

SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

- A. Basic Electrical Requirements and materials specifically applicable to Division 26 Sections. Section includes:
 - 1. Electrical Identification.
 - 2. Conductors and Devices.
 - 3. Raceways and Boxes.
 - 4. Supporting Devices.

1.03 REGULATORY REQUIREMENTS

- A. Conform to NFPA 70 - National Electrical Code, 2014 edition with amendments as adopted by the City of Des Plaines, IL.
- B. Install electrical Work in accordance with the NECA Standard of Installation.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store and protect all materials as specified herein.
- B. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- C. Ship products to the job site in their original packaging. Receive and store products in a suitable manner to prevent damage or deterioration. Keep equipment upright at all times.
- D. Investigate the spaces through which equipment must pass to reach its final destination. Coordinate with the manufacturer to arrange delivery at the proper stage of construction and to provide shipping splits where necessary.

1.05 PROJECT/SITE CONDITIONS

- A. Install work in locations shown on Drawings, unless prevented by Project conditions. Drawings have omitted certain branch circuitry in areas for ease of reading. All branch circuitry is to be provided by Contractor.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission from Architect/Engineer before proceeding as specified under modification procedures.

1.06 QUALITY ASSURANCE

- A. Provide Work as required for a complete and operational electrical installation.
- B. All products shall be designed, manufactured, and tested in accordance with industry standards. Standards, organizations, and their abbreviations as used hereafter, include the following:
 - 1. American National Standards Institute, Inc (ANSI).
 - 2. American Society for Testing and Materials (ASTM).

3. National Electrical Manufacturers Association (NEMA).
4. Underwriters Laboratories, Inc. (UL).

C. Install all Work in accordance with the NECA Standard of Installation.

1.07 SUBMITTALS

A. Submit all requested items in Division 26 Sections.

1.08 PROJECT RECORD DOCUMENTS

A. Cooperate and assist in the preparation of project record documents.

1.09 TRENCHING, FILL AND COMPACTION

- A. Provide trenching, fill and compaction for all work indicated on Drawings and specified in Division 26 sections.
- B. Delegated Engineering Responsibility: The Contractor shall employ experienced horizontal directional drilling personnel familiar with local conditions. Contractor shall be responsible for selection of drilling equipment, drilling fluids, drilling operations, location and tracking instrumentation, ream and pull back procedures.

1.10 PROJECT MANAGEMENT AND COORDINATION

A. Proper project management and coordination is critical for a successful project. Manage and coordinate the Work with all other trades. Reliance on the Drawings and Specifications only for exact project requirements is insufficient for proper coordination.

PART 2 PRODUCTS

2.01 WIRING METHODS

- A. All locations: Building wire in raceway.
- B. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 14 AWG for control wiring.

2.02 WIRE AND CABLE

- A. Manufacturers:
 1. Okonite.
 2. Southwire.
 3. Collyer.
- B. Building Wire:
 1. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation.
 2. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, stranded conductor (solid for device terminations).
 3. Control Circuits: Copper, stranded conductor, 600 volt insulation.
 4. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.
 5. Use conductor not smaller than 12 AWG for power and lighting circuits.
 6. Use conductor not smaller than 16 AWG for control circuits.
- C. Locations:
 1. Exposed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.
 2. Exterior Locations: Use only building wire with Type XHHW insulation in raceway.

3. Underground Installations: Use only building wire with Type XHHW insulation in raceway.

2.03 RACEWAY REQUIREMENTS

- A. Use only specified raceway in the following locations:
 1. Branch Circuits and Feeders:
 - a. Exposed Dry Interior Unfinished Locations: Electrical metallic tubing.
 - b. Utility Primary and Site Lighting: Sch 40 PVC, concrete encased under road ways and parking lots.
 - c. All other locations: Galvanized Rigid Metallic Conduit.
- B. Size raceways for conductor type installed.
 1. Minimum Size Conduit Homerun to Panelboard: 3/4-inch.

2.04 METALLIC CONDUIT AND FITTINGS

- A. Conduit:
 1. Rigid Steel Conduit: ANSI C80.1.
 2. Electrical metallic tubing: ANSI C80.3.
 3. Flexible Conduit: UL 1, zinc-coated steel.
 - a. Liquidtight Flexible Conduit: UL360. Fittings shall be specifically approved for use with this raceway.
- B. Conduit Fittings:
 1. Metal Fittings and Conduit Bodies: NEMA FB 1.
 - a. EMT fittings: Use set-screw indentor-type fittings.

2.05 NONMETALLIC TUBING

- A. Manufacturers:
 1. Carlon Co.
 2. LCP National Plastics, Inc.
 3. Pacific Western Extruded Plastics Co.
- B. Description: UL651A "Type EB and A PVC Conduit and HDPE Conduit."
 1. Conduit: Schedule 40. Suitable for exposure to sunlight and direct burial.

2.06 CONDUIT HANGERS

- A. Manufacturers:
 1. Minerrallac Electric Company.
 2. Substitutions: Or Approved Equal.
- B. Description:
 1. Standard conduit hanger, zinc-plated steel with bolts.
 2. Threaded rod and hardware: Plated finish, size and length as required for loading and conditions.

2.07 BEAM CLAMPS

- A. Manufacturers:
 1. Appleton.
 2. Midwest.
 3. Raco.
- B. Description: Malleable beam clamp, zinc plated steel.

2.08 ELECTRICAL BOXES

- A. Manufacturers:
 - 1. Raco.
 - 2. Steel City.
 - 3. Appleton.
 - 4. Substitutions: Or Approved Equal.
- B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel, suitable for installation in masonry:
- C. Equipment Support Boxes: Rated for weight of equipment supported; include 2 inch male fixture studs where required.
- D. Wet Location Outlet Boxes: Cast aluminum: Cast alloy, deep type, gasket cover, threaded hubs.

2.09 PENETRATION SEALANTS

- A. Fire-rated assemblies: Provide firestopping of all penetrations made by Work under this Contract.
- B. Thermal and Moisture Protection: Provide thermal and moisture protection made by Work under this Contract of all exterior wall, floor and roof penetrations.

2.10 HAND HOLES

- A. Manufacturers:
 - 1. Quazite.
 - 2. Or Approved Equal.
- B. Description: Precast polymer concrete or precast concrete, Non-conductive, non-flammable with open bottom. Flanged, non-conductive, gasketed cover enclosure with stainless-steel cover screws.
 - 1. Load Rating: UL listed Tier 22 as suitable for driveway, parking lot and off-roadway applications subject to occasional non-deliberate heavy vehicular traffic.
 - 2. Cover inscribed with "FIELD LIGHTING" or "ELECTRIC" or other suitable description.

2.11 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.
- C. Letter Size:
 - 1. Use 1/8 inch letters for identifying individual equipment and loads.
 - 2. Use 1/4 inch letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16 inch white letters on a black background. Use only for identification of individual wall switches and receptacles and control device stations.

2.12 WIRE AND CABLE MARKERS

- A. Manufacturers:
 - 1. Brady Model PCPS.
 - 2. Panduit Model PCM.
 - 3. T & B Model WM.

- B. Description: Cloth type wire markers.
- C. Locations: Each conductor at panelboard gutters, pull boxes, and each load connection.
- D. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
- E. Legend: Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2.13 CONDUIT MARKERS

- A. Location: Furnish markers for each conduit longer than 6 feet.
- B. Spacing: 20 feet on center.
- C. Color:
 - 1. 480 Volt System: Orange
 - 2. 208 Volt System: Black
 - 3. Fire Alarm System: Red.

2.14 UNDERGROUND WARNING TAPE

- A. Description: 4 inch wide plastic tape, detectable type, colored red with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- B. Beginning of demolition means installer accepts existing conditions.
- C. Verify that supporting surfaces are ready to receive work.
- D. Electrical boxes are shown on Drawings, in approximate locations, unless dimensioned.
 - 1. Obtain verification from Architect/Engineer for locations of outlets throughout prior to rough-in.
- E. Degrease and clean surfaces to receive wire markers.
- F. Verify that interior of building is physically protected from weather.
- G. Verify that mechanical work which is likely to injure conductors has been completed.
- H. Completely and thoroughly swab raceway system before installing conductors.

3.02 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove all existing electrical installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Repair adjacent construction and finishes damaged during demolition and extension work.
- E. Properly dispose of all ballast to approved ballast recycler. Do not land fill ballasts.

3.03 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.
- E. Neatly train and secure wiring inside boxes, equipment, and panelboards.
- F. Use wire pulling lubricant for pulling 4 AWG and larger wires.
- G. Route wire and cable as required to meet project conditions.
 - 1. Wire and cable routing indicated is approximate unless dimensioned.
 - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- H. Pull all conductors into raceway at same time.
- I. Protect exposed cable from damage.
- J. Neatly train and lace wiring inside boxes, equipment and panelboards.
- K. Support cables above accessible ceilings to keep them from resting on ceiling tiles.
- L. Make splices, taps, and terminations to carry full ampacity of conductors without perceptible temperature rise.
- M. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- N. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
- O. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- P. Do not use powder-actuated anchors.
- Q. Do not drill or cut structural members.
- R. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- S. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- T. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
- U. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- V. Terminate spare conductors with electrical tape.

END OF SECTION

**SECTION 26 56 00
EXTERIOR LIGHTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior luminaires.

1.02 REFERENCE STANDARDS

- A. ANSI C82.4 - American National Standard for Lamp Ballasts - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps 2017.
- B. IEEE C2 - National Electrical Safety Code 2017.
- C. IESNA LM-5 - Photometric Measurements of Area and Sports Lighting Installations 2004 (Reaffirmed 2007).
- D. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products 2008.
- E. IESNA LM-64 - Photometric Measurements of Parking Areas; 2001 (Reaffirmed 2007).
- F. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules 2015, with Errata (2017).
- G. IES RP-8 - Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting 2018.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- I. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems 2006.
- J. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1598 - Luminaires Current Edition, Including All Revisions.
- L. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
 - 2. Notify Architect/Engineer of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.04 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
 - 2. Provide photometric calculations where luminaires are proposed for substitution upon request.

- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
 - b. Include IES LM-79 test report upon request.
 - 2. Lamps: Include rated life and initial and mean lumen output.
 - 3. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.
- C. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- E. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.
- C. Receive, handle, and store wood poles in accordance with ANSI O5.1.

1.07 WARRANTY

- A. Provide three year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

- A. Type A : LED Bollard Luminaire.
 - 1. Products:
 - a. Gardco - PBL-42-14L-450-WW-G2-3-UNV-BL-IMRI-F1-BK.
 - 2. Housing: Aluminum.
 - 3. Finish: Black.
 - 4. Shape: Round.
 - 5. Nominal Height: 42".
 - 6. Lighting Distribution: Asymmetrical, IES Type III.
 - 7. Voltage: Multi-tap 120/208/240/277 V.
 - 8. Provide with the following features/accessories:

- a. Integral Occupancy Sensor.
- 9. Listings:
 - a. Suitable for wet locations.

2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.
- H. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 05 00 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).

- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires in accordance with NECA/IESNA 501.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Bollard Luminaires:
 - 1. Foundation-Mounted:
 - a. Provide cast-in-place concrete foundations for bollards as indicated.
 - 1) Install anchor bolts plumb per template furnished by pole manufacturer.
 - 2) Position conduits to enter bollard shaft.
 - b. Install foundations plumb.
 - c. Install bollard plumb, using leveling nuts or shims as required to adjust to plumb.
 - d. Tighten anchor bolt nuts to manufacturer's recommended torque.
 - 2. Grounding:
 - a. Bond luminaires, metal accessories, and foundation reinforcement to branch circuit equipment grounding conductor.
 - 3. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
 - 4. Electrical Contractor shall provide conduits, fuse holder and fuses for each phase.
- G. Install accessories furnished with each luminaire.
- H. Bond products and metal accessories to branch circuit equipment grounding conductor.
- I. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect/Engineer.

3.05 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect/Engineer. Secure locking fittings in place.

3.06 CLEANING

- A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

- A. Just prior to Substantial Completion, replace all lamps that have failed.

3.08 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

**SECTION 31 23 16.13
TRENCHING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Trenching, backfilling and compacting for utilities outside the building to utility main connections.

1.02 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 6 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

1.03 REFERENCE STANDARDS

- A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)) 2012 (Reapproved 2021).
- B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision.
- D. SSRBC - Standard Specifications for Road and Bridge Construction, adopted by the Illinois Department of Transportation on January 1, 2012, including applicable current Supplemental Specifications and Special Provisions.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. Easements for existing utilities, both public and private, and utilities within public rights-of-way are shown on the drawings according to available records. If existing utility lines are encountered which conflict in location with new construction, notify Architect/Engineer.

1.05 SEQUENCING AND SCHEDULING

- A. Schedule, sequence and coordinate the work of this section, and prior and subsequent portions of the work.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill: Subsoil excavated on-site.
 - 1. Graded.
 - 2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris, waste, frozen materials, vegetable and other deleterious matter.
- B. Structural Fill: Subsoil excavated on-site.
- C. Granular Fill - Gravel - Fill Type CA-7: Pit run washed stone; free of shale, clay, friable material and debris.
 - 1. Graded in accordance with ASTM D2487 Group Symbol GW.

- D. Granular Fill: Conforming to SSRBC Article 1004.04; CA-7 or CA-11, except crushed concrete or blast furnace slag is not permitted.
- E. Fine Granular Fill: Conforming to SSRBC Article 1003.04.
- F. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
 - 1. Grade in accordance with ASTM D2487 Group Symbol SW.
- G. Topsoil: Topsoil excavated on-site.

2.02 SOURCE QUALITY CONTROL

- A. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect/Engineer.

3.03 TRENCHING

- A. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove excavated material that is unsuitable for re-use from site.
- H. Remove excess excavated material from site.
- I. Pump out accumulated water in excavated trenches.
- J. Obtain, erect, maintain and remove signs, covers, barricades, flagmen and other control devices necessary for the purpose of diverting, regulating, warning or guiding pedestrian and vehicular traffic at open excavations.
 - 1. Placement and Maintenance of Traffic Control Devices: In accordance with SSRBC Article 107.14 and with applicable parts of SSRBC Division 700.

3.04 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 98 percent of maximum dry density.
 - 2. At other locations: 95 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

- A. Use general fill unless otherwise specified or indicated.
- B. Conduits:
 - 1. Bedding: Use fine granular fill.
 - 2. Cover with general fill for lawn or planted areas.
 - 3. Cover with granular fill for paved areas.
 - 4. Fill up to subgrade elevation.
 - 5. Compact in maximum 8 inch lifts to 95 percent of maximum dry density under lawn or planted areas.
 - 6. Compact in maximum 6 inch lifts to 98 percent of maximum dry density under paved areas.

3.07 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.08 FIELD QUALITY CONTROL

- A. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

3.09 CLEANING

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION