with jaw release and flash shield

FIGURE 17

1ø-3W SERVICE
5 TERMINAL METER SOCKET
320 AMP MAXIMUM

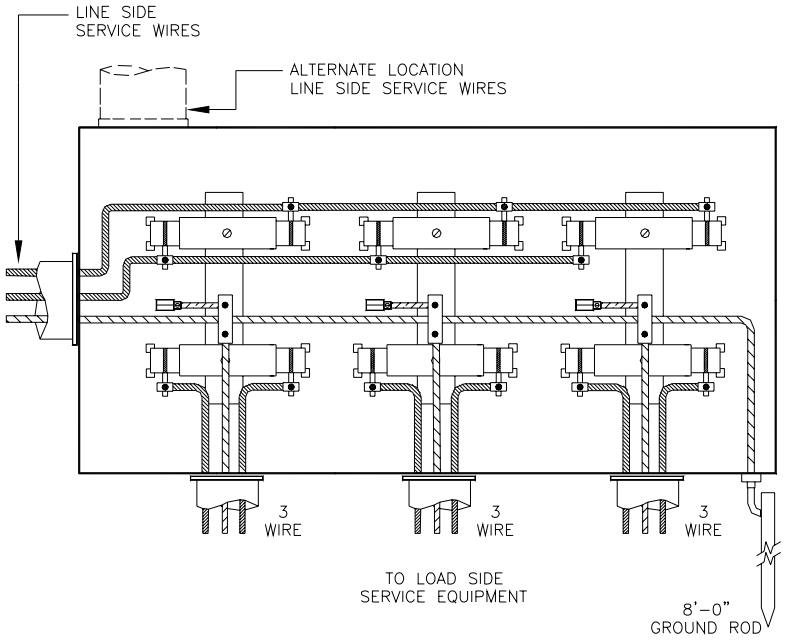


NOTES:

1. Fifth terminal at 9 O'Clock position required,
2. All meter sockets shall have a lever operated manual bypass with jaw release and flash shield
3. Outdoor installations limited to height of 3 vertical socket positions, and dimensions stated in Article 709
4. For installations greater than 3 socket positions or 3ø, consult SHELD for additional requirements

FIGURE 23

MULTIPLE METERS–VERTICAL MOUNTED TROUGH
1ø–3w SERVICE

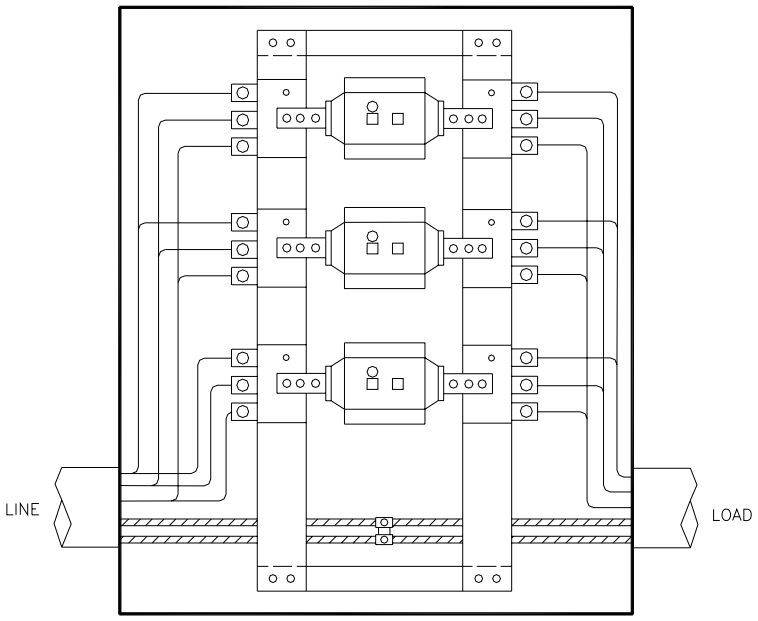


NOTES:

1. Fifth terminal at 9 O'Clock position required,
2. All meter sockets shall have a lever operated manual bypass with jaw release and flash shield
3. Outdoor installations limited to height dimensions stated in Article 709
4. For installations greater than 3 socket positions or 3ø, consult SHELD for additional requirements

FIGURE 25

MULTIPLE METERS–HORIZONTALLY MOUNTED TROUGH
1ø–3W SERVICE



NOTES:

1. Customer to furnish and install meter socket and conduit from CT cabinet
2. SHELD to furnish and install all required conductors from CT cabinet to meter socket
3. Consult SHELD regarding CT cabinet sizes

FIGURE 27

CURRENT TRANSFORMER INSTALLATION
3ø–4W SERVICE
208Y/120 & 480Y/277

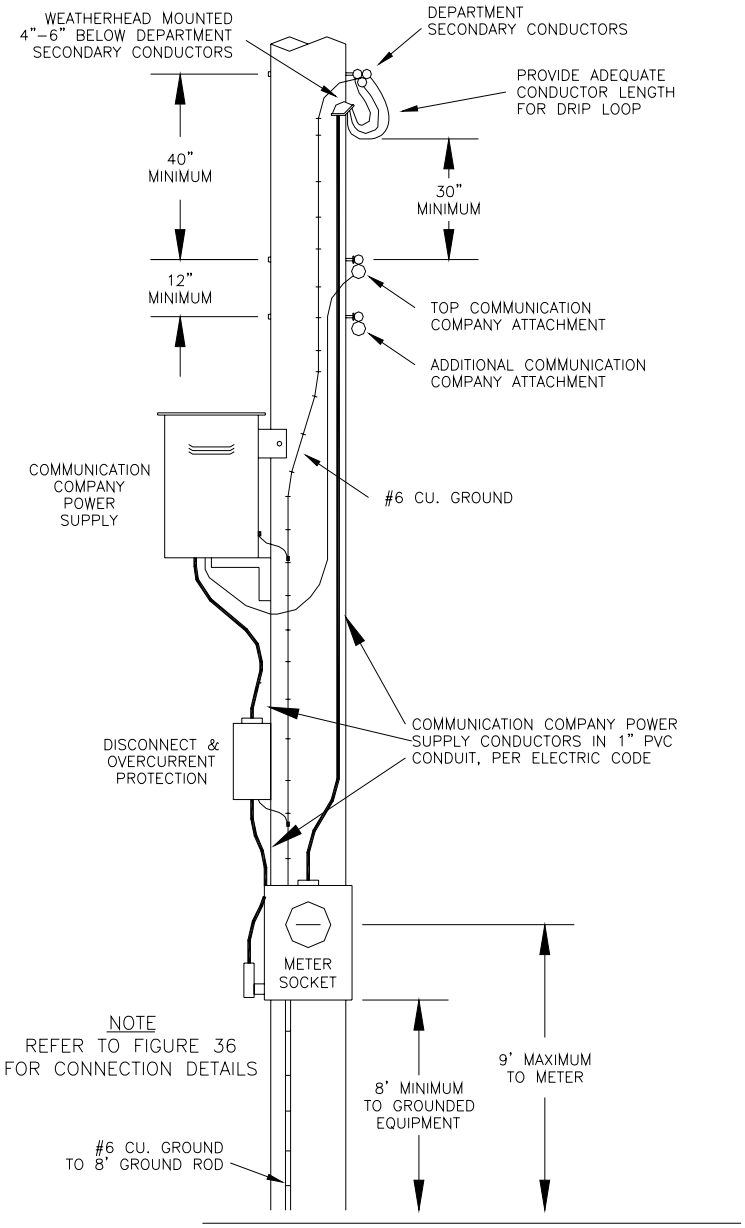


FIGURE 35

WOOD POLE INSTALLATION DETAILS
METERED POWER SUPPLY
TO COMMUNICATION INSTALLATIONS

LEGEND

A. Weatherhead – located to allow for driploop and secondary connections by SHELD

B. Conductors – #10 stranded copper, type THHN or THWN two black and one white

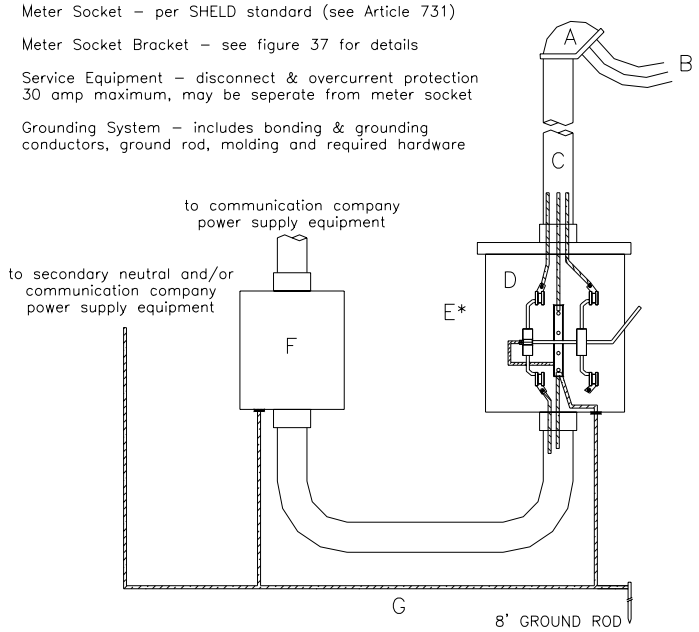
C. Conduit – 1" PVC, weather sealed to meter socket

D. Meter Socket – per SHELD standard (see Article 731)

E. Meter Socket Bracket – see figure 37 for details

F. Service Equipment – disconnect & overcurrent protection 30 amp maximum, may be seperate from meter socket

G. Grounding System – includes bonding & grounding conductors, ground rod, molding and required hardware

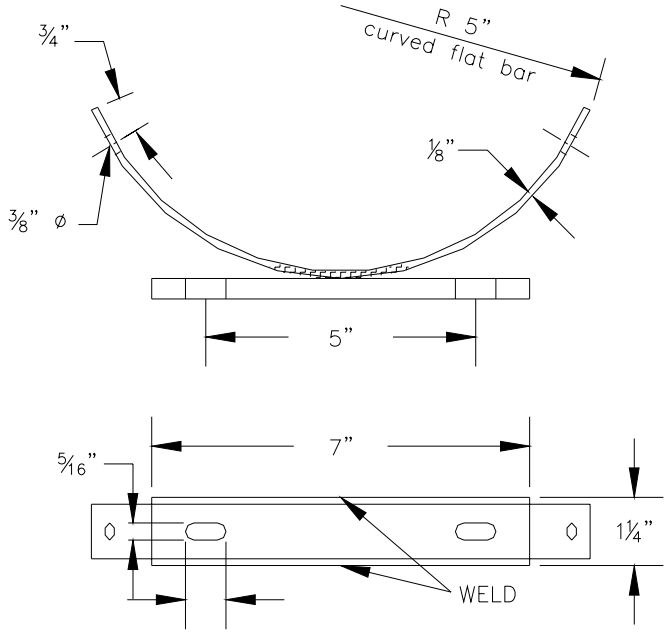


NOTES:

1. Communication company shall furnish and install items A through G, shown above
2. Item D (meter socket) shall be located on the quarter of the pole downsteam from traffic
3. Installer shall provide adequate grounding conductor at weatherhead for connection to SHELD aerial ground
3. SHELD will furnish and install all connections to department secondary conductors and aerial ground

FIGURE 36

WOOD POLE INSTALLATION
DETAIL OF CONNECTIONS
FOR COMMUNICATION INSTALLATIONS



NOTES:

1. Meter bracket assembly shall be hot–dip galvanized after fabrication

FIGURE 37

WOOD POLE INSTALLATION
DETAIL OF METER SOCKET BRACKET

NON-TEXT PAGE

EXCERPTS FROM GENERAL LAWS OF MASSACHUSETTS:

Chapter 82, Section 40

"No person, other than a direct employee of a public utility company, as defined in section three of chapter twenty-five, shall, except in an emergency, make an excavation in a public way unless at least forty-eight hours, exclusive of Saturdays, Sundays, and legal holidays, before the proposed excavation is to be made, he has given notice in writing of the proposed excavation to natural gas pipe line companies and to such public utility companies as supply gas, electricity, water or telephone service in the city or town in which such way is located. Such notice shall set forth the name of the street, or route number of the way, and a reasonably accurate description of the location in which the excavation is to be made. If such notice cannot be given as aforesaid because of an emergency, it shall be given as soon as may be practicable. Copies of such notices together with a statement certifying that they have been mailed or delivered to such public utility companies as required by the preceding provisions of this section shall be filed with the officer or board having charge of any such public way before a permit to excavate may be approved or issued, except in case of an emergency.

Where an excavation is to be made by a contractor as part of the work required by a contract with the Commonwealth or with any political subdivision thereof or other public agency, for the construction, reconstruction, relocation or improvement of a public way or for the installation of a railway track, conduit, sewer or water main, such contractor shall be deemed to have complied with the requirements of this section by giving one such notice setting forth the location and the approximate time required to perform the work involved to each of said companies.

Proper return notice shall be made by said companies designating the location, if any, of pipes or conduits in that portion of the public way in which the excavation is to be made. Any such excavation shall be performed in such a manner, and such reasonable precautions taken, as to avoid damage to the pipes or conduits in use under the surface of said way.

Nothing contained in this section shall be construed to affect or impair local ordinances or by-laws requiring permits to be obtained before excavating in a public way, except that, notwithstanding any contrary provision of local ordinances or by-laws, no permit to excavate in a public way shall be approved or issued by the officer or board having charge of any such way, except in an emergency, until such time as copies of such notices to public utility companies are filed by the applicant for a permit as required by this section.

Whoever violates any provision of this section shall be punished by a fine of not more than fifty dollars for the first offense and not less than fifty dollars nor more than one-hundred dollars for any subsequent offense."

Chapter 82, Section 40A

Excavations.

No excavator installing a new facility or an addition to an existing facility or the relay or repair of an existing facility shall, except in an emergency, make an excavation, in any public or private way, any company right-of-way or easement or any public or privately owned land or way, unless at least 72 hours, exclusive of Saturdays, Sundays and legal holidays, but not more than 30 days before the proposed excavation is to be made, such excavator has premarked not more than 500 feet of the proposed excavation and given an initial notice to

the system. Such initial notice shall set forth a description of the excavation location in the manner as herein defined. In addition, such initial notice shall indicate whether any such excavation will involve blasting and, if so, the date and the location at which such blasting is to occur.

Chapter 82, Section 41

"No person, other than a direct employee of a public utility company, as defined in section three of chapter twenty-five shall, except in an emergency, make an excavation in a defined utility company right-of-way or easement unless he shall first have given notice to said company in the manner required by section forty."

Chapter 82, Section 42

"No person, other than, acting in the course of his employment, an employee of a public utility company, as defined in section three of chapter twenty-five shall, except in an emergency and except while engaged in gardening or tilling the soil, make an excavation or change grade, with power equipment, on any privately-owned land serviced by a public utility company, municipal utility department or natural gas pipe line company which maintains underground facilities located on such land unless he shall first give notice to the company or department servicing said land at least forty-eight hours before commencing such excavation or change in grade. Such notice shall contain a reasonably accurate description of the location in which the excavation is to be made. If such notice cannot be given, as aforesaid, because of an emergency, it shall be given as soon as may be practicable."

Chapter 164, Section 116

Entry on Premises to Examine and Maintain Gas or Electric Meters.

"An officer or servant of a gas or electric company who is duly authorized in writing by the president, treasurer, agent or secretary of said company and who displays on his outer garment a suitable badge bearing his photograph, issued to him by his employer, identifying him as such officer or servant, may at any reasonable time enter any premises supplied with gas or electricity by such company for the purpose of examining or removing the meters, pipes, wires, fittings and works for supplying or regulating the supply of gas or electricity and of ascertaining the quantity of gas or electricity consumed or supplied; and if any person, directly or indirectly, prevents or hinders such officer or servant from so entering such premises or from making such examination or removal, such officer or servant may make complaint to any court or magistrate authorized to issue criminal process, who may thereupon issue a warrant directed to the sheriff or to any of his deputies, or to a constable of the town where such company is located, commanding him to take sufficient aid and repair to said premises accompanied by such officer or servant, who shall examine such meters, pipes, wires, fittings and works for supplying or regulating the supply of gas or electricity, and ascertain the quantity of gas or electricity consumed or supplied therein, and shall, if required, remove any meters, pipes, wires, fittings and works belonging to said company."

Chapter 164, Section 127

Intentional Injury to Electric Meter or Other Property; Penalty.

"Whoever unlawfully and intentionally injures or destroys, or suffers to be injured or destroyed, any meter, pipe, conduit, wire, line, pole, lamp or other apparatus belonging to a corporation engaged in the manufacture or sale of electricity or to any person, or unlawfully and intentionally prevents an electric meter from duly registering the quantity of electricity supplied, or in any way interferes with its proper action or just registration, or, without the consent of such corporation or person, unlawfully and intentionally diverts any electrical current from any wire of such corporation or person, or otherwise unlawfully and intentionally uses or causes to be used, without the consent of such corporation or person, any electricity manufactured or distributed by such corporation, or charged to such person, shall be punished by a fine of not more than one-hundred dollars or by imprisonment for not more than one year, or both."

Chapter 164, Section 127A

Theft of Electricity or Gas: Destruction of Injury to Meters, Wires, Conduits or Other Apparatus; Civil Penalties; Monetary Damages.

“Whoever unlawfully and intentionally injures or destroys, or suffers to be injured or destroyed, any meter, pipe, conduit, wire, line, pole, lamp or other apparatus belonging to a corporation, including municipal corporations which own municipal lighting plants engaged in the manufacture or sale of electricity or gas or to any person, or unlawfully and intentionally prevents an electric or gas meter from duly registering the quantity of electricity or gas supplied, or in any way interferes with its proper action or just registration, or without the consent

of such corporation or person, unlawfully and intentionally diverts or suffers to be diverted any electric current from any wire or gas from any pipe of such corporation or person, or otherwise unlawfully and intentionally uses or causes to be used, without the consent of such corporation or person, any electricity or gas manufactured or distributed by such corporation, or charged to such person, shall be liable to such corporation or person for triple the amount of damages sustained thereby or one thousand dollars, whichever is greater. Damages shall include the value of the electricity or gas used and the cost of equipment repair and replacement. Any damages assessed under the provisions of this section in excess of the actual damages sustained by the corporation or person manufacturing, distributing of selling such electricity, or gas shall be paid to the Commonwealth."

Chapter 166, Section 21 A

Coming into Close Proximity to High-Voltage Lines.

"No person shall require or permit any employee to operate a crane, power shovel or other such types of construction equipment in close proximity to overhead high-voltage lines; nor to enter upon any land, building or other premises to engage in construction work, including excavation, demolition, repair or other such work or to erect, install, operate or store in or upon such premises any machinery or construction equipment, including well drilling, pile driving or hoisting equipment, where it is intended to perform such work or operate such equipment in close proximity to overhead high-voltage lines unless and until contact with said high-voltage lines has been effectively guarded against in the manner hereinafter prescribed. For the purposes of this section and sections twenty-one B and twenty-one G, the words "in close proximity to overhead high-voltage lines" shall mean within six feet of such lines."

Chapter 166, Section 21 B

Protection of Overhead High-Voltage Lines.

"The operation or erection of any tools, machinery or equipment, or any part thereof capable of vertical, lateral, or swinging motion; the handling or storage of any supplies, materials or apparatus or the moving of any house or other building, or any part thereof, under, over, by or near overhead high-voltage lines, shall be prohibited, if at any time during such operation or other manipulation it is intended or necessary to bring such equipment, tools, materials, buildings or any part thereof within six feet of such overhead high-voltage lines, except where such high-voltage lines have been effectively guarded against danger from accidental contact, by either:

(1) The erection of mechanical barriers to prevent physical contact with high-voltage conductors; or

(2) De-energizing the high-voltage conductors and grounding where necessary. Only in the case of either of such exceptions may the six-foot clearance required be reduced. The required six foot clearance shall not be provided by movement of the conductors through strains impressed by attachments or otherwise upon the structures supporting the overhead high-voltage lines, nor upon any equipment, fixtures, or attachments thereon.

If neither (1) or (2) are practicable in the opinion of the utility company or other owner or operator of such overhead lines, and it is necessary to temporarily relocate the high-voltage conductors, mutually agreeable arrangements shall be made with the owner or operator of such lines for their temporary relocation.

(3) In addition to (1) and (2), an insulated cage-type guard or other effective protective device of a type approved by the commissioner or labor and industries shall be installed about the boom or arm of all hoisting or other such construction equipment, except backhoe or diggers being operated in proximity of overhead high-voltage lines.

(4) All mechanical barriers and all insulated protective devices referred to herein shall be such character and construction as are suited to work operations, and adequate for the electrical conditions to be encountered.

(5) All mechanical barriers and all insulated protective devices shall be maintained in good functioning condition and shall be subject to periodic inspection.

The provisions of this section and the preceding section, insofar as they require the erection of mechanical barriers or the de-energizing of high-voltage conductors, shall not apply to the transportation of a crane, power shovel or other similar types of construction equipment upon a public way when such equipment is being transported to a construction site."

Chapter 166, Section 21 C

Warnings; Operation of Equipment Near High-Voltage Lines.

"The owner, agent or employer responsible for the operation of equipment shall post and maintain in plain view of the operator on each crane derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver, or similar apparatus, any part of which is capable of vertical, lateral or swinging motion, an approved weather-resistant warning sign legible at twelve feet reading

"WARNING -- Unlawful to operate this equipment within SIX FEET of high-voltage lines.""

Chapter 166, Section 21 D

Warning Signs; Size; Posting.

"Warning signs shall be placed:

(1) Within the equipment readily visible to operator of cranes and other equipment when at the controls of such equipment;

(2) On the outside of equipment in such number and locations as to be readily visible to mechanics or other persons engaged in the work operations.

Warning signs shall be not less than five inches in height, nor less than seven inches in width."

Chapter 166, Section 21 E

Notification of Operation Near High-Voltage Lines.

"Before any operations are to be performed within six feet of any overhead high-voltage lines, the person or persons responsible for the work to be done shall promptly notify the utility or other company owning or operating the overhead high-voltage lines.

The work shall be performed only after satisfactory arrangements have been negotiated between the owner or operator of the lines and the contractor."

Chapter 166, Section 21 F

Exemptions; Definitions.

"The provisions of sections twenty-one A to twenty-one E inclusive, shall not apply to the construction, reconstruction, operation and maintenance of overhead electrical conductors and their supporting structures and associated equipment by authorized electrical workers; nor to any authorized person engaged in the construction, reconstruction, operation and maintenance of overhead electrical or communications circuits or conductors and their supporting structures and associated equipment of rail transportation systems, electrical generating, transmission or distribution systems, or communications systems.

As used in sections twenty-one A to twenty-one F, inclusive, the words "high-voltage" shall mean a voltage in excess of four-hundred and forty volts, measured between conductors, or measured between the conductor and the ground; the words "mechanical barrier" shall mean, temporary devices for separating and preventing contact between material or equipment and overhead electrical conductors such as:

(a) Series of poles or the equivalent;

(b) Non-conductive enclosures around conductors.

"De-energizing" shall mean removing the voltage from electrical conductors.

"Temporary relocation" shall mean:

(a) Removing electrical conductors from poles;

(b) Elevating electrical conductors from poles;

(c) Re-routing electrical conductors.

"Authorized person" shall mean:

(a) Employees of a light and power company with respect to the electrical system of such a company, and the employees of a transportation system with respect to the electrical circuits of such system;

(b) Employees of communication utilities, state, county or municipal agencies having authorized circuit construction on the poles or structures of an electric power company or transportation system or communication system;

(c) Employees of an industrial plant with respect to the electrical system of such plant;

(d) Employees of any electrical or communications contractor with respect to work under his supervision.

"Warning sign" shall mean a weather-resistant sign of not less than five inches by seven inches with a yellow background and black lettering reading as follows:

"WARNING -- Unlawful to operate this equipment within SIX FEET of high-voltage lines."

Chapter 166, Section 21 G

Violations; Fines and Penalties.

"Whoever violates any of the provisions of sections twenty-one A to twenty-one F, inclusive, shall be punished by a fine of not less than one-hundred dollars, nor more than one-thousand dollars or by imprisonment for not more than one year, or both."

Chapter 266, Section 30

Larceny.

“Whoever steals, or with intent to defraud obtains by a false pretense, or whoever unlawfully and with intent to steal or embezzle, converts, or secretes with intent to convert, the property of another…whether such property is or is not in his possession at the time of such conversion or secreting, shall be guilty of larceny, and shall…, if the value of the property stolen exceeds two hundred and fifty dollars, be punished by imprisonment in the state prison for not more than five years, or by a fine of not more than twenty-five thousand dollars and imprisonment in jail for not more than two years; of if the value of the property stolen…does not exceed two hundred and fifty dollars, shall be punished by imprisonment in jail for not more than one year or by a fine of not more than three hundred dollars…”

Chapter 266, Section 127

Malicious or Wanton Injuries to Personal Property.

“Whoever destroys or inures the personal property,… of another in any manner or by any means not particularly described or mentioned in this chapter shall, if such

destruction or injury is willful and malicious, be punished by imprisonment in the state prison for not more than ten years or by a fine of three thousand dollars or three times the value of the property so destroyed or injured, whichever is greater and imprisonment in jail for not more than two and one-half years, or if such destruction or injury is wanton, shall be punished by a fine of fifteen hundred dollars or three times the value of the property so destroyed or injured, whichever is greater, or by imprisonment for not more than two and one-half years; if the value of the property so destroyed or injured is not alleged to exceed two hundred and fifty dollars, the punishment shall be by a fine of three times the value of the damaged or injury to such property, or by imprisonment for not more than two and one-half months; provided, however, that where a fine is levied pursuant to the value of the property destroyed or injured, the court shall after conviction, conduct an evidentiary hearing to ascertain the value of the property so destroyed or injured. The words "personal property", as used in this section, shall also include electronically processed or stored data, either tangible or intangible, and data while in transit."

.

NON-TEXT PAGE

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION EXCERPTS

29 CFR 1910.333, Subpart C

Working on or Near Exposed Energized Parts.

(1) *Application*. This paragraph applies to work performed on exposed live parts (involving either direct contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

(2) *Work on energized equipment*. Only qualified persons may work on electric circuit parts or equipment that have not been de-energized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(3) *Overhead lines.* If work is to be performed near overhead lines, the lines shall be de-energized and grounded, or other protective measures shall be provided before work is started. If the lines are to be de-energized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating are provided, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

(I) Unqualified persons.

(a) When an unqualified person is working in an elevated position near overhead lines, the location shall be such that the person and the longest conductive object he or she may contact, cannot come closer to any unguarded, energized overhead line than the following distances:

(1) for voltages to ground 50kV or below – 10 feet (305 cm);

(2) for voltages to ground over 50kV – 10 feet (305 cm) plus 4 inches (10 cm) for every 10kV over 50kV.

(b) When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances give in paragraph (c) (3) (I) (a) of this section.

NOTE: For voltages normally encountered with overhead power lines, objects, which do not have an insulating rating for the voltage involved are considered to be conductive.

29 CFR 1926.550, Subpart N

Cranes and Derricks.

(15) Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part

of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

(i) For line rated 50kV or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;

(ii) For lines rated over 50kV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1kV over 50kV, or twice the length of the line insulator, but never less than 10 feet;

(iii) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50kV and 10 feet for voltages over 50kV, up to and including 345kV and 16 feet for voltages up to and including 750kV;

(iv) A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means;

(v) Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other regulation of this part even if such device is required by law or regulation.

(vi) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded;

(vii) Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:

(a) The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

(b) Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews shall be provided with non-conductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

(c) Combustible and flammable materials shall be removed from the immediate area prior to operations.

29 CFR 1926.651, Subpart P

Excavations.

(b) Underground Installations.

(1) The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during

excavation work, shall be determine prior to opening an excavation.

(2) Utility companies or owners shall be contracted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used.

(3) When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(4) While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

NON-TEXT PAGE

APPROVED METERING EQUIPMENT

SINGLE-PHASE * RESIDENTIAL/COMMERCIAL * OUTDOOR
All installations require a lever-operated bypass with flash shield
Three-Wire 120/240 Volt and Three-Wire 120/208 Volt

Manufacturer	Number of Positions	Type of Service	Ringless
100 Ampere:			
T & B/Anchor	1	OH	URS1395ML-S-K1-HO
Durham/Square D	1	OH	UBT-H4203
	1	OH	UBT-H4213
	1	OH	UBT-H5203 (120/208)
	1	OH	UBT-H5213 (120/208)
L & G/Siemens	1	OH	40405-OBNU
Milbank	1	OH	U3741-XL-100*
	1	OH	U2272-RL-5T9-BL
Murray	1	OH	RH173CRJ
200 Ampere:			
T & B/Anchor	1	OH/UG	TB2052-NU-4
Durham/Square D	1	OH	TB2052-OH-NU
	1	OH	UBT-H4203B
	1	OH	UBT-H4213T
	1	OH	UBT-H5203 (120/208)
	1	OH	UBT-H5213 (120-208)
	1	UG	1007995 (120/208)
	1	UG	1007994
L & G/Siemens	1	OH	S/40405-OBNU
	1	OH/UG	S/48805-OBNU
Milbank	1	OH	U9800-R-RL-QG-BL*
	1	OH/UG	U3791-RXL-200-BL*
	1	UG	U4721-0-BL
Murray	1	OH	RH173CRJNU
	1	OH/UG	RH178CRJN4

*Combination meter socket and disconnect device

METER PEDESTALS

*SINGLE-PHASE * RESIDENTIAL/COMMERCIAL * OUTDOOR*

All installations require lever-operated bypass with flash shield

Manufacturer	Number of *Positions*	Type of *Service*	*Ringless*
200 Ampere:			
Milbank	1	UG	U4322-0
	2	UG	U4323-0

SINGLE-PHASE * RESIDENTIAL/COMMERICIAL *
OUTDOOR

All installations require a lever-operated bypass with flash shield Three-Wire 120/240 Volt Only

Manufacturer	Number of Positions	Type of Service	Ringless
320 Ampere:	Three-Wire 120/240 Volt Only		
T&B/Anchor	1	OH/UG	TB44542-NU
Durham/			
Square D	1	OH	UBT-H4300T
	1	OH/UG	1008068
L&G/Siemens	1	OH	S/9804-9144
	1	OH/UG	S/9804-9146
Milbank	1	OH/UG	U4778-X-BL
Murray	1	OH	RK173AHJNU
	1	OH/UG	RK178AHJNU
Murray	1	OH	RK173AHJNU

320 Ampere:	Combination Meter Sockets and Disconnect Devices 120/240 Volt Only		
Millbank	1	OH/UG	U4835-X-2\200-BL
Murray	1	OH/UG	JB404S
	1	OH/UG	MM0404ML22L
Siemens ITE	1	OH/UG	W1MM1400
Square D	1	UG	CU12L400L