# **Shrewsbury Electric and Cable Operations**



100 Maple Avenue Shrewsbury, MA 01545

# Construction Handbook Electric

### **Table of Contents**

1	Introduction	Л
י. ר		4
Ζ.		5
a.	Plans and Documents	5
b.	Work Request	5
C.	Customer Payment	5
3.	Responsibilities	5
a.	SELCO scope of work	5
b.	Customer/ Developer scope of work	6
C.	Existing Installations	6
4.	Inspections	6
5.	Underground Construction Requirements	7
a.	Layout and Grading	7
b.	Trenching and Backfilling	7
C.	Conduit Installation	8
d.	Fiberglass Transformer Foundation (Single Phase)	9
e.	Secondary Pedestal	10
f.	Primary Junction Boxes	10
g.	Riser Pole	.11
h.	Bollard Protection	.11
6.	Overhead Construction Requirements	11
7.	Services	12
8.	Meters	12
9.	Street Lighting	13
10.	Easements	13
Арр	endix	14
I.	Load Data Sheet	15
11.	One-line diagram for loop feed URD system	16
	. Express feed one-line diagram for radial URD system	.17
١V	/. Trench/ Duct Bank Detail	18
V	Fiberglass transformer pad installation specification	19

VI.	Single Phase Fiberglass Transformer Pad cut-sheet	20
VII.	Transformer vault (concrete) pedestal – Single phase 100kva	21
VIII.	Transformer vault (concrete) pedestal – 3 phase up to 75kva	22
IX.	Transformer vault (concrete) pedestal – 3 phase 75-500kVA	23
Х. Т	ransformer vault (concrete) pedestal – 3 phase 750-2500kVA	24
XI.	Fiberglass Junction box specification	25
XII.	Single Phase Fiberglass Junction Enclosure cut-sheet	26
XIII.	Three Phase Fiberglass Junction Enclosure cut-sheet	27
XIV.	Ground Grid for Underground Equipment	28
XV.	Bollard Protection Detail	29
XVI.	Secondary pedestal specification	30
XVII.	Secondary Pedestal cut-sheet	31
XVIII.	Secondary Handhole – Concrete Enclosure cut sheet	32
XIX.	Secondary Handhole Cover – Concrete Enclosure cut sheet	32
XX.	Meter Socket Placement Detail	33
XXI.	Overhead Temporary Service Detail	34
XXII.	Underground Temporary Service Detail	35
XXIII.	Secondary Riser Pole Detail	36
XXIV.	Decorative Street Light Pole – Broadway	37
GRAN	NT OF EASEMENTS	39

# **1.** Introduction

Shrewsbury Electric and Cable Operations (SELCO) provides electricity and communications services to the town of Shrewsbury, MA subject to our Terms and Conditions, policies and procedures, rate schedules, and industry standards found on the SELCO website and within this handbook. This booklet is designed to provide you with information regarding the construction requirements that are mandated by SELCO. This booklet is not intended to ensure adequacy and safety of the customer's wiring and equipment; such responsibility remains with the customer. These requirements do not relieve the customer from the obligation of complying with all applicable codes, statutes, rules or regulations, nor shall SELCO be deemed to have accepted any responsibility for the condition of the customer's wiring and equipment.

The Construction Handbook may be revised, amended or approved when necessary and all changes shall supersede any and all previous versions. SELCO Engineering has the responsibility of making interpretations of all rules, decisions on equipment and materials, and granting of special permissions where applicable. SELCO cannot guarantee to give notice of revisions to persons who may have received this handbook. The most recent version of this handbook is available on the SELCO website.

#### Failure to comply with our requirements, applicable codes, or orders of enforcement authority can result in our refusal to energize an electric service or cause a suspension of an existing service. Contact Information

Customer Service: 508-841-8500

Website: https://www.selco.shrewsburyma.gov/home

Wiring and Work Requests: https://www.selco.shrewsburyma.gov/wiring

#### Project Coordination and Field Support

Contact our Engineering department for field support for construction and questions on new projects. This includes inspections of trenches, transformer foundations, meter socket locations, and any required SELCO construction.

Email: <a href="mailto:selcoeng@shrewsburyma.gov">selcoeng@shrewsburyma.gov</a>

#### **Operating Hours**

All SELCO construction and SELCO inspections shall be conducted during SELCO's normal operations hours. Any construction or inspection that cannot be completed during normal operating hours is subject to overtime labor and administration costs as applicable. SELCO personnel do not complete non-emergency work in inclement weather.

### 2. General Requirements

### a. Plans and Documents

Customer will provide, in advance and at no cost to the SELCO, the following:

- i. The total number of house lots proposed to be constructed;
- ii. A complete copy of the subdivision plans, on a scale not less than one-inch equal to one hundred feet, approved by the Shrewsbury Planning Board. The SELCO will not begin design work prior to receipt of the approved plans.
- iii. Easements for all facilities are required to serve the development;
- iv. A copy of a street light proposal for the development, approved by the Planning board.
- v. A schedule of customer's best estimated timeline for the construction of homes in the development; and
- vi. Such other reasonable information that may be requested to confirm the viability of the development.

### b. Work Request

- i. Customer/ Developer shall create a SELCO work request and fill out a SELCO Load Data Form (*Appendix I*).
- ii. SELCO design and planning will commence after the load data sheet is submitted with total estimated/ connected load
- iii. Permits/Work requests can be opened at the web address mentioned in Introduction.

### c. Customer Payment

i. Construction shall not begin until the Customer makes any required payment to SELCO.

### 3. Responsibilities

### a. SELCO scope of work

- i. SELCO's Engineering Department shall design the electrical distribution layout on the Auto CAD plan provided by the developer/contractor. SELCO's Engineering Department shall also schedule the order in which equipment shall be installed and energized.
- ii. SELCO's Engineering Department will estimate the construction cost for service, which the developer must pay before installation begins.
- iii. Supply and install all primary conductors, primary connections, primary load break elbows, primary terminations, and associated equipment and materials.
- iv. Install all transformers, switchgear, and associated equipment and materials unless otherwise specified by SELCO.
- v. Perform all high voltage acceptance tests on primary conductors and associated electrical equipment.

vi. Perform all required overhead line work to bring necessary power to the underground system.

### b. Customer/ Developer scope of work

- i. Perform excavating, installing and backfilling work required for all electric facilities. This would include excavating for primary conduits, secondary crossings, CATV/communications conduits, CATV hand holes, etc.,
- ii. Install per SELCO specifications foundations, conduit and wire for SELCO owned street lights
- iii. Provide and install all transformer pads, junction enclosure pads, and/or manholes, hand holes and build covers to meet established grades as specified by SELCO.
- iv. Items part of SELCO estimate can be picked up at the SELCO Service Area (Ex: Fiberglass Transformer pad, Junction Box, Handholes, Secondary Pedestal, etc.,)
- v. Provide and install all grounding systems (i.e. Ground wire, ground rods, connectors, etc.) per SELCO specifications *Appendix XIV*.
- vi. Developer/Contractor must call SELCO to have all conduit installations inspected for approval before backfilling trench.
- vii. Developer/Contractor must backfill trenches and openings around pads with the proper materials, properly compacting trenches and openings around pads.
- viii. Developer/Contractor must have respective lot corners, transformer pads and hand hole placements, surveyed by licensed surveyors.
- ix. Purchase, install and own all secondary conductors, connectors and connection blocks within the property.
- x. Purchase and install meter sockets at customer service entrance per SELCO's specifications and designated location
- xi. Supply and install secondary conductors, and secondary connections up to the final secondary hand hole, if necessary.

### c. Existing Installations

- i. All existing URD house services that are direct buried or in conduit of any size or type is the sole responsibility of the customer/ homeowner.
- ii. SELCO will serve and maintain all existing URD/ OH furnishings that are owned by SELCO up to the demarcation point determined by SELCO.

### 4. Inspections

- a. SELCO shall be responsible for the inspection and approval of all primary conduit systems being prepared and installed by the customer, at various stages of installation
- b. The Town of Shrewsbury Wire Inspector shall be responsible for inspecting all secondary electrical service conduits and wiring feeding homes and buildings.
- c. The inspection shall include, but not be limited to the following:
  - i. All trenches and excavations (Appendix IV)
  - ii. All material supplied by the Customer;
  - iii. All backfill and base sand material during or after installation as applicable;

- iv. All foundations, pull-boxes, handholes, and other facilities, after setting in place, but prior to backfilling;
- v. All riser pole conduit installations, all conduit, including cemented joints, bends, sweeps, bell-ends and conduit spacers, prior to backfilling, or concrete encasement;
- vi. All conduit terminations and supports at transformer foundations, pull-boxes, handholes, switch/fuse module foundations, riser poles, streetlight foundations, and at other applicable locations;
- vii. The pouring of any required concrete encasement and subsequent backfilling around the conduit runs;
- viii. All backfilling operations

### **5. Underground Construction Requirements**

### a. Layout and Grading

i. Final grades shall be established and the binder coat installed, and easement boundaries, street, lot, and trench lines staked by the customer before any trenching is started (except for SELCO inspected road crossings).

### b. Trenching and Backfilling

- i. The Customer shall adhere to the construction plan specifying trench locations and depths, with any deviation being subject to approval by the SELCO;
- ii. Minimum burial depths specified for all electric conduit shall be maintained during all phases of construction. Temporary mechanical protection over buried conduit during construction to prevent conduit crushing or damage due to unusually heavy construction equipment shall be the responsibility of the Customer;
- iii. Trench detail shown in attached SELCO standards *Appendix IV* shall be adhered to. The trench bottom shall be solid, undisturbed earth. Earth showing signs of peat, cinders, rubble or any conditions not suitable for a stable foundation shall be reported to the SELCO's representative for recommendation. Pockets of unsuitable soil shall be replaced with compacted sand;
- iv. The SELCO's representative shall be notified in advance of the backfilling of any electric facility, i.e., conduit, foundation, handholes, pull-box, cable-in-conduit, grounding, etc.
  - 1. If any facility is backfilled without the SELCO's prior approval, the SELCO reserves the right to require re-excavation of the facility;
  - 2. A minimum of **six inches** of sand shall be placed under, beside, around, and on top of all electric conduits. The sand shall pass through a 3/8 inch mesh screen and shall not contain any sharp stones;
  - 3. Sand shall be placed and suitable tamped over installed conduit in reasonable small quantities (not a front end loader bucketful all at once) to avoid conduit damage. Sand shall be evenly distributed between and around all electric conduits.
  - 4. Remainder of backfill shall not contain stones greater than one inch and shall not contain ashes, cinders, shell, or frozen material;

- 5. Trenches shall be immediately backfilled following conduit system inspection and approval by authorized SELCO representative;
- 6. Backfilling shall be accomplished in a continuous manner from one terminal, i.e., riser pole, foundation, handholes, etc. to the next;
- 7. Backfilling over any concrete encasement shall not commence less than two hours after concrete pouring;
- 8. Backfilling shall not take place over any open-ended (unplugged) conduits;
- 9. SELCO approved red cable "Warning" or "Marking" tape shall be installed in the trench twelve inches below finished grade and directly above the conduit line.
- v. Conduit shall be encased in a **3 inch** envelope of concrete under following conditions:
  - 1. Brook crossings.
  - 2. Crossings of water, sewer, and gas pipelines. Crossings shall be done at ninety degrees if possible. Normally, the electrical conduit shall be a minimum of 18 inches above the pipe. Carefully compact the fill below the electrical conduit. Concrete encasement is required for 10 feet on each side of the pipe.
  - 3. Under all traveled ways subject to vehicular traffic.
  - 4. Conduits within 20 feet of tanks containing fuels, or solvents. This shall apply regardless of whether the tanks are above or below grade.
  - 5. Check with SELCO for the encasement requirement for communication conduits.

### c. Conduit Installation

- i. Conduit shall be installed in accordance with Standards and Construction Plans, which accompany this specification package.
- ii. Plastic spacers shall be used to separate all ducts where more than one duct is installed. Spacers shall not exceed eight-foot intervals. Spacers shall be placed at each coupling. Spacers are required to maintain proper separation from adjacent conduits and to aid in proper sand placement for thermal reasons.
- iii. Type DB **schedule 40** conduit shall be employed whether the duct is direct buried or encased in concrete. When under driveway or roadway crossing schedule 80 shall be used.
- iv. All sweeps at risers shall have a minimum radius of thirty-six inches and shall use rigid metal sweeps. Refer *Appendix XXIII*
- v. All risers shall be a **10ft** section of rigid metal conduit and a bonding terminal shall be provided to ground to.
- vi. Conduit sweeps in a single pull stretch cannot exceed 360 degrees
- vii. Curves and bends in conduit runs shall be gradual, and the radius of curvature shall not be less than forty feet.
- viii. Conduit grade shall be such as to cause all ducts to drain toward one or both equipment foundations, pull-boxes or handholes. Minimum pitch shall be three inches per 100 feet.
- ix. Conduit shall have a maximum penetration inside walls of pull/splice boxes, equipment foundations or handholes of **6 inches**. All unused conduits and conduit knockouts shall be sealed with conduit plugs.
- x. Conduit entering transformer foundations shall be installed as shown in SELCO transformer pad installation specification drawing.
- xi. All road crossings shall, when practical, be perpendicular to the sidelines of the road.
- xii. Where foreign objects threaten to interfere with the installation of conduit in the sidewalk area or other areas, the SELCO may require concrete encasement of the conduit.
- xiii. All conduits shall be marked with black permanent marker as follows:

- 1. PM = PRIMARY MAIN
- 2. PEx = PRIMARY EXPRESS
- 3. H# = HOUSE # (WRITE # OF HOUSE NEXT TO H.)
- 4. SPL = SECONDARY PEDESTAL LEFT
- 5. SPR = SECONDARY PEDESTAL RIGHT
- 6. SL = STREET LIGHT
- xiv. The minimum separation between electrical conduit and foreign conduit or pipes shall be as follows:
  - 1. Communication systems twelve inches;
  - 2. Water, gas, and sewer twelve inches where the paths of these utilities intersect electrical conduits at approximately right angles. A minimum separation of ten feet shall be maintained between parallel placement of any of these utilities and electrical conduits.
- xv. All electrical trenches shall have a **thirty-inch** burial depth, top of conduit to finished grade, for both primary and secondary voltages.
- xvi. Electrical conduit sizes shall be as follows:
  - 1. **One** 3 inch for 100amp, 200amp and 400amp house services
  - 2. **One** 4 inch for secondary crib (transformer to pedestal)
  - 3. **Two** 4 inch for single phase primary cable
  - 4. **Two** 5 inch for three phase primary cable
  - 5. **One** 2 inch conduit for Town street lights

**Note:** House service conduit sizes used other than specified will still need to be accepted by the Town Wire Inspector, however if the service ever fails, the sole replacement cost for the wire and/ or conduit will be the responsibility of the homeowner within their property.

#### d. Fiberglass Transformer Foundation (Single Phase)

- i. All foundations shall be level and installed in accordance with specifications available at the Light Department Operations office. Call to schedule pick up of transformer foundation at SELCO.
- ii. A minimum of **12 inches** base course of crushed stone (3/4 inch max. stone size) shall be placed under all transformer foundation excavations and shall be thoroughly compacted using a vibratory compactor. Certain soil conditions may require removal below normal depth and subsequent additional clean sand or stone added and compacted to insure sound base course for foundation. (Appendix V)
- iii. Two 5/8"x 8' copper ground rods shall be placed at opposite corners on the outside of the transformer foundation. A 1/0 bare continuous copper ground grid shall encircle the foundation, connect to the ground rods, and both ends inside the foundation with 20ft of slack. (Appendix XIV)
- iv. Transformer foundation top surfaces shall be **3 inches** above final grade. In no instance shall final grades hamper proper access or operation of equipment.
- Retaining walls or other devices shall be installed where slopes exist that would undermine or cover equipment, such as transformers due to sharp drop-off or rise.
  **Note:** In most instances, the SELCO shall require that equipment easements on private property be reasonably level. Also, all retaining walls shall fall outside of equipment easements and in no case shall they hamper door openings or placement of such equipment. Retaining wall design shall be approved by the SELCO.

- vi. Upon completing the installation of the transformer foundation, the top opening shall be securely sealed with a suitable matching cover.
- vii. Transformer foundation shall be completely backfilled prior to commencing any cable pulling.
- viii. Transformer foundations shall have a 50ft minimum of clearance from any fire hydrant.
- ix. Transformer foundations shall have a minimum of 3ft clearance on both sides, 8ft clearance to the back, and 10ft clearance to the front.

### e. Secondary Pedestal

- i. Secondary Pedestals shall be installed in accordance with specifications available at the Light Department Operations office. Call to schedule pick up of secondary pedestals at SELCO.
- ii. Secondary Pedestals shall be installed such that their indicated "Ground Line" is at finish level grade. (Appendix XVI)
- iii. A minimum of **12 inches** base course of crushed stone (3/4 inch max. stone size) shall be placed under all secondary pedestal excavations and shall be thoroughly compacted using a vibratory compactor. Certain soil conditions may require removal below normal depth and subsequent additional clean sand or stone added and compacted to insure sound base course for foundation.
- iv. Secondary Pedestals shall only be placed within private property equipment easements. They shall not be placed within the sidewalk area or within the traveled way.
- v. Secondary Pedestal covers shall be secured immediately upon completion of their installation and backfilling.
- vi. Secondary Pedestals shall have a 50ft minimum of clearance from any fire hydrant.
- vii. Secondary Pedestals shall have a minimum of 3ft clearance on both sides, 8ft clearance to the back, and 10ft clearance to the front.

#### f. Primary Junction Boxes

- i. Primary junction box shall be installed in accordance with specifications available at the Light Department Operations office. Call to schedule pick up of primary junction boxes at SELCO.
- ii. A minimum of **12 inches** base course of crushed stone (3/4 inch max. stone size) shall be placed under all primary junction boxes and shall be thoroughly compacted using a vibratory compactor. Certain soil conditions may require removal below normal depth and subsequent additional clean sand or stone added and compacted to insure sound base course for foundation. *(Appendix XI)*
- iii. **Two** 5/8"x 8' copper ground rods shall be placed at opposite corners on the outside of the primary junction box. A **1/0** bare continuous copper ground grid shall encircle the foundation, connect to the ground rods, and end inside the primary junction box with **20ft** of slack.
- iv. Final grade shall be brought to the first step of the box (**11 inches** below penta bolt) In no case shall final grade cover or hamper access to their covers.
- v. Covers will be left secured to box when unattended. Boxes shall be suitably protected during construction to avoid their damage.
- vi. The area surrounding primary junction boxes shall be completely backfilled before any cable pulling shall commence.
- vii. Primary junction boxes shall have **50ft** of clearance from any fire hydrant
- viii. Primary junction boxes shall have a minimum of **3ft** clearance on both sides, **6ft** clearance to the back, and **10ft** clearance to the front.

### g. Riser Pole

- i. SELCO shall designate conduit riser locations on the pole(s). (Appendix XXIII)
- ii. All spare riser bends shall be terminated in a coupling and plugged or capped, above ground at the pole base.
- iii. All risers shall be a 10ft section of rigid metal conduit. If rigid metal conduit is used then a bonding terminal shall be provided to ground to.

### h. Bollard Protection

- i. SELCO reserves the right to determine if protection of equipment is necessary in the form of bollards, etc.
- ii. Protective bollards shall be installed in accordance with SELCO specifications. Refer *Appendix XV*
- iii. When fiber enclosures are adjacent to electric pad mount equipment the bollards shall surround both electric and communications equipment.

### 6. Overhead Construction Requirements

- a. No new construction shall have overhead service connection.
- b. Only one service of the same voltage will be run to a single building except as otherwise permitted by the local wiring inspector and SELCO.
- c. Where a building is too low to maintain the minimum clearances, the property owner shall install a service mast of suitable height and strength, guyed if necessary. When such a service is installed, the property owner shall be responsible for the installation including any roof leaks, storm damage and repairs. Only power service drops shall be attached to such a mast.
- d. The maximum length of a service drop will be determined by the characteristics of the load to be served and the terrain over which the service drop passes.
- e. SELCO will furnish and install the service drop to the point of attachment located on the building or other location and connectors to connect the service drop to the property owner's service entrance conductors. The property owner shall furnish and install all necessary service entrance equipment beyond the service drop attachment.
- f. Where it is considered necessary by SELCO for the proper installation of large capacity overhead service conductors, the property owner shall supply a suitable attachment in the building's exterior wall to support the service drop(s).
- g. For services to semi-permanent mobile homes, the property owner shall install the meter socket with integral main breaker on a suitable service entrance structure separated from the mobile home.
- h. Overhead services at private property must be kept clear of vegetation including trees, branches, and shrubs.
- i. Temporary overhead service structure shall be constructed in accordance with drawing on *Appendix XXI*. Temporary structures must be inspected and approved by the local wiring inspector and must be removed within 2 years.
- j. Standard temporary overhead service shall be defined as: Single phase 120/240V, spanning no more than 120 linear feet. Building heights, large conductors, or the necessity for street, driveway, or sidewalk crossings may reduce maximum permissible spans.
- k. Customer installed services shall be sized to limit voltage drop to less than 3.5%

### 7. Services

- a. Residential services shall be single-phase, three-wire, 120/240 volts nominal.
- b. Services shall terminate at SELCO secondary pedestals or transformer foundations with sufficient cable left to allow the SELCO to make final electrical connections.
- c. Secondary wire size **350** or bigger installations are required to inform SELCO in advance to schedule and provide one-hole compression lugs sized appropriately for each wire at transformer spades.
- d. Secondary **Parallel** service installations are required to inform SELCO to schedule
- e. Services shall not be connected until:
  - i. Service request form filled out at SELCO (you will receive a Work Request #)
  - ii. Electric permit is filed with the Town (have your Work Request # ready)
  - iii. Submit a copy of recorded easement paperwork
  - iv. Complete the 100% construction work payment.
  - v. Once the wiring inspections are passed and signed off on the portal, contact the SELCO office for meter sign-on.
  - vi. SELCO Operations schedules the connection (all above must be completed)

### 8. Meters

- a. SELCO engineering should be contacted to determine the socket location early in the project to prevent rework, or delays. SELCO ultimately has final determination where new electric meters will be located. (*Appendix XX*)
- b. Meters will not be installed until necessary wiring permit approvals have been received by the SELCO. SELCO will own, furnish and install the revenue meters. Property owners/contractors shall not remove locks or seals from SELCO metering equipment
- c. All single-phase residential and commercial meters sockets on new construction with commercial application shall have a **mechanical bypass**
- d. All secondary conduit and wiring on the load or line side of the meter socket is customer owned within their property. SELCO assumes ownership of the wire on line side up to the corner of the property with a handhole, pedestal or transformer. Customer owns and is responsible for secondary service conduit and wire entering their property.
- e. Single occupancy meter installations must be installed outdoors. The meter and its equipment shall be in a location that is accessible to SELCO 24/7
- f. Outdoor meter sockets or troughs should be mounted so that the face of the meter is less than 5 feet above the final grade, and no less than 3 feet above the final grade. A clear area of 3 feet is required in front of each meter.
- g. Indoor meter troughs/centers shall be mounted so that the top of all meters is less than 5 feet above the final grade and the bottom of all meters is no less than 3 feet above final grade. A clear area of 3 feet is required in front of each meter.
- h. If the final grade at the meter socket is changed or a structure such as a deck is added, the meter socket must be relocated to SELCO's specifications with proper notice
- i. All meter installations shall be "**hot sequence**". (main disconnect on load side of meter socket)
- j. All meter sockets and customer disconnecting means shall be plainly and permanently marked proper suite, floor, office, etc. by the electrical contractor or owner. Service will not be provided to a building that has unidentified meter sockets
- k. Freestanding meter pedestals are not permitted to be used in the design of new builds.

### 9. Street Lighting

- a. Standard street lighting shall consist of LED luminaries installed on twelve-foot base-mounted post-tops. Refer *Appendix XXIV*
- b. Precast bases shall be installed in accordance with the construction layout plan. Bases shall not extend above ground more than three inches to the top of the concrete.
- c. Conduit shall be installed between precast bases and SELCO designated secondary sources (pedestals or transformers) in accordance with the site-specific construction layout plan

### 10. Easements

- a. The developer shall grant SELCO, without cost, the perpetual rights and easements free and clear of encumbrances of record, the form and content of which shall be acceptable to and approved by SELCO including rights of ingress and egress for:
  - i. Transformer Installations, junction enclosures, switch boxes, etc. with a ten-foot easement strip around all right of ways.
  - ii. Primary conduits, cables, and connection points within the confines of the entire development plan.
- b. Before SELCO energizes a portion of a project, the developer shall provide SELCO with formal documentation stating that the required easements have been filed at the Worcester County Registry of Deeds. Refer the *Appendix Grant of Easements* of this document for an easement template

# Appendix

### I. Load Data Sheet

SELCO	LOAD DATA FORM	
SHREWSBURY ELECTRIC AND CABLE OPERATIONS 100 MAPLE AVE, SHREWSBURY MA 01545 PH: 508-841-8500	5	
EMAIL: selcoeng@shrewsburyma.gov <u>www.selco.shrewsburyma.gov</u> 	DATE:	SELCO
Customer Address:	Contact Person:	
Service Address:		
Contractor Name:	Contact Person:	
Contractor License #:		
Electrician Name:	Electrician License #:	

SERVICE EQUIPMENT DATA					
Main Panel Size	Main Breaker Size	Phase (single/three)			
Single Ph:(120/240V)	Three Ph 4-Wire:(120/208V)	_(277/480V) Delta(240V)(480V)			
	ELECTRICAL LOAD IN KW				
Lighting:	Washer:				
Receptacles:	Dryer:				
Space Heating:	Elevator:				
Water Heating: Miscellaneous:					
Air Conditioning: Other (describe):					
Motors:					
Emergency/Solar Generation or Battery System:					
TOTAL CONNECTED LOAD IN KW:					

LARGE ELECTRICAL EQUIPMENT (List any single item larger than 5 KW or 5 HP below)						
	1 or 3		Starting	Running	Operati	ngTime
Item	Ph	Vol ts	Current	Current	Starts/day:	Duration:
Form filled out by: Title:						
I certify that the information provided above on this form accurately reflects the expected load.						
Signature:			Date:			

### II. One-line diagram for loop feed URD system



III. Express feed one-line diagram for radial URD system



LAST TRANSFORMER END BOTH CONDUITS

### IV. Trench/ Duct Bank Detail



#### NOTE:

- a. All trenches and electrical conduits require approval by respective utility inspectors before backfilling.
- b. All trenches shall be 18" minimum width. The conduit shall be embedded in unfrozen sand and fine gravel that will pass a 1 inch mesh. The remainder of the backfill shall be clean, and, shall not contain rocks larger than 6 inches in any dimension. Carefully compact the full depth of backfill, under traveled ways and parking lots. Mounding the trench, to provide required depth, is not allowed.
- c. The minimum depth under a highway, shall be 48 inches rather than 36 inches.
- d. Trenches should be located 10 feet from the structure, unless the conduit is going to the structure. Contact SELCO if closer approaches are necessary.
- e. Trenches should be located 10 feet from any water, sewer, or gas pipeline that parallels the conduit, contact SELCO if closer approaches are necessary.
- f. Communications conduits may be located in the same trench with electric. A minimum horizontal distance or vertical separation of 12 inches is required. Electric conduits shall be separated by 3 inches. These distances are measured surface— to— surface not center— to— center.
- g. Depths shallower than 36 inches may be allowed where obstructions such as ledge are encountered. Any portion of the conduit shallower than 24 inches shall be covered with a minimum 2 inch concrete cap. See SELCO for depths shallower than 12 inches.
- h. All conduits shall have pulling tape (mule tape) rated for 2,500 lbs.

i.

### V. Fiberglass transformer pad installation specification



#### VI. Single Phase Fiberglass Transformer Pad cut-sheet



### VII. Transformer vault (concrete) pedestal – Single phase 100kva





#### VIII. Transformer vault (concrete) pedestal – 3 phase up to 75kva



IX. Transformer vault (concrete) pedestal – 3 phase 75-500kVA



#### X. Transformer vault (concrete) pedestal – 3 phase 750-2500kVA

### XI. Fiberglass Junction box specification





### XII. Single Phase Fiberglass Junction Enclosure cut-sheet



### XIII. Three Phase Fiberglass Junction Enclosure cut-sheet



### XIV. Ground Grid for Underground Equipment

- A. Install two (2) copper ground rods with wire in square orientation. Top of rod to be 6" below final grade
- B. Use 8' copper ground rod 5/8" diameter Joslyn #J8338, Eritech #615880 or SELCO approved equal
- C. Install 1/0 AWG bare stranded copper ground wire 12" deep with (2) 20' tail (minimum) for transformer connection
- D. Use bronze ground rod clamp Joslyn #J8492, Eritech #CP58, Burndy #GRC58 or SELCO approved equal



### XVI. Secondary pedestal specification



### XVII. Secondary Pedestal cut-sheet



### XVIII. Secondary Handhole – Concrete Enclosure cut sheet



Enclosure, Box, Polymer Concrete Tier 22, 24"x36"x24", Straight Wall, Open Bottom, Gasket By QUAZITE. Catalog ID: **PG2436BG24** 

Hubbell Power Systems 210 N. Allen Centralia, MO 65240 USA Phone: (573) 682-5521 Fax: (573) 682-8475 Email: hpscs@hubbell.com

#### General

Insulated?	No
Load Rating (ANSI Tier)	T22
Material	Polymer Concrete
Туре	Below Ground Boxes
UPC	662037140403
Height	24 in
Length	26 in
Weight	189 lb
Width	37.625 in

### XIX. Secondary Handhole Cover – Concrete Enclosure cut sheet



Cover, polymer concrete, Tier 8, 24x36, 1 piece, 2 Bolts, Electric Logo

By QUAZITE Catalog ID: PG2436CA0017

# Dimensions:

Height	3 in
Length	35.625 in
Weight	103 lb
Width	24 in

#### General

Insulated?	No
Load Rating (ANSI Tier)	Т8
Material	Polymer Concrete
UPC	662037101138

### XX. Meter Socket Placement Detail







### XX. Overhead Temporary Service Detail

- A. 6" x 6" x 15' minimum wood service structure with braces & stakes to be sound
- <u>B.</u> Grounding electrode conductor shall be stapled to timber at intervals of no more than one foot
- <u>C.</u> Where it is necessary to cross a highway, SELCO engineering will specify the construction method which, must be used to comply with road clearance requirements.
- D. The structure will be located within 100ft of SELCO's existing facilities as designated by the wiring inspector

### XXI. Underground Temporary Service Detail



- A. All equipment including socket and weather head, except watt-hour meter, shall be furnished and installed by the customer.
- B. SELCO will supply watthour meter and make service connections.
- C. Install 8' loop of service wire around XFMR/ Hand hole for SELCO connections.

#### XXII. Secondary Riser Pole Detail



- A. Customer to furnish and install all secondary riser conduit, weather head, stand-off brackets, and hardware for supporting equipment. SELCO to make connections to weather head from transformer.
- B. Conduits must be installed away from the direction of oncoming traffic.
- C. Maximum of 4 conduits are allowed on a riser pole
- D. Risers shall not be placed directly below overhead pole equipment. Coordinate with SELCO to finalize locations.

### XXIII. Decorative Street Light Pole – Broadway



DECORATIVE ALUMINUM POLES



#### DESIGN CONSIDERATIONS - VIBRATIONS AND NON-GROUND MOUNTED INSTALLATIONS

The information contained herein is for general guidance only and is not a replacement for professional judgment. Design considerations for wind-induced vibrations and non-ground mounted installations le.g., installations on bridges or buildings) are not included in this document. Consult with a professional, and local and federal standards, before ordering to ensure product is appropriate for the intended purpose and installation location. Refer to the Cooper Lighting Solutions Light Pole White Paper for risk factors and design considerations. Learn more.

NOTE: The Limited Warranty for this product specifically excludes fatigue failure or similar damage resulting from vibration, harmonic oscillation or resonance.

Specifications and dimensions subject to change without notice. Consult your lighting representative at Cooper Lighting Solutinos or visit www.cooperlighting.com for available options, accessories and ordering information.

Options to meet Buy American and other domestic preference requirements

#### BASE HEIGHT DIMENSIONS



ANCHORAGE DATA



Pole	Anchor Bolt and Template Package	Shaft Diameter (inches)	Bolt Circle (inches)	Number of Bolts	Bolt Size (inches)	Template Only
Aspen (ASP)	317AVE40S	10 x 4	14.19 + - 0.81	4	3/4 x 17	406541D
Broadway (BWR)1	317RB408	8 x 4	12	4	3/4 x 17	405592D
Broadway (BWR) <sup>2</sup>	436RB408	8 x 4	12	4	1 x 36	227878D
Charleston (CHI)	317RB4HN	4, 5, 6	11.5 + - 1.50	4	3/4 x 17	227095D
Cheasapeake (CPR)	317RB4WI	4, 5	13.25	4	3/4 x 17	227116D
Seattle (STL)	317AVE10	4	9	4	3/4 x 17	407040D
Tampa (TAM)	317AVE30	5 x 4	16	4	3/4 x 17	407040D
Utica (UBN)	317RB4SC	4, 5	12.5	4	3/4 x 17	227314D
Washington (WA3)	317RB4WA	4, 5, 6	11.5 + - 1.50	4	3/4 x 17	227077D



TD513030EN January 6, 2022 6:04 PM



#### **GRANT OF EASEMENTS**

("Grantor"), having an ad	dress of,
and being the owner of the property located at	and described
in a deed recorded with the F	Registry of Deeds in Book, Page
(the "Property"), for consideration paid of One	Dollar (\$1.00), the receipt and sufficiency
of which is hereby acknowledged, hereby grants and	conveys, with Quitclaim Covenants, to the
Town of Shrewsbury, Electric & Cable Operatio	ns ("Grantee"), a municipal corporation
organized and existing under the laws of the Com	monwealth of Massachusetts, having an
address of 100 Maple Avenue, Shrewsbury, Massa	chusetts 01545 and its successors and
assigns (Grantee) a permanent exclusive easement ir	1, on, under, upon, over, across and along
the portion of the Property approximately	shown on a sketch plan entitled
"", dated, prepare	d by, attached hereto as
Exhibit A and recorded herewith (the "Plan") to constr	uct, reconstruct, install, maintain, operate,
inspect, improve, alter, repair, replace, relocate an	d abandon in place lines, wires, poles,
conduits, cables, pipes, terminals, transformers, pads,	street lights, markers, braces, fittings and
other equipment, structures and/or appurtenances for	or the transmission and/or distribution of
high and low voltage electric current, cable television	i, telephone and intelligence (collectively,
the "Grantee Facilities"), and for any and all oth	er purposes and/or uses necessary or
convenient to exercise the rights granted herein.	ne location of the Grantee Facilities are
approximately shown on the Plan, but the final definit	ve locations of said System shall become
established by and upon the installation and erect	ion thereof by Grantee (the "Easement
Premises ). Grantee shall have the right to connect	the Grantee Facilities located within the
Easement Premises to facilities located within any pu	blic or private way, and/or any other land,
to serve the Property and Grantee's other customers	. It is agreed that said Grantee Facilities
shall remain the property of the Grantee and its succes	sors and assigns.

The rights granted herein shall include the right of Grantee to enter upon the Property at reasonable times from time to time by foot, motor vehicles, and/or heavy equipment, to access the Easement Premises and to exercise the rights granted herein, as well as the right to cut, clear and/or remove any trees, shrubs, bushes, underbrush and/or above ground and below ground structures, objects and surfaces, as may, in the opinion and judgment of the Grantee, interfere with the efficient and safe operation and maintenance obstructions within the Easement Area and/or on land adjoining said Easement Premises that may interfere with easements granted herein.

Grantor shall have the right to use the Easement Premises for any and all purposes, provided that Grantor does not interfere unreasonably with the rights granted to Grantee. Without limiting the foregoing, Grantor agrees not to, and shall not permit others to, excavate, alter, or change the grade of the Easement Premises or construct or place any building, structures, and/or other obstructions within the Easement Premises, it being acknowledged that Grantee shall have the right to remove the same.

As consideration for the rights granted herein, Grantee agrees that it shall restore the surface of the Easement Premises, replace any grass and/or asphalt and shall repair any damage caused by Grantee to the Easement Premises and/or the improvements thereof to the condition existing prior to Grantee's disturbance thereof, as closely as practicable, provided that Grantee shall not be required to replace any vegetation and/or obstructions placed within the Easement Premises in contravention of the terms hereof.

If the location of the Grantee Facilities within the Easement Premises is unsuitable for the purposes of Grantor or Grantee, then the locations may be subject to the prior written consent of Grantee or Grantor, which consent shall not be reasonably withheld, be changed to areas mutually satisfactory to both the Grantor and the Grantee herein; and further the newly agreed to locations shall be indicated and shown on the sketch by proper amendment or amendments thereto. Any relocation so requested shall be at the sole cost and expense of the requesting party, and the request shall be made at least one hundred twenty (120) days prior to any proposed relocation.

Grantee shall be responsible for obtaining any and all applicable federal, state, and/or local permits, license and/or approvals, at Grantee's sole cost and expense, and shall exercise its rights in compliance with all applicable laws, rules, regulations and/or bylaws.

The rights and easements shall run with the Property and be binding on Grantor and Grantor's successors and assigns and benefit Grantee and Grantee's successors and assigns.

[signature page follows]

IN WITNESS WHEREOF, Grantor has signed this agreement under seal as of this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

### **GRANTOR:**

By:

Name:

Title:

### THE COMMONWEALTH OF MASSACHUSETTS

\_\_\_\_\_, SS.

On this \_\_\_\_\_ day of \_\_\_\_\_\_, 20\_\_\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_\_\_, who proved to me through satisfactory evidence of identification, which was \_\_\_\_\_\_\_, to be the person whose name is signed on the preceding document, and acknowledged to me that he/she/they/it signed it voluntarily for its stated purpose.

Notary Public

My Commission Expires: