TECHNICAL SPECIFICATIONS

LESTERTOWN ROAD PUMP STATION SHED AND FENCE REPLACEMENT

SECTION TITLE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

01010 Summary of Work

01025 Measurement & Payment

01300 Submittals

02200 Earthwork

02905 Landscaping

06100 Carpentry & Millwork

07200 Building Insulation

07300 Roofing

08710 Doors & Hardware

09250 Gypsum Board Drywall

09900 Painting

16400 Electrical

**SECTION 01010**

 **SUMMARY OF WORK**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

 A. Project/Work Identification

 B. Work Covered by Contract Documents

 C. Work by Owner

 D. Contractor Use of Premises, Work Sequence, and Owner Occupancy

1.02 PROJECT/WORK IDENTIFICATION

 A. The name of the Project is "Lestertown Road Pump Station Shed and Fence Replacement", and is located at 285 Lestertown Road, Groton, Connecticut. The work of this Contract has been identified in the Contract Documents by the Town of Groton Public Works Water Pollution Control Division.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

 A. Briefly and without force and effect upon Contract Documents, the work of the Contract can be summarized as follows:

 1. Demolition of the existing vinyl fence and posts, demolition of the existing fiberglass pump house enclosure, installation of a new cedar board fence, new shed enclosure, and site work including re-grading and construction of concrete slabs.

1.04 WORK BY OWNER

 A. Work of the Project which will be executed during Work of this Contract, and which is specifically excluded from this Contract is as follows:

 1. New pavement to be installed after contractor’s work is complete.

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1.05 CONTRACTOR USE OF PREMISES, WORK SEQUENCE, AND OWNER OCCUPANCY

 A. Contractor shall have use of the site for Work, storage, and access. Under no conditions, shall roads be blocked.

 B. Assume full responsibility for protection and safekeeping of products under this Contract.

 C. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

 D. Coordinate the Progress Schedule and operations with the Town.

 E. Cooperate with the Town in scheduling operations to minimize conflict and to facilitate Owner usage. Pump station, controls and alarms must be in service at all times. Provide any and all temporary measures to ensure the safety of the Town and the Town's representatives.

 F. In particular, the Contractor is not to disrupt existing utility service, interfere with normal school bus, auto, and pedestrian traffic, or obstruct existing exits and life safety systems, including access to private driveways.

 END OF SECTION

01010/2-2

**SECTION 01025**

 01025/1-1

**SECTION 01300**

 **SUBMITTALS**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

A. Submittal Procedures

B. Construction Progress Schedules

C. Proposed Products List

D. Product Data

E. Samples

F. Manufacturer's Certificates

1.02 SUBMITTAL PROCEDURES

A. Review submittals prior to submission. Verify field measurements, catalog numbers and other information critical to construction or installation. Coordinate each submittal with requirements of Work and of Contract Documents.

B. Notify Engineer in writing at time of submission of deviations in submittals from requirements of Contract Documents. Responsibility for deviations from requirements of Contract Documents is not relieved by Engineer's review of submittals, except when given written acceptance of specific deviation.

C. Transmit each submittal with Engineer accepted form. Two copies of each submittal shall be forwarded except for samples for which only one of each is required.

D. Identify Project, Contractor, Sub-contractor or supplier; and specification Section number, as appropriate.

E. Contractor shall sign or initial, certifying that review, verification of Products required, is in accordance with the requirements of the Work and Contract Documents. Submittals may be transmitted by Email.

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F. Schedule submittals in advance so as to cause no delay to the Work. Deliver to Engineer at her business address. Coordinate submission of related items.

 G. Obtain new samples, revise drawings and/or data as required by Engineer review and resubmit, identify changes made since previous submittal.

1. Engineer will review, product data, and samples and return submittals.

 I. One copy of submittal goes back to contractor, one to Town.

J. Begin no work which requires submittals until return of submittals with Engineer's review indicating review.

1.03 CONSTRUCTION PROGRESS SCHEDULES

 A. Submit initial progress schedule and schedule of values (if lump sum project) in duplicate within 15 days after date established for commencement of work. After review by Engineer, revise and resubmit as required. Submit revised schedules with every Application for Payment, reflecting changes since previous submittal.

 B. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

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1.04 PROPOSED PRODUCT LIST

 A. Within 15 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.05 PRODUCT DATA

 A. Product data includes standard printed information on materials, products and systems; not specially prepared for this project, other than the designation of selections from among available choices printed therein.

 B. Submit 2 copies of product data of which one will be retained by the Engineer.

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1.06 SAMPLES

A. Samples are required only for examples of fence and siding finishing.

1.07 MANUFACTURER'S CERTIFICATES OR TAGS

1. When specified in individual specification Sections, submit manufacturer's certificate to Engineer for review, in quantities specified for Product Data.
2. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.08 ENGINEER REVIEW

 A. Engineer will endeavor to review shop drawings, product data, and samples, and to return submittals within 5 working days.

 END OF SECTION

01300/3-3

**SECTION 02200**

**EARTHWORK**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

A. Site grading, removal of topsoil and subsoil, building excavating and trenching, backfilling, and compacting.

**PART 2 PRODUCTS**

2.01 SOIL MATERIALS

1. Topsoil: Reusable excavated friable loam; free of subsoil, roots, grass, excessive amount of weeds, large stone, and foreign matter.

2.02 FILL MATERIALS

A. ¾” Crushed Stone Grade “C”, angular, washed, natural stone; free of shale, clay, friable material, sand, debris; CT DOT Form 816, Div. III updated through January 2015.

B. #8 crushed gravel washed free of clay, shale, organic matter; Per CT DOT Form 816, div. III updated through January 2015.

2.03 ACCESSORIES

A. Geotextile Fabric: Spun poly Weedblocker, and silt fence.

**PART 3 EXECUTION**

3.01 EXAMINATION AND PREPARATION

1. Identify required lines, levels, contours, and datum.
2. Install silt fencing.

C. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

1. Identify and flag known utility locations. Coordinate water valve box adjustment with Groton Utilities.

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E. Maintain and protect existing utilities to remain.

* 1. PROTECTION OF ADJACENT WORK
1. Protect adjacent structures which may be damaged by excavation work including service utilities and pipe chases.
2. Grade excavation top perimeter to prevent surface water run‑off into excavation or to adjacent properties.

3.03 TOPSOIL EXCAVATING

A. Do not excavate wet topsoil.

B. Excavate topsoil and stockpile in area designated by the Town at the time of construction.

3.04 SUBSOIL EXCAVATING

A. Existing “crushed stone” surfacing inside pump station enclosure has been compromised by organic matter and silt. Remove the top 6” of all material within the enclosure and in area between traveled edge of road and pump station enclosure. Dispose of this material off site.

 B Excavate subsoil from areas shown on plan as required for concrete slabs, piping,

 and other work.

1. Slope banks to angle of repose or less, until shored.
2. Excavation shall not interfere with 45 degree bearing splay of any foundation or slab.
3. Correct unauthorized excavation at no extra cost to Owner.
4. Fill over‑excavated areas under structure bearing surfaces in accordance with direction by Engineer.
5. Reuse subsoil for back fill of propane and water piping. Remove excess subsoil not being reused from site.

02200/2-4

3.05 TRENCHING

A. Excavate for water and gas piping as shown on plans.

B. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.

C. Hand trim excavation and leave free of loose matter.

D. Support pipe during placement and compaction of bedding fill.

E. Backfill trenches to required contours and elevations.

F. Place and compact fill materials as for Backfilling.

3.06 BACKFILLING

A. Backfill areas to contours and elevations. Use unfrozen and unsaturated materials.

B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

1. Place weed blocking geotextile fabric between crushed stone and topsoil around perimeter of fence and parking areas.
2. Place and compact fill materials in continuous layers not exceeding 6 inches loose depth except where noted for post holes.

E. Employ a placement method so not to disturb or damage slabs and utilities in trenches.

F. Maintain optimum moisture content of backfill materials to attain required compaction density.

3.07 PLACING TOPSOIL

1. Place topsoil in areas where the existing landscaping has been disturbed and where seeding is scheduled.

02200/3-4

B. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.

C. Remove large stone, roots, grass, weeds, debris, and foreign material while spreading.

D. Roll placed topsoil.

E. Leave stockpile area and site clean and raked, ready to receive landscaping.

END OF SECTION

02200/4-4

**SECTION 02905**

**LANDSCAPING**

**PART 1 GENERAL**

1.01 WORK INCLUDED

 A. The work under this section includes all labor, materials, tools, and equipment required to restore and establish lawns.

1.02 RELATED WORK

 A. Section 02200 - Earthwork

1.03 QUALITY ASSURANCE

 A. Include the following test requirements:

 1. Supply written analysis, and chemical requirements for lawns, based on the mechanical analysis and pH value of the tested topsoil.

 B. Provide letters from supplier(s) of grass seed and sod indicating mix analysis.

1.04 MAINTENANCE SERVICE

 A. Maintain seeded areas immediately after placement until grass is well established and exhibit a vigorous growing condition for two cuttings. Water will be available for irrigation from the new yard hydrant inside the pump station enclosure. It will be the responsibility of the contractor to provide necessary watering.

**PART 2 PRODUCTS**

2.01 GRASS

 A. Permanent Seed for Upland Areas % by Weight

 KY-31 Tall Fescue 70

 Kentucky Bluegrass 20

 Perennial Grass 10

02905/1-5

2.02 SOIL AND SOIL MODIFICATION MATERIALS

 A. Topsoil: Excavated from site and reused.

 B. Lime: Ground limestone, 95 percent passing through a 100-mesh screen, or pelletized.

 C. Fertilizer: Complete fertilizer as determined by topsoil analysis derived from natural organic sources. Store so as to be kept dry.

2.03 ACCESSORIES

 A. Hay Mulch:

1. Obtained from acceptable grass or legume mowing, free from weeds, course matter or other objectionable material.

2. Free from rot or mold with moisture content of not more than 15 percent when delivered to project.

3. Mulch Adhesive: Emulsified asphalt conforming to ASTM D977, Grade SS-1H.

**PART 3 EXECUTION**

3.01 EXAMINATION AND PREPARATION

 A. Verify that required underground utilities are in proper location.

 B. Perform a soil analysis on a blended sample of topsoil.

3.02 PLACING TOPSOIL

A. Spread reserved topsoil to a minimum depth of 4” in seeded areas. Rake smooth.

1. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
2. Quantities of lime, fertilizer and other amendments applied shall be as recommended from the results of the topsoil test.

02905/2-5

3.03 SEEDING

 A. Preparation:

1. Loosen topsoil to a depth of 4 inches by scarifying or other disking methods. Obtain a loose friable soil.

2. Remove any weeds, and debris and stones having any dimension greater than 1 inch.

3. Fine grade to a smooth even surface.

4. Surface shall be approved by Engineer before seeding.

 B. Hydraulic Seeding:

1. Mix materials with water. Keep in an agitated state so that the materials are uniformly suspended in the water.

2. Spraying equipment shall be so designed that when the solutions are sprayed over an area, the resulting deposits of lime, fertilizer, grass seed and mulch shall be equal in quantity to those specified.

 C. Mechanical Seeding:

1. Apply lime and fertilizer evenly at rates determined by topsoil test results and thoroughly incorporate into the upper 4 inches of topsoil.

2. Rake finish surface smooth.

3. Sow seed applying half the quantity in one direction and the remaining quantity at right angles to it. Do not sow seed on a windy day, or when the ground is frozen, wet or otherwise non-tillable. See Paragraph 3.02 for rates of application.

4. Cover seed with a thin layer of topsoil by raking or dragging.

5. Roll with a hand roller not heavier than 300 lbs.

6. Maintain a moist seed bed at all times. Water seed bed so that the topsoil is wet to a depth of 2 inches. Apply one complete coverage to the seeded area in an 8 hour period.

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 D. Protect the seed bed with barricades, where necessary, to keep all traffic off the area.

 E. Apply approved mulch on all seeded areas which are less than a 3:1 slope. Install jute mesh on seeded slopes which are 3:1 or steeper. Follow procedures in Section 02270, Soil Erosion and Sediment Control.

 F. Reseeding shall consist of the following:

1. If areas are low, utilize topsoil to bring to grade.

2. Scratch soil surface to about 1/2 inch in depth. Apply seed using a drop-type spreader at application rate as specified and incorporate seed into top 1/4 inch of soil.

3. Use light roller to go over the area to ensure good seed-soil contact or use a commercial type slice seeding process to incorporate the seed into existing topsoil to ensure proper seed to soil contact and to minimize soil erosion.

4. Water seed bed so that the topsoil is wet to a depth of 2 inches.

5. Spring-seeded areas shall be reseeded in the Fall and Fall-seeded areas reseeded in the Spring.

3.06 MAINTENANCE

 A. Period Required: Immediately after installation and continue until acceptance as defined in Paragraph 3.08.

 B. Perform all reseeding and watering, mowing, weeding and rolling, insect or disease control, refertilizing and repair of wash-outs which are necessary.

 C. Water minimum 3 times per week so that the depth of moisture is minimum 4 inches.

 D. When average height of grass becomes 3-1/2 inches, mow to the height of 2-1/2 inches. Remove heavy clippings. Minimum 2 mowings.

02905/4-5

3.07 INSPECTION AND ACCEPTANCE

 A. Submit written notice requesting inspection by the Engineer at least 10 days prior to the anticipated date.

 B. No lawn areas will be inspected for acceptance:

 1. Prior to the completion of this Contract.

 2. Minimum 60 days from date of installation.

 3. Prior to the completion of 2 mowings.

 C. Engineer will be the sole judge of acceptance.

 D. Unacceptable lawn areas shall be reconstructed under the direction of the Engineer.

END OF SECTION

SECTION 02905/5-5

**SECTION 06100**

 **CARPENTRY & MILLWORK**

**PART 1 GENERAL**

1.01 WORK INCLUDED

 A. Provide wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform carpentry, siding, and millwork for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.02 RELATED WORK

 A. Section 07300 - Roofing

 B. Section 08100 - Doors, Windows, and Finish Hardware

 C. Section 09250 - Gypsum Wallboard

1.03 REFERENCES

 A. "Product Use Manual" of the Western Wood Products Association for selection

 And use of products included in that manual.

 B. "Timber Construction Manual" of the American Institute of Timber Construction.

 C. 2003 International Building Code.

D. "State Building Code", Connecticut Supplement, June 2005 and amendments through 2013.

 E. "Architectural Woodwork Quality Standards" of the Architectural Woodwork

 Institute.

1.04 QUALITY ASSURANCE

 A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

06100/1-7

1.05 SUBMITTALS

A. Shop drawings showing pertinent dimensions, cut sheets or samples shall be submitted for all fence hardware.

1.06 DELIVERY, STORAGE, AND HANDLING

 A. Comply with pertinent provisions of Section 01600.

 B. Protection:

 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.

 2. Identify framing lumber as to grades, and store each grade separately from other grades.

 3. Protect metals with adequate waterproof outer wrapping.

 4. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.

1.07 MEASUREMENT AND PAYMENT

A. All work in this section shall be included for payment under the lump sum bid for this Contract.

**PART 2 PRODUCTS**

2.01 GRADE STAMPS

 A. Identify framing lumber by the grade stamp of the West Coast Lumber Inspection Bureau, or such other grade stamp as is approved in advance by the Engineer.

 B. Identify other materials of this Section by the appropriate stamp of the agency approved in advance by the Engineer.

2.02 MATERIALS

 A. Provide materials in the quantities needed for the Work shown on the Drawings, and meeting or exceeding the following standards of quality:

06100/2-7

 1. Horizontal framing members: Douglas Fir-Hemlock, Table 1, No. 2 grade.

 2. Vertical framing members: Douglas Fir-Hemlock, Table 1, No. 2 grade.

 3. All finish lumber shall be kiln dried, and at the time of delivery at

 the building site, the moisture content shall not exceed 12 percent

 for materials one (1) inch or less in thickness.

 4. Plywood to be ½" EXT-DFPA, Type AC, or ½" CDX as shown

 on the plans.

 5. Shiplap sheathing/siding shall be #1 white cedar.

 6. All trim shall be #1-1 face (or better) white cedar.

7. Lumber that is called out on the plan as pressure-treated shall be treated to 0.40 lb./ft. CCA.

 8. House Wrap: Tyvek ™ or approved equal.

 9. Wood preservative: Ammoniacal copper arsenite, or 5% solution of pentachlorophenol.

 10. Rough hardware:

 a. Steel Items:

 (1) Comply with ASTM A36.

 (2) Use galvanized at exterior locations.

 (3) Stainless steel nails or screws may be substituted for galvanized for cedar attachment.

 (4) Staples are not permitted for any use except applying house wrap

 b. Lag bolts: Comply with Fed Spec FF-B-561.

 c. Nails:

 (1) Use common except as otherwise noted.

 (2) Comply with Fed Spec FF-N-1.

 (3) Use hot-dipped galvanized at all locations.

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 d. Joist hangers, ties, post supports: Simpson, Teco, or equal as approved by the Engineer.

2.03 OTHER MATERIALS

 A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

**PART 3 EXECUTION**

3.01 SURFACE CONDITIONS

 A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 DELIVERIES

 A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.

 B. Make as many trips to the job site as are needed to deliver materials of this Section in a timely manner to ensure orderly progress of the Work.

3.03 COMPLIANCE

 A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.

 B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

3.04 WORKMANSHIP

 A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.

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 B. Selection of lumber pieces:

 1. Carefully select the members.

 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.

 3. Cut out and discard defects which render a piece unable to serve its intended function.

 4. Lumber may be rejected by the Engineer, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

 C. Do not shim any framing component.

3.05 GENERAL FRAMING

 A. General:

 1. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.

 2. Set horizontal and sloped members with crown up.

 3. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Engineer.

 B. Bearings:

 1. Make bearings full unless otherwise indicated on the Drawings.

 2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.

 3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

06100/5-7

3.06 ALIGNMENT

 A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

3.07 FASTENING

 A. Nailing:

 1. Use only common wire nails or spikes, except where otherwise specifically noted on the Drawings.

 2. Provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.

 3. Nail without splitting wood.

 4. Prebore as required.

 5. Remove split members and replace with members complying with the specified requirements.

 B. Bolting:

 1. Drill holes 1/16" larger in diameter than the bolts being used.

 2. Drill straight and true from one side only.

 3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

 C. Screws:

 1. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.

06100/6-7

3.08 FINISH CARPENTRY

A. Running finish shall have minimum number of splices, and where these occur, they shall be beveled and jointed where solid fastenings can be made. All nail heads in finish work solid fastenings can be made. All nail heads in finish work shall be sunk with a nail punch. Exterior finish will be fastened with GALVANIZED finish nails. Panels shall be set loose and so secured as to prevent cracks and warps. Woodwork shall be properly framed, closely fitted, and accurately set to required lines and levels, and shall be rigidly secured in place.

B. All millwork and finish carpentry shall be thoroughly sanded and smoothly finished. Interior frames, trim or other finish of any sort shall not be set until the building is, in the judgment of the Engineer, sufficiently dry.

C. Finish hardware shall be free from all blemishes and defects. All defective pieces will be rejected even though they are set in place before the defectiveness is discovered and shall be removed and new pieces substituted in their place without extra cost to the Owner. This shall include the labor of removing and replacing the various items.

D. Grounds, nailing strips, plates, blocking, etc. shall be provided wherever required to afford proper nailing and supports for all rough and finish carpentry throughout and for all built-in items of other trades. Dress to sizes required and secure in position in a manner absolutely rigid, straight, level, even and plumb, so that they shall finish to surfaces required.

E. Before erection of millwork and trim, check all surfaces which will be concealed or out of reach after erection, and those with defective or missing prime coats. Cut-outs, rabbets and mortises made at the job shall be primed after cutting and before assembly.

3.09 SHIPLAP SIDING (SHEATHING) AND TRIM

1. Clapboard siding shall be installed directly over house wrap, over framing. Corner and gable boards shall be 4" on both sides. Apply trim over shiplap and caulk all gaps under trim.
2. Interior trim door trim may be pre-primed pine with no loose knots or splits.

END OF SECTION

06100/6-7

**SECTION 07200**

**BUILDING INSULATION**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

1. Batt thermal insulation
2. Vapor retarder.

C. Spray foam insulation (low expansion type dispensed from a can) for gaps of 2” and smaller including cavities around doors and vents

**PART 2 PRODUCTS**

2.01 INSULATION MATERIALS

A. Batt Insulation: ASTM C665, preformed glass fiber batt, friction fit, conforming to the following:

1. Thermal Resistance: R of 15 for walls and R of 19 for ceiling, unfaced.

B. Air Barrier: 10 mil (minimum) polyethylene sheeting, taped at all seams with polyethylene self‑adhering tape.

1. Spray foam for gaps (Great Stuff brand window and door foam sealant or equal)

**PART 3 EXECUTION**

3.01 INSTALLATION - BATT INSULATION

A. Install insulation in accordance with insulation manufacturer's instructions.

B. Install in exterior walls and roof spaces without gaps or voids.

C. Fit insulation tight in spaces. Leave no gaps or voids. For spaces 2” wide or less, use spray foam.

D. Install friction fit insulation tight to framing members, completely filling prepared spaces.

E. Place polyethylene sheeting over all insulation using staples and tape all seams.

END OF SECTION

07200/1-1

**SECTION 07300**

**ROOFING**

**PART 1 GENERAL**

1.01 WORK INCLUDED

The work under this section includes all labor, materials, tools, and equipment required to: Install ice dam membrane / underlayment,

Install metal flashing associated with shingle roofing,

Install laminated asphalt roofing shingles to 120 mph wind rating,

1.02 RELATED WORK

1. Section 06100 –Carpentry & Millwork

1.03 SUBMITTALS

A. Submit a sample of shingle for confirmation of specified color. Submit manufacturer's product data. Certify flammability rating and conformity with specified standards. State weight of the fiberglass reinforcing mats per square.

 B. Submit fastener samples and nailing pattern to be used.

 C. Submit list of other products to be used.

D. Submit materials data sheets indicating that products specified in this section do not contain asbestos. In particular, indicate that:

1. There is no asbestos in the mineral filler used in the shingles and coated base sheet or in the coating and cement.

2. The mica used as a bond breaker on the surfaces of the shingles and coated base sheet does not contain asbestos.

E. Submit manufacturer's statement regarding the maximum wind velocity for which the shingles are warranted and the manufacturer's approved methods for installing shingles for higher velocities (manufacturer’s certification).

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**PART 2 PRODUCTS**

2.01 MATERIALS

A. Laminated Fiberglass-Asphalt Shingles: A.S.T.M. D3462 and also A.S.T.M. D3018, Type I, shall be one of the following:

1. CertainTeed Landmark PREMIUM and Landmark Woodscape PREMIUM: 30 year minimum warranty.

2. Timberline® Natural Shadow™ 30 yr Ltd Warranty Shingles, by GAF-E

3. Requests for substitutions will be considered.

4. Color shall be as selected by owner.

 B. Furnish one bundle of additional shingles for future replacement use.

C. Underlayment: Asphalt or modified bitumen-saturated and coated fiberglass base sheet without perforations or holes, equivalent to one of the following. All are superior to the code-mandated underlayment, Type 15 asphalt-saturated felt meeting ASTM D226 or ASTM 4869. If the products listed below are not approved by the shingle manufacturer, notify the Engineer and proceed as directed.

 1. CertainTeed "The WinterGuard"

2. GAF-Elk. Storm Flash™ Self-Adhering Flashing

 D. Fasteners:

1. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum, or chromated steel; minimum 3/8 inch (9.5 mm) head diameter; minimum 11 or 12 gauge (2.5 mm) shank diameter; shank to be of sufficient length to penetrate through roof sheathing or 3/4 inch (19 mm) into solid wood, plywood, or non-veneer wood decking.

E. Eave Flashing: W. R. Grace "Ice and Water Shield" eave flashing or equivalent product by manufacturers specified in Paragraph "C. Under-layment" above.

F. Metal eave and rake drip edge, and other metal flashings: 24 gauge hot-dip galvanized steel sheet, complying with ASTM A 653/A 653M, G90/Z275.

07300/2-4

G. All materials and equipment shall conform to the requirements of all authorities having jurisdiction regarding not using or installing asbestos or asbestos-containing materials.

H. Provide ice dam membrane/flashing for all roof systems. Ice Dam Membrane shall cover entire roof. Lap flashing 6", and seal laps.

**PART 3 EXECUTION**

3.02 APPLICATION

A. Plan roofing installation so that underlayment does not remain exposed to the weather. Submit roof installation plan with estimated time lapse at pre-construction conference.

1. Apply materials generally in the following order:

1. Apply eave flashings. At bottom edge, turn eave flashing material over to the bottom of the metal drip or fascia. Eave flashings shall extend from the eaves up the roof slope to a point 30" or more inside the projected interior plane of the exterior wall of the building. Lap the flashing 6" and seal laps.

1. Apply underlayment over all roof surfaces, including over eave flashings down to the edge. Lap joints 12", the upper over the lower if modified bitumen underlayment is used, use 2-ply, 50% overlap if type 15 underlayment is used. Apply patches where underlayment is cut, broken, or fitted around penetrations. Tape patches and all penetration and edge joints.

3. Apply starter shingles and metal eave and rake drips

4. Install shingles as recommended by manufacturer. Apply nailing pattern required to achieve compliance with 120 mph wind speed code requirements. Do not use staples. Adjust pneumatic or power nailers to manufacturers recommended settings so as not to punch nail heads through the shingles. If the temperature and season at the time of installation are not such that self-sealing shingles will bond, warm them with hot air gun and press them to adhere self-sealing material, or apply mastic and press shingles into it to adhere them.

07300/3-4

5. Make all shingles, including lowest courses and rake shingles, tight to the wind.

a. Follow manufacturer's instructions for installation of starter shingles to ensure that there are self-sealing strips under the butts of the lowest courses of shingles. This will require removing tabs from shingles. In addition to following manufacturer's and reference recommendations, set lowest two courses of shingles with full bed of roof cement between all layers.

b. In addition to following manufacturer's and reference recommendations, set rake shingles with full bed of roof cement between all layers, 12" wide.

c. If the shingles are not effectively self-sealed within 1 month of installation, provide a bed of roof cement or "Blackjack" asphalt sealant to hold them.

d. Flatten all shingles which do not naturally lie flat, and cement them in place. Note that fiberglass shingles do not always flatten by themselves.

C. Apply underlayment and flashings as a completely waterproof system. Patch tears with underlayment material and flashing cement. Make penetrations waterproof with flashing cement. If underlayment and flashings are not correctly lapped, the work will not be approved by the Engineer.

END OF SECTION

07300/4-4

**SECTION 08710**

 **DOORS & HARDWARE**

**PART 1 GENERAL**

1.01 WORK INCLUDED

A. This section covers the furnishing of all labor, materials, tools, and equipment necessary for the complete installation of all door hardware as required by this section of the specifications and as shown on the contract drawings.

 B. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation;

 C. Deliver to the job site those items of finish hardware scheduled to be installed at the job site; and deliver to other points of installation those items of finish hardware scheduled to be factory installed.

1.02 SUBMITTALS

A. Product Data: Within 10 calendar days after the Contractor has received the Purchase Order, submit:

 1. Materials list of items proposed to be provided under this Section.

 Front door

 Roll up doors

 Door hardware

1. Approval of this list by the Engineer will not relieve the Contractor of the responsibility to provide all finish hardware items required for the Work even though such required items may not have been shown on the approved list.

 2. Proposed work schedule.

1.03 QUALITY ASSURANCE

 A. Be available for consultation with the Engineer at no additional cost to the Owner during progress of construction;

08710/1-4

 B. Be present at completion of construction, and:

1. Inspect installation of all finish hardware items, and

 2. Make all minor adjustments required.

1. Approved Manufacturers:

 Item Manufacturer:

 Keyed entry knob. Sargent

 Automatic door closer Sargent

 Fiberglass front door Masonite

 Roll up Doors Trac-Rite

**PART 2 PRODUCTS**

2.01 GENERAL

 A. All materials and equipment shall be new and of good quality and shall bear the manufacturer's name, trade name, and catalog number and shall be so selected and arranged as to fit properly into the building spaces.

 B. Where material, equipment or other products are specified by manufacturer, brand name, type, or catalog number, such designation is to establish standards of a desired quality and style and shall be the basis of the bid. Substitutions may be made only in conformance with these specifications and with the Engineer's approval.

 C. Fasteners:

 1. Furnish necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware and doors in position for long life under hard use.

08710/2-4

2.02 ACCEPTABLE PRODUCTS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Door and Louver Schedule** |   |   |   |   |
| **Symbol** | **Description** | **Manufacturer** | **Model** | **Features** | **Installation Notes** |
| RUD5 | 5' x 6'8" roll up door | Trac-Rite Door, Inc. | 944 | 5'0"x6'8", polar blue, wood mount, insulated, draft stops, brush seals, space guard latch | inside mount, no hood, west and east sides |
| RUD3 | 3' x 6'8" roll up door | Trac-Rite Door, Inc. | 944 | 3'0"x6'8", polar blue, wood mount, insulated, draft stops, brush seals, space guard latch | inside mount, no hood, north side |
| FD | Fiberglass Entry Door | Masonite | 31633 | 6 panel painted smooth fiberglass pre-hung door with brickmold, 36" x 80" right hand in-swing, color: canyon view | south side |
| IL | Backdraft Damper | Dayton | DF-5928 | Wall mount, supply, 12 x 12 damper size. 14 3/4" square R.O. | Install on east side in se corner with hardware cloth screen on outside. |

1. For each of the required items of finish hardware, provide from the specified manufacturer or from one of the indicated acceptable substitutes.

1. Passage sets:

 Sargent, 7805 OB, keyed to match existing Town locks.

2. Door, Closers:

Push side with holder track and bumper, powder coat with special rust resistant coating; Sargent Model SRI-421-PCHTB or approved equal.

1. Provide all finishes as brushed stainless or as approved by owner.
2. New locks shall be keyed to match existing locks.

**PART 3 EXECUTION**

3.01 GENERAL

1. The Contractor shall be totally responsible for the proper performance of the work under this Section. Prior to installation of the specified materials, all surfaces and construction to receive rough carpentry or finish shall be inspected carefully for conditions which might lead to a defective installation. All such conditions shall be corrected to the satisfaction of the Engineer. All unacceptable work shall be repaired or replaced to the satisfaction of the Engineer at no additional cost to the Owner.

08710/3-4

B. Verify all dimensions in the field. Coordinate and schedule the work of this Section with the Town. Anchors, furrings, and blockings shall be built in accordance with manufacturer's standard details and/or instructions from the Engineer.

C. Include supplementary materials, parts and accessories necessary to complete the work properly and in accordance with the intent of this section, whether or not specifically detailed on the drawings or specified herein.

3.02 DELIVERIES

1. Stockpile items sufficiently in advance to assure their availability, and make necessary deliveries in a timely manner to assure orderly progress of the total Work.

3.03 COORDINATION

 A. Coordinate as necessary with the Town to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

 B. Upon completion of the work, and as a condition of its acceptance, provide the inspection, adjustment, and touch-ups as required.

 END OF SECTION

08710/4-4

**SECTION 09250**

**GYPSUM BOARD DRY WALL**

**PART 1 GENERAL**

1.01 WORK INCLUDED

1. The work under this section includes all labor, materials, tools, and equipment required to:
2. Install drywall
3. Seal and caulk dry wall joints (no mudding or painting required on this job).

1.02 RELATED WORK

1. Section 06100-Carpentry & Millwork
2. Section 07200-Insulation

1.03 REFERENCES

1. Perform Work in accordance with ASTM C840., GA-201 - Gypsum Board for Walls and Ceilings.

1.04 QUALITY ASSURANCE

1. Use skilled installers who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.05 DELIVERY, STORAGE AND HANDLING

1. Since there will be no mud work on this job to conceal marring, tears, faults, or punctures on drywall for this job, deliver materials to the job site, store in a safe area protected from damage and moisture, and off the ground. Use care when unwrapping and handling the dry wall.

1.06 MEASUREMENT AND PAYMENT

1. All work in this section shall be included for payment under the lump sum bid for this contract.

09250/1-2

**PART 2 PRODUCTS**

2.01 MATERIALS

A. Gypsum Board Types: 5/8 inch, maximum available length in place; ends square cut, tapered edges; unless noted otherwise as follows:

1. Moisture resistant type (green board) shall be used for ceiling and walls.

2.02 ACCESSORIES

1. Joint Materials: all seams shall be caulked with silicone-type exterior caulk instead of using joint compound.
2. Fasteners: ASTM C1002 Type S12 hardened screws.
3. Adhesive: ASTM C557.

**PART 3 EXECUTION**

3.01 INSTALLATION - WALL STUDS

1. Space studs maximum 16 inches oc, not more than 4 inches from [floor and ceiling lines and abutting walls.

3.02 INSTALLATION - GYPSUM BOARD

A. Install gypsum board in accordance with manufacturer's instructions.

B. Fasten gypsum board to furring or framing with screws.

3.03 JOINT TREATMENT

A. Do not tape or mud joints. Use neatly applied exterior silicon caulk instead.
This is a shed.

3.04 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

09250/2-2

**SECTION 09900**

 **PAINTING**

**PART 1 - GENERAL**

1. WORK INCLUDED
	1. Stain and finish the exterior exposed surfaces listed on the paint/stain schedule in Part 3 of this section, as specified herein, and as needed for a complete and proper installation.
	2. Protect adjacent materials and areas.
	3. Thoroughly clean up upon completion.
2. RELATED WORK
	1. Section 06100 – Carpentry and Millwork
3. WORK NOT INCLUDED
	1. Unless otherwise indicated, painting is not required on the interior of the shed.
	2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this section except as may be so specified.
	3. Do not paint moving parts of operating units; mechanical or electrical parts, such as valve operators; linkages, sensing devices, and motor shafts, unless otherwise indicated.
	4. Do not paint over required labels or equipment identification, performance ratings, name or nomenclature plates.
	5. Do not paint concrete.

09900/1-8

1. REFERENCES
	1. ANSI/ASTM D16 - Definitions of Terms relating to Paint, Varnish, Lacquer, and Related Products.
	2. ASTM D2016 - Test Method for Moisture Content of Wood.
	3. NFPA 255 - Surface Burning Characteristics of Building Materials.
2. DEFINITIONS
	1. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.
3. QUALITY ASSURANCE
	1. Single Source Responsibility: Use only thinners approved by stain manufacturer and use only within recommended limits.
	2. Coordination:
		1. Review other sections of specifications in which prime paints are to be provided to ensure capability of total coatings system for various substrates.
		2. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats as used.
	3. Fungus Control: All organic coating shall show no fungus growth when tested in accordance with Federal Test Method Standard No. 141, Method 6271.1.
	4. Products shall conform to applicable state and local code for flame/fuel/smoke rating requirements for finishes.
4. SUBMITTALS
	1. Submit under provisions of Section 01300.
	2. Product Data: Submit manufacturer’s technical information including installation for each material proposed for use.
	3. Paint/Stain Schedule: Submit schedule indicating specific paint for each surface.

09900/2-8

* 1. Samples: Prior to beginning work contractor will furnish sample stain color chips for cedar surfaces to be stained.
		1. Wood and other surfaces: Provide 2 samples of each color, texture, and material on 12" long cedar fence board.
1. DELIVERY, STORAGE, AND HANDLING
	1. Deliver, store, and protect products under provisions of Section 01600.
	2. Deliver products to site in original, new, sealed and labeled containers. Labels shall include the following information:
		1. Name of manufacturer
		2. Name or title of product
		3. Manufacturer's stock number and date of manufacture
		4. Federal Specification Number if applicable
		5. Contents by volume
		6. Thinning instructions
		7. Application instructions including surface preparation
		8. Color name and number
		9. Amount of coverage
	3. Take proper care to prevent damage during delivery, handling and storage.
	4. Store in weatherproof, lockable enclosures in location as directed by Contractor.
	5. Store paint materials at minimum ambient temperature of 45 degrees F. (7 degrees C.) and a maximum of 90 degrees F. (32 degrees C.), in well-ventilated area, unless required otherwise by manufacturer's instructions.
	6. Comply with health and fire regulations having jurisdiction over the project.
	7. Take precautionary measures to prevent fire hazards and spontaneous combustion.

09900/3-8

1. ENVIRONMENTAL REQUIREMENTS
	1. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
	2. Minimum Application Temperatures for Latex Paints: 50 degrees F. for exterior; unless required otherwise by manufacturer's instructions.
	3. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.
2. EXTRA STOCK
	1. Provide a one gallon container of each color to Owner.
	2. Label each container with color and locations, in addition to the manufacturer's label.

**PART 2 - PRODUCTS**

1. ACCEPTABLE MANUFACTURERS
	1. Subject to compliance with requirements, provide products of one of the following:
		1. Cabot
		2. Benjamin Moore
	2. Schedule of Finishes: Refer to schedule at end of this section for surface finishes.
	3. Standard of Quality: Manufactured products listed in the schedule are to provide a standard of quality required.
	4. Materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
2. MATERIALS
	1. Material Quality: Provide best quality grade of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best grade product will not be acceptable.

09900/4-8

* 1. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.
	2. Lead Content in Pigment: Limited to contain not more than 0.06% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight. This limitation is extended to interior surfaces and those exterior surfaces such as stairs, decks, porches, railings, windows and doors which are readily accessible to children under seven years of age.
	3. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
	4. All finish materials in public and fire-protected areas, shall have an "A" Flame Spread Classification in accordance with Connecticut State Fire Code.
1. COLORS
	1. Allow for colors normally selected from manufacturer's full range of colors for all paint or coating systems specified, but include provision for custom-mixed colors.
2. MIXING AND TINTING
	1. Deliver paints and enamels ready-mixed to job site.
	2. Accomplish job mixing and job tinting only when acceptable to Owner, and then in strict adherence to manufacturer's instructions.

**PART 3 - EXECUTION**

1. INSPECTION
	1. Verify that surfaces or substrate conditions are ready to receive work as instructed by the product manufacturer.
	2. Thoroughly examine surfaces scheduled to be finished prior to commencement of work. Report in writing to Engineer any condition that may potentially affect proper application. Do not commence Work until such defects have been corrected.

09900/5-8

* 1. Beginning of installation means acceptance of existing surfaces or substrate.
1. PREPARATION
	1. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing. Reinstall after finishing.
	2. Correct minor defects and clean surfaces which affect work of this Section.
	3. Remove mildew from surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
2. PROTECTION
	1. Do not apply finish in areas where dust is being generated.
	2. Protect elements surrounding the work of this Section from damage or disfiguration.
	3. Repair damage to other surfaces caused by work of this Section.
	4. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
	5. Remove empty stain containers from site.
3. APPLICATION
	1. Apply products in accordance with manufacturer's instructions.
	2. Do not apply coating until moisture content of surface is within limitations recommended by paint manufacturer. Test with moisture meter. Do not apply finishes to surfaces that are not dry.
	3. Apply stain to uniform finish. Manufacturer recommends brush application.
	4. Rate of application shall not exceed that as recommended by manufacturer for the surface involved.

09900/6-8

* 1. Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints, and skipped or missed areas.
	2. Keep applicators clean, dry, free from contaminants and suitable for the finish required.
1. CLEANING
	1. Touch-up and restore finish where damaged.
	2. Do not mar surface finish of items being cleaned.
	3. As Work proceeds, promptly remove stain where spilled, splashed, or spattered.
	4. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
	5. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
2. INSPECTION
	1. Do not apply additional coats until completed coat has been inspected by Owner.
	2. Leave all parts of moldings and trim clean and true to details with no undue amount of stain in corners and depressions.
	3. Make edges of stain adjoining other materials or colors clean and sharp with no overlapping.
3. SURFACES NOT TO BE STAINED
	1. Factory finished ceilings, floor coverings.
	2. Items with factory applied final finish, unless noted otherwise.
	3. Concealed ducts, pipes and conduit.
	4. U.L. labels on doors and frames.
	5. Green board

09900/7-8

1. SURFACE FINISH SCHEDULE - EXTERIOR SURFACES
	1. Cedar sheathing and cedar fence:
		1. Semi-solid waterborne stain in driftwood gray shall be applied to all exposed wood surfaces including both sides of fence.
		2. Acceptable products include Cabot semi solid deck and siding stain (series 1400) or Benjamin Moore.

END OF SECTION

09900/8-8

 **SECTION 16400**

 **ELECTRICAL**

**PART 1 GENERAL**

1.01 WORK INCLUDED

A. Provide complete electrical installation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

 1. Branch circuit wiring, in conduit, for lighting, receptacles, and junction boxes.

 2. Hangers, anchors, sleeves, chases, supports for fixtures, and other electrical materials and equipment in association therewith.

* + 1. Lighting fixtures and lamps.
		2. Other items and services required to complete the systems.

 B. Contractor shall obtain an electrical permit prior to work.

 C. All work shall be performed in accordance with applicable codes and regulations.

1.02 SUBMITTALS

 A. Comply with pertinent provisions of Section 01300.

 B. Product data: Within 10 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

Materials list of items proposed to be provided under this Section.

Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

16400/1-8

1.03 REFERENCES

 A. American National Standards Institute C1 National Electrical Code (NFPA 70)

 B. Connecticut Building Code Supplement – 2005 and supplements to 2013

 C. National Electrical Code (NFPA 70)

1.04 QUALITY ASSURANCE

 A. Use adequate numbers of skilled, appropriately licensed workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

 B. Without additional cost to the Owner, provide such other labor and materials as are required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract documents.

1.05 WARRANTY

 A. Provide a standard one-year warranty on all labor and materials.

1.06 MEASUREMENT AND PAYMENT

 A. All work in this section shall be included for payment under the lump sum bid for this Contract.

**PART 2 PRODUCTS**

2.01 GENERAL

1. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. has established standards for such materials, provide only materials bearing the UL label.

16400/2-8

2.02 GROUNDING SYSTEM

 A. Ground all equipment, including conduit systems, lighting, heaters, and other apparatus, by conduit or conductor to the existing grounding system, as approved by the building inspector.

2.03 DISTRIBUTION SYSTEM

 A. Identification:

 1. Identify all new panelboards, cabinets, safety switches, and other apparatus used for operation and control of new circuits, appliances, and equipment.

 2. Re-locate existing power circuits as shown on plan.

 B. Wiring devices:

 1. Provide GFI duplex receptacles of 3-pole grounding type with the third pole U-shaped and grounded to the conduit system.

 C. Raceways:

 1. Provide rigid galvanized or sherardized steel conduit, electrical metallic tubing, with compression or tap-on type fittings or Type MC cable, for all conduit mounted on walls, and ceilings, and exposed in work areas, in accordance with applicable codes and regulations. No electrical shall be placed within walls and ceilings (only to pass through to outside light

 a. Indenter fittings are not acceptable.

 2. Where electrical metallic tubing is used, comply with pertinent requirements of the National Electrical Code.

 3. PVC conduit may not be used.

16400/3-7

 4. Outlets, junction boxes, and switch boxes: Shall all be of surface mount type;

 a. Provide standard one-piece units, galvanized or sherardized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires and connectors without crowding, per code.

 b. Provide deep boxes with 1" and larger conduit.

 c. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.

 d. For switches and receptacles, provide standard gang switch boxes with stainless steel covers; except for exposed work provide pressed steel boxes with galvanized or cadmium-plated steel covers.

 (1) Provide boxes 4" square by 1-1/2" deep, except for boxes at ends of run where containing a single device.

 (2) These may be No. 180 handy boxes if permitted by the governing code.

 5. Provide sleeves and chases where conduits pass through floors and walls.

 D. Conductors:

 1. For line voltages, provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by the authorities having jurisdiction.

 2. With conductors No. 4 and larger, provide insulating bushings or insulating sleeves.

 3. For wire and cable No. 1 and larger, provide RHW or THW.

 a. Wires smaller than No. 1 may be TW.

 b. Identify feeder neutrals with white tape or white paint.

16400/4-8

 4. Where branch circuit wiring is installed in wiring channels of continuous row-mounted fixtures, provide UL type RHH or other approved 90 degree C wires, rated at 600 V.

 5. For wire No. 8 and smaller, provide solid wire; for wire larger than No. 8, provide stranded wire.

 6. For wire in conduits subjected to direct sunlight, provide THWN or RHWN.

 7. Use only copper wires and cables.

2.04 ELECTRICAL FIXTURES

 A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.

2.05 OTHER MATERIALS

1. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

**PART 3 EXECUTION**

3.01 SURFACE CONDITIONS

 A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

 A. Coordinate:

 1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

16400/5-8

 2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total Work.

 3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.

 B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

 C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Engineer. Where outlets are installed without such specific direction, relocate as directed by the Engineer, and at no additional cost to the Owner.

 D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the Drawings and actual measurements at the site of construction.

 E. The Electrical Drawings are diagrammatic, but are required to be followed as closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.03 INSTALLATION OF RACEWAYS AND FITTINGS

 A. Use flexible conduit only where subject to vibration.

 B. Provide necessary sleeves and chases where conduits pass through floors and walls, and provide other necessary openings and spaces, arranging for in proper time to prevent unnecessary cutting in connection with the Work. Perform cutting and patching in accordance with the provisions for the original Work.

C. Where conduit is exposed, run parallel to or at right angle with lines of the building.

 1. Make bends with standard conduit elbows or conduit bent to not less than the same radius.

16400/6-8

 2. Make bends free from dents and flattening.

D. Securely and rigidly support conduits per NEC throughout the Work.

3.04 INSTALLATION OF LIGHTING FIXTURES

 A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.

1. Wire fixtures with fixture wiring of at least 50 degrees C. rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.

 C. Install all lighting fixtures so that the weight of the fixture is supported, either directly or indirectly, by a sound and safe structural member of the building, using adequate number and type of fastenings to assure safe installation.

 1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.

 2. Do not support from sub-purlins of panelized roof systems.

3.05 INSTALLATION OF CONDUCTORS

A. Unless otherwise shown on the Drawings, use No. 12 type THWN conductors for all branch circuits, protected by 20 amp circuit breakers. Where so indicated on the Drawings, use larger wires to limit voltage drops.

B. Provide code-sized conduit for number and size wires shown or required.

C. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.

 1. Make splices electrically and mechanically secure with pressure-type connectors, or by soldering.

 a. For wires size 6 AWG and smaller, provide "Scotch-lock" connectors.

 b. For wire size 4 AWG and larger, provide Burndy “Versitaps" and heavy-duty connectors, or T & b "Lock Tite" connectors.

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 2. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-plastic electrical tape where insulation is required.

D. Tape all joints with rubber tape 1-1/2 times the thickness of the conductor insulation, then cover with the friction tape or the vinyl-plastic electrical tape specified above.

1. The Drawings indicate the general direction of home runs. Continue all such home runs to the panel as though the routes were shown completely.

3.06 TESTING AND INSPECTION

 A. Provide personnel and equipment, make required tests, and secure required approvals from the building inspector jurisdiction.

 B. When material and/or workmanship is found to not comply with the specified requirements, within three days after receipt of notice of such non-compliance remove the non-complying items from the job site and replace them with items complying with the specified requirements, all at no additional cost to the Owner.

3.07 PROJECT COMPLETION

 A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.

 B. Forward to the Owner's operation and maintenance personnel any manufacturers literature on new lighting or equipment.

 END OF SECTION

16400/7-7