

Submittal Schedule

033000 Cast-In-Place Concrete

1. Shop Drawings: Reinforcing steel: Complete shop drawings
2. Mill Test Reports:
 - a. Reinforcing Steel.
 - b. Cement.
3. Manufacturer's Certificates:
 - a. Abrasive aggregate.
 - b. Air-entraining admixture.
 - c. Chemical admixtures, including chloride ion content.
 - d. Waterproof paper for curing concrete.
 - e. Liquid membrane-forming compounds for curing concrete.
 - f. Non-shrinking grout.
 - g. Liquid hardener.
 - h. Waterstops.
 - i. Expansion joint filler.
 - j. Adhesive binder.
4. Testing Agency for Concrete Mix Design.
5. Test Report for Concrete Mix Designs.
6. Shoring and Reshoring Sequence.

040513 Masonry Mortaring

1. Manufacturer's Literature and Data: Description of each product.
2. Certificates: Certify each product complies with specifications.
 - a. Portland cement.
 - b. Masonry cement.
 - c. Mortar cement.
 - d. Hydrated lime.
 - e. Fine aggregate.
 - f. Color admixture.
3. Qualifications: Substantiate qualifications comply with specifications.
 - a. Testing laboratory.

040516 Masonry Grouting

1. Manufacturer's Literature and Data: Description of each product.
2. Sustainable Construction Submittals:
 - a. Recycled Content: Identify pre-consumer recycled content percentage by weight.
3. Test Reports: Certify each product complies with specifications.
 - a. Grout, each type.
 - b. Cement.

- c. Aggregate.
- 4. Certificates: Certify each product complies with specifications.
 - a. Blended hydraulic cement.
 - b. Portland cement.
 - c. Grout.
 - d. Hydrated lime.
 - e. Aggregate.
 - f. Color admixture.

042000 Unit Masonry

- 1. Submittal Drawings:
 - a. Fabrication, bending, and placement of reinforcing bars. Comply with ACI 315. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies.
 - b. Special masonry shapes, profiles, and placement.
 - c. Masonry units for typical window and door openings, and, for special conditions as affected by structural conditions.
- 2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
- 3. Samples:
 - a. Face brick: Sample panel, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of bricks, bond, and proposed mortar joints.
 - b. Concrete masonry units, when exposed in finish work.
 - c. Anchors and Ties: Each type.
 - d. Joint Reinforcing: 1200 mm (48 inches) long each type.
- 4. Sustainable Construction Submittals:
 - a. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- 5. Certificates: Certify products comply with specifications.
 - a. Face brick.
 - b. Solid and load-bearing concrete masonry units, including fire-resistant rated units.
- 6. Delegated Design Drawings and Calculations: Signed and sealed by responsible design professional.

051200 Structural Steel Framing

- 1. Shop and Erection Drawings: Complete
- 2. Certificates:
 - b. Structural steel.

- c. Steel for all connections.
- d. Welding materials.
- e. Shop coat primer paint.
- 3. Test Reports:
 - a. Welders' qualifying tests.
- 4. Design Calculations and Drawings:
 - a. Connection calculations, if required.
- 5. Record Surveys.

053100 Steel Decking

- 1. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and similar information necessary for completing installation as shown and specified, including supplementary framing, sump pans, ridge and valley plates, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- 2. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics.
- 3. Certification: For each type and gauge of metal deck supporting concrete slab or fill, furnish certification of the specified fire ratings. Certify that the units supplied are U.L. listed as a "Steel Floor and Form Unit".
- 4. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

054000 Cold-Formed Metal Framing

- 1. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- 2. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.
- 3. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

055000 Metal Fabrications

- 1. Manufacturer's Literature and Data.
- 2. Shop Drawings:

- a. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
 - b. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
 - c. Provide templates and rough-in measurements as required.
3. Manufacturer's Certificates:
 - a. Anodized finish as specified.
 - b. Live load designs as specified.
4. Design Calculations for specified live loads including dead loads.
5. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

055100 Metal Stairs

1. Sustainable Design Submittals, as described below:
 - a. Post-consumer and pre-consumer recycled content as specified.
2. Shop Drawings: Show design, fabrication details, installation, connections, material, and size of members.
3. Fabrication qualifications.
4. Installer qualifications.
5. Calculations.
6. Welding qualifications.

061000 Rough Carpentry

1. Sustainable Design Submittals, as described below:
 - a. Post-consumer and pre-consumer recycled content as specified.
 - b. Volatile organic compounds per volume as specified.
 - c. For composite wood products, submit documentation indicating that product contains no added urea formaldehyde.
2. Shop Drawings showing framing connection details, fasteners, connections and dimensions.
3. Manufacturer's Literature and Data:
 - a. Submit data for lumber, panels, hardware and adhesives.
 - b. Submit data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plants that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - c. Submit data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials

comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

- d. For products receiving a waterborne treatment, submit statement that moisture content of treated materials was reduced to levels specified before shipment to project site.

4. Manufacturer's certificate for unmarked lumber.

062000 Finish Carpentry

1. Shop Drawings:

- a. Millwork items - Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans.
- b. Show construction and installation.

2. Samples:

- a. Plastic laminate finished plywood or particleboard, 150 mm by 300 mm (six by twelve inches).

3. Certificates:

- a. Indicating preservative treatment or fire retardant treatment of materials, where specified, meet the requirements specified.
- b. Indicating moisture content of materials meet the requirements specified.

4. List of acceptable sealers for fire retardant and preservative treated materials.

5. Manufacturer's literature and data:

- a. Finish hardware
- b. Sinks with fittings
- c. Electrical components

071352 Modified Bituminous Sheet Waterproofing

1. Manufacturer's Literature and Data:

- a. Bituminous sheet.
- b. Primer.
- c. Mastic.
- d. Protection material, temporary and permanent.
- e. Printed installation instructions for conditions specified.

2. Certificates:

- a. Indicating bituminous sheet manufacturer's approval of primer, and roof cement.
- b. Indicating bituminous sheet waterproofing manufacturer's qualifications as specified.
- c. Approval of installer by bituminous sheet manufacturers.
- d. Water test report.

072113 Thermal Insulation

1. Submittal Drawings:
 - a. Show insulation type, thickness, and R-value for each location.
2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Adhesive indicating manufacturer recommendation for each application.
3. Sustainable Construction Submittals:
 - a. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
 - b. Low Pollutant-Emitting Materials:
 - i) Show volatile organic compound types and quantities.

072200 Roof and Deck Insulation

1. Submittal Drawings:
 - a. Show size, configuration, and installation details.
 - i) Nailers, cants, and terminations.
 - ii) Layout of insulation showing slopes, tapers, penetrations, and edge conditions.
2. Manufacturer's Literature and Data:
 - a. Description of each product.
3. Samples:
 - a. Roof insulation, each type.
 - b. Fasteners, each type.
4. Sustainable Construction Submittals:
 - a. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
 - b. Biobased Content:
 - i) Show type and quantity for each product.
 - c. Low Pollutant-Emitting Materials:
 - i) Show volatile organic compound types and quantities.
 - ii) Certify each composite wood and agrifiber product contain no added urea formaldehyde.
5. Qualifications: Substantiate qualifications meet specifications.
 - a. Installer.

072400 Exterior Insulation and Finish Systems

1. Submittal Drawings:
 - a. Show size, configuration, and fabrication and installation details.
 - b. Show details for corner treatment, sills, soffits, dentils, quoins, lintels, openings, penetrations, flashing, and other special applications.

2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
 - c. Warranty.
3. Samples:
 - a. Two 300 mm (1 foot) square samples of EIFS finishes over cement board identical to proposed installation in thickness, color, texture insulation and workmanship.
4. Test reports: Certify each product and complete system complies with specifications.
5. Qualifications: Substantiate qualifications comply with specifications.
 - a. Installer with project experience list.

072726 Fluid-Applied Membrane Air Barriers, Vapor Permeable

1. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
2. Sustainable Construction Submittals: Low Pollutant-Emitting Materials: Identify volatile organic compound types and quantities.
3. Test reports: Submit field inspection and test reports.
4. Certificates: Certify each product complies with specifications. Certify products are compatible with adjacent materials.
5. Qualifications: Substantiate qualifications comply with specifications.
 - a. Manufacturer with project experience list.
 - b. Installer with project experience list.
 - i) Include personnel qualifications.
 - ii) Field supervisor qualifications.
 - iii) Certify installer approval by air barrier manufacturer.
6. Installation Audit: Submit audit report.

074000 Roofing and Siding Panels

1. Sustainable Design Submittals, as described below:
 - a. Postconsumer recycled content as specified.
2. Samples: Metal panel, 152 mm (6 inch) square, showing finish, each color and texture.
3. Shop Drawings: Wall and roof panels, showing details of construction and installation. Collateral steel framing, U value, thickness and kind of material, closures, flashing, fastenings and related components and accessories. Show interfaces and relationships to work at other trades and continuity with adjacent thermal, weather, air and vapor barriers.
4. Manufacturer's Literature and Data: Wall and roof panels.

5. Fire Test Report: Report of fire test by recognized testing laboratory for fire rating specified, showing details of construction.
6. Manufacturer's Certificates: Indicating manufacturer's qualifications specified.
7. Installer qualifications.
8. Manufacturer warranty.

075423 Thermoplastic Polyolefin (TPO) Roofing

1. Product Data:
 - a. Adhesive materials.
 - b. Membrane sheet roofing and flashing membrane.
 - c. Roofing cement.
 - d. Roof walkway.
 - e. Fastening requirements.
 - f. Application instructions.
2. LEED and Federal Sustainable Design Submittals:
 - a. Product Test Reports for Credit SS 7.2: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement.
 - b. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
 - c. Product Data for Federally-Mandated Bio-Based Materials: For roof materials, indicating USDA designation and compliance with definitions for bio-based products, Rapidly Renewable Materials, and certified sustainable wood content.
3. Samples:
 - a. Nails and fasteners, each type.
4. Shop Drawings: Include plans, sections, details, and attachments.
 - a. Base flashings and terminations.
5. Certificates:
 - a. Indicating materials and method of application of roofing system meets requirements of FM Approvals "RoofNav" for specified fire/windstorm classification.
 - b. Indicating compliance with energy performance requirement.
6. Warranty: As specified.
7. Documentation of supervisors' and inspectors' qualifications.
8. Field reports of roofing inspector.
9. Temporary protection plan. Include list of proposed temporary materials.
10. Contract Close-out Submittals:

- a. Maintenance Manuals.
- b. Warranty signed by installer and manufacturer.

076000 Flashing and Sheet Metal

1. Shop Drawings: For all specified items, including:
 - a. Flashings
 - b. Copings
 - c. Gutter and Conductors
 - d. Expansion joints
 - e. Fascia-cant
2. Manufacturer's Literature and Data: For all specified items, including:
 - a. Two-piece counterflashing
 - b. Thru wall flashing
 - c. Expansion joint cover, each type
 - d. Fascia-cant
3. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

077100 Roof Specialties

1. Sustainable Design Submittals, as described below:
 - a. Post-consumer and pre-consumer recycled content as specified.
2. Samples: Representative sample panel of color-anodized aluminum not less than 101 x 101 mm (4 x 4 inches), except extrusions are to be of a width not less than section to be used. Submit sample that shows coating with integral color and texture. Include manufacturer's identifying label.
3. Shop Drawings: Each item specified showing design, details of construction, installation and fastenings.
4. Manufacturer's Literature and Data: Each item specified.
5. Certificates: Stating that aluminum has been given specified thickness of anodizing.

078400 Firestopping

1. Sustainable Design Submittals, as described below:
 - a. Volatile organic compounds per volume as specified.
2. Installer qualifications.
3. Inspector qualifications.
4. Manufacturer's literature, data, and installation instructions for types of firestopping and smoke stopping used.
5. List of FM, UL, or WH classification number of systems installed.
6. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

7. Submit certificates from manufacturer attesting that firestopping materials comply with the specified requirements.

079200 Joint Sealants

1. Sustainable Design Submittals, volatile organic compounds per volume as specified.
2. Installer qualifications.
3. Contractor certification.
4. Manufacturer's installation instructions for each product used.
5. Cured samples of exposed sealants for each color.
6. Manufacturer's Literature and Data:
 - a. Primers.
 - b. Sealing compound, each type, including compatibility when different sealants are in contact with each other.
7. Manufacturer warranty.

079513 Expansion Joint Cover Assemblies

1. Submittal Drawings:
 - a. Include large-scale details indicating profiles of each type of expansion joint cover, splice joints between joint sections, transitions to other assemblies, terminations, anchorages, fasteners, and relationship to adjoining work and finishes.
 - b. Show size, configuration, and fabrication and installation details.
 - c. Include composite drawings showing work specified in other Sections coordinated with expansion joints.
2. Manufacturer's Literature and Data:
 - a. Description of each product specified.
 - b. Show movement capability of each cover assembly and suitability of material used in exterior seals for ultraviolet exposure.
 - c. Description of materials and finishes.
 - d. Installation instructions.
3. Samples: Submit 300 mm (12 inch) long samples.
 - a. Each type and color of metal finish for each required thickness and alloy.
 - b. Each type and color of flexible seal.
4. Sustainable Construction Submittals:
 - a. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
 - b. Low Pollutant-Emitting Materials: Identify volatile organic compound types and quantities.

5. Qualifications: Substantiate qualifications comply with specifications. Installer with project experience list.
6. Certificates: Indicate products comply with specifications. Fire rated expansion joint cover assemblies.
7. Operation and Maintenance Data: Care instructions for each exposed finish product.

081113 Hollow Metal Doors and Frames

1. Manufacturers Literature and Data:

- a. Fire rated doors and frames, showing conformance with NFPA 80 and Underwriters Laboratory, Inc., or Intertek Testing Services or Factory Mutual fire rating requirements and temperature rise rating for stairwell doors. Submit proof of temperature rating.
- b. Sound rated doors, including test report from Testing Laboratory.

081400 Interior Wood Doors

1. Submittal Drawings:

- a. Show size, configuration, and fabrication and installation details.
- b. Include details of glazing.
- c. Indicate project specific requirements not included in Manufacturer's Literature and Data submittal.

2. Manufacturer's Literature and Data:

- a. Description of each product.
- b. Fire rated doors showing conformance with NFPA 80.

3. Samples:

- a. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
- b. Veneer sample 200 mm by 275 mm (8 inch by 11 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.

4. Sustainable Construction Submittals:

- a. Low Pollutant-Emitting Materials:
 - i) Show volatile organic compound types and quantities.

5. Test Reports: Indicate products comply with specifications.

- a. Screw Holding Capacity Test.
- b. Cycle-Slam Test.
- c. Hinge-Loading Test.

6. Operation and Maintenance Data:

- a. Care instructions for each exposed finish product.

083113 Access Doors and Frames

1. Submittal Drawings: Show size, configuration, and fabrication and installation details.
2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
3. Sustainable Construction Submittals: Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

084113 Aluminum-Framed Entrances and Storefronts

1. Sustainable Design Submittals: Volatile organic compounds per volume as specified.
2. Shop Drawings: 1:2 (half size) scale showing construction, anchorage, reinforcement, and installation details. Show interfaces and relationships to work of other trades and continuity with adjacent thermal, weather, air and vapor barriers.
3. Manufacturer's Literature and Data:
 - a. Doors, each type.
 - b. Entrance and Storefront construction.
4. Calculations: Submit calculations and certification of performance of this work signed and sealed by Professional Engineer registered in the state where the work is located. Indicate how design requirements for loading and other performance criteria have been satisfied.
5. Samples:
 - a. Door corner section, 450 mm x 450 mm (18 x 18 inches), of each door type specified, showing vertical and top hinge edges, door closer reinforcement, internal reinforcement and insulation, of flush panel door.
 - b. Two (2) samples of organic finish of each color specified.
6. Test Reports: Submit certified test reports for specified tests.
7. Manufacturer's Certificates indicating manufacturer's qualifications specified.

084413 Glazed Aluminum Curtain Walls

1. Sustainable Design Submittals, as described below: Volatile organic compounds per volume as specified.
2. Manufacturer's Literature and Product Data:
 - a. Manufacturer's standard details and fabrication methods.
 - b. Data on finishing, components, and accessories.
 - c. Instructions: Submit descriptive literature, detail specifications, performance test data and instructions for installation, and adjustments.

d. Recommendations for maintenance and cleaning of exterior surfaces.

3. Shop Drawings:

a. Show elevations of glazed curtain wall system at 1:48 (1/4 inch) scale, metal gages, details of construction, methods of anchorage, flashing and coping details, glazing details, firestopping assemblies at edge of slabs and details of installation. Show interfaces and relationships to work of other trades and continuity with adjacent thermal, weather, air and vapor barriers.

b. Submit for curtain wall system, and accessories. Tentative approval of drawings is to be received before fabrication of mock-up. Final approval of drawings is to be deferred pending approval of mock-up and accessories.

c. Operation and Maintenance Manuals

i) Submit cleaning and maintenance instructions.

4. Samples:

a. Submit pairs of samples of each specified color and finish on 305 mm (12-inch) long section by width of each tubular, or extruded shape section or 305 mm by 305 mm (12-inch by 12-inch) wide sections of sheet shapes.

b. Submit corner section of framing members showing fasteners, panels, glazing methods, glazing materials, and weather-stripping. Submit one (1) sample minimum 305 mm by 305 mm (12 inches by 12 inches). In lieu of submitting separate samples for corner section, intermediate section, and panel, one (1) composite sample incorporating all components and features listed may be submitted.

c. Where normal color variations are anticipated, include two (2) or more units of each sample indicating extreme limits of color variations.

5. Glass:

a. Specified in Section 08 80 00, GLAZING.

6. Quality Assurance Submittals:

a. Design Data: Submit structural and thermal calculations for complete wall assembly. Structural calculations and design shop drawings signed and sealed by a Professional Engineer (PE).

b. Factory Test Reports: Submit certified test reports, for each of following listed tests, from a qualified independent testing laboratory showing that glazed aluminum curtain wall system assembly has been tested in accordance with specified test procedures and complies with performance characteristics as indicated by manufacturer's testing

procedures. Submit factory tests required except that where a curtain wall system or component of similar type, size, and design as specified for this project has been previously tested within last year, under conditions specified herein, resulting test reports may be submitted in lieu of listed testing. Submit appropriate testing reports for specific tests indicated below:

- i) Deflection and structural tests.
- ii) Water penetration tests.
- iii) Air infiltration tests.
- iv) Delamination tests.
- v) Thermal conductance tests.

7. Manufacturer's Certificates:

- a. Submit Certificates of Compliance, with specification requirements, for the following:
 - i) Metal extrusions.
 - ii) Metal accessories.
 - iii) Statement(s) that aluminum has been given specified thickness of anodizing or organic coating finish.
 - iv) Statement(s) indicating manufacturers and installers conform with qualifications as specified.
 - v) Submit list (minimum of five (5)) of equivalent project size installations for both manufacturer and installer.

8. Manufacturer's Field Reports:

- a. Submit field reports of manufacturer's field representative observations of curtain wall installation indicating observations made during inspection at beginning of project, during middle of installation and at conclusion of project.

9. Welders: Submit welders' qualifications as specified.

10. Testing Laboratory: Submit Testing Laboratory qualifications.

085619 Pass Windows

- 1. Submittal Drawings: Show size, configuration, and fabrication and installation details.
- 2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
- 3. Samples: Exposed Finishes: 50 by 100 mm (2 by 4 inches), each type and color.

4. Sustainable Construction Submittals: Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

087100 Door Hardware

1. Hardware Schedule: Prepare and submit hardware schedule in the following form:
2. Samples and Manufacturers' Literature:
 - a. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
 - b. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.
3. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

087113.11 Low Energy Power Assist Door Operators

1. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.
2. Shop Drawings: Showing location of controls and safety devices in relationship to each automatically operated door. This includes templates, wiring diagrams, fabrication details, anchorage and other information to providers of related work to coordinate the proper installation of the door operators.

088000 Glazing

1. Sustainable Design Submittals: Volatile organic compounds per volume as specified.
2. Manufacturer's Certificates:
 - a. Certificate stating that fire-protection and fire-resistive glazing units meet code requirements for fire-resistance-rated assembly and applicable safety glazing requirements.
 - b. Certificate on solar heat gain coefficient when value is specified.
 - c. Certificate on "R" value when value is specified.
 - d. Certificate test reports confirming compliance with specified bullet resistive rating.
3. Manufacturer Warranty.

4. Manufacturer's Literature and Data:
 - a. Glass, each kind required.
 - b. Insulating glass units.
 - c. Elastic compound for metal sash glazing.
 - d. Putty, for wood sash glazing.
 - e. Glazing cushion.
 - f. Sealing compound.
 - g. Plastic glazing material, each type required.
5. Samples:
 - a. Size: 305 mm by 305 mm (12 inches by 12 inches).
 - b. Tinted glass.
 - c. Reflective glass.
6. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

092216 Non-Structural Metal Framing

1. Manufacturer's Literature and Data:
 - a. Studs, runners and accessories.
 - b. Hanger inserts.
 - c. Channels (Rolled steel).
 - d. Furring channels.
 - e. Screws, clips and other fasteners.
2. Shop Drawings:
 - a. Typical ceiling suspension system.
 - b. Typical metal stud and furring construction system including details around openings and corner details.
 - c. Typical shaft wall assembly
 - d. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
3. Test Results: Fire rating test designation, each fire rating required for each assembly.

092900 Gypsum Board

1. Manufacturer's Literature and Data:
 - a. Cornerbead and edge trim.
 - b. Finishing materials.
 - c. Laminating adhesive.
 - d. Gypsum board, each type.
2. Shop Drawings:

- a. Typical gypsum board installation, showing corner details, edge trim details and the like.
 - b. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.
 - c. Typical shaft wall assembly.
 - d. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.
3. Samples:
- a. Cornerbead.
 - b. Edge trim.
 - c. Control joints.
4. Test Results:
- a. Fire rating test, each fire rating required for each assembly.
 - b. Sound rating test.
5. Certificates: Certify that gypsum board types, gypsum backing board types, cementitious backer units, and joint treating materials do not contain asbestos material.

093013 Ceramic/Porcelain Tiling

1. Sustainable Design Submittals as described below: Volatile organic compounds per volume as specified.
2. Samples:
 - a. Base tile, each type, each color, each size.
 - b. Mosaic floor tile panels, 228 by 228 mm (9 by 9 inches), each type, color, size and pattern.
 - c. Paver tile, each size, type, color and pattern.
 - d. Quarry tile, each type, color, and size.
 - e. Porcelain tile, each type, color, patterns and size.
 - f. Wall (or wainscot) tile, each color, size and pattern.
 - g. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
3. Product Data:
 - a. Ceramic and porcelain tile, marked to show each type, size, and shape required.
 - b. Chemical resistant mortar and grout (epoxy and furan).
 - c. Cementitious backer unit.
 - d. Dry-set portland cement mortar and grout.
 - e. Divider strip.

- f. Elastomeric membrane and bond coat.
- g. Reinforcing tape.
- h. Leveling compound.
- i. Latex-portland cement mortar and grout.
- j. Commercial portland cement grout.
- k. Organic adhesive.
- l. Slip resistant tile.
- m. Waterproofing isolation membrane.
- n. Fasteners.

4. Certification:

- a. Master grade certificate, ANSI A137.1.
- b. Manufacturer's certificates indicating that the following materials comply with specification requirements:
 - i) Chemical resistant mortar and grout (epoxy and furan).
 - ii) Modified epoxy emulsion.
 - iii) Commercial portland cement grout.
 - iv) Cementitious backer unit.
 - v) Dry-set portland cement mortar and grout.
 - vi) Elastomeric membrane and bond coat.
 - vii) Reinforcing tape.
 - viii) Latex-portland cement mortar and grout.
 - ix) Leveling compound.
 - x) Organic adhesive.
 - xi) Waterproof isolation membrane.
 - xii) Factory back mounted tile documentation for suitability for application in wet area.

5. Installer Qualifications:

- a. Submit letter stating installer's experience.

095100 Acoustical Ceilings

1. Samples:

- a. Acoustical units, each type, with label indicating conformance to specification requirements, including units specified to match existing.
- b. Colored markers for units providing access.

2. Manufacturer's Literature and Data:

- a. Ceiling suspension system, each type, showing complete details of installation, including suspension system specified to match existing systems.

- b. Acoustical units, each type
- 3. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements.

096513 Resilient Base and Accessories

- 1. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Adhesives and primers indicating manufacturer's recommendation for each application.
 - c. Installation instructions.
- 2. Samples:
 - a. Resilient Base: 150 mm (6 inches) long, each type and color.
 - b. Resilient Stair Treads: 150 mm (6 inches) long, each type and color.
 - c. Sheet Rubber Flooring: 300 mm (12 inches) square, each type and color.
- 3. Sustainable Construction Submittals:
 - a. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
 - b. Low Pollutant-Emitting Materials:
 - i) Stair Treads and Sheet Rubber Flooring: Submit FloorScore label.
 - ii) Show volatile organic compound types and quantities.
- 4. Operation and Maintenance Data: Care instructions for each exposed finish product.

096516 Resilient Sheet Flooring

- 1. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
 - c. Warranty.
- 2. Samples:
 - a. Sheet material, 38 mm by 300 mm (1-1/2 inch by 12 inch), of each color and pattern with welded seam using specified welding rod 300 mm (12 inches) square for each type, pattern and color.
 - b. Cap strip and fillet strip, 300 mm (12 inches) for integral base.
 - c. Shop Drawings and Certificates: Layout of joints showing patterns where joints are expressed, and type and location of obscure type joints. Indicate orientation of directional patterns.
 - d. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
 - e. Edge strips: 150 mm (6 inches) long each type.
 - f. Primer: Pint container, each type.
- 3. Sustainable Construction Submittals:

- a. Low Pollutant-Emitting Materials:
 - i) Sheet Flooring: Submit FloorScore label.
 - ii) Identify volatile organic compound types and quantities.
- 4. Certificates: Certify products comply with specifications.
 - a. Heat welded seaming is manufacturer's prescribed method of installation.
- 5. Qualifications: Substantiate qualifications comply with specifications.
 - a. Manufacturer with project experience list.
 - b. Installer with project experience list.

096519 Resilient Tile Flooring

- 1. Sustainable Design Submittals as described below:
 - a. Volatile organic compounds per volume as described.
 - b. Post-consumer and pre-consumer recycled content as described.
- 2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Resilient material manufacturer's recommendations for adhesives, underlayment, primers, and polish.
 - c. Application, installation and maintenance instructions.
- 3. Samples:
 - a. Tile: Each type, color, thickness and finish.
 - b. Edge Strips: Each type, color, thickness and finish.
- 4. Shop Drawings:
 - a. Layout of patterns as shown on the construction documents.
 - b. Edge strip locations showing types and detail cross sections.
- 5. Test Reports: Abrasion resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory. Tested per ASTM F510/F510M.

097231 Polyethylene Wall Covering

- 1. Sustainable Design Submittals as described below: Volatile organic compounds per volume as specified.
- 2. Samples:
 - a. Fabric wall covering, each type and pattern as specified, size, 450 mm (18 inch) long, full width of mill run, each color.
 - b. Molding, each type.
- 3. Manufacturer's Literature and Data:
 - a. Wall covering primer and adhesive.
 - b. Adhesive for edge guards and wainscot cap.
 - c. Complete instructions for installation of wall covering.
 - d. Maintenance instructions for each type of wall covering.

4. Certificate: Flame spread, and smoke density factors.
5. Tests: Substrate moisture.

098433 Sound-Absorbing Wall Units

1. Sustainable Design Submittals, as described below:
 - a. Post-consumer and pre-consumer recycled content as specified.
 - b. Volatile organic compounds per volume as specified.
 - c. For composite wood products, documentation indicating product contains no added urea formaldehyde.
2. Samples: Fabric covering as specified, size 457 mm (18 inches). Submit four (4) each, full width of mill run for each color specified.
3. Manufacturer's Literature and Data: Complete instructions for installation of wall panels. Include fabric facing, panel edge, core material and acoustical data for each sound-absorbing wall unit.
4. Certificate: Flame spread and smoke development index factors.

099100 Painting

1. Sustainable Design Submittals: Volatile organic compounds per volume as specified.
2. Painter qualifications.
3. Manufacturer's Literature and Data:
 - a. Before work is started, or sample panels are prepared, submit manufacturer's literature and technical data, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one (1) list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.
4. Sample Panels:
 - a. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
 - b. Panels to Show Color: Composition board, 100 x 250 mm (4 x 10 inch).
 - c. Panel to Show Transparent Finishes: Wood of same species and grain pattern as wood approved for use, 100 x 250 mm (4 x 10 inch face) minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 x 50 mm (2 x 2 inch) minimum or actual wood member to show complete finish.

- d. Attach labels to panel stating the following:
 - i) Federal Specification Number or manufacturers name and product number of paints used.
 - ii) Product type and color.
 - iii) Name of project.
- e. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.
- 5. Sample of identity markers if used.
- 6. Manufacturers' Certificates indicating compliance with specified requirements:
 - a. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
 - b. Epoxy coating.

102113 Toilet Compartments

- 1. Manufacturer's Literature and Data: Specified items indicating all hardware and fittings, material, finish, and latching.
- 2. Shop Drawings: Construction details at 1/2 scale, showing installation details, anchoring and leveling devices.
- 3. Manufacturer's certificate, attesting that zinc-coatings conform to specified requirements.

102123 Cubicle Curtain Tracks

- 1. Samples:
 - a. 305 mm (12 inch) long piece of cubicle curtain track with carrier access and end stop.
 - b. Clip anchor for fastening track to grid system of acoustical ceilings.
 - c. Curtain carrier for attaching curtain to track.
- 2. Shop Drawings: Showing layout of tracks and method of anchorage.
- 3. Manufacturer's Literature and Data: Cubicle curtain track.

102600 Wall and Door Protection

- 1. Sustainable Design Submittals, as described below:
 - a. Volatile organic compounds per volume as specified.
 - b. For composite wood products, submit documentation indicating product contains no added urea formaldehyde.
- 2. Shop Drawings: show design and installation details.
- 3. Manufacturer's Literature and Data:
 - a. Handrail/Wall Guard Combinations.
 - b. Wall Guards.
 - c. Corner Guards.
 - d. Door/Door Frame Protectors.

- e. High Impact Wall covering.
- 4. Test Report: Showing that resilient material complies with specified fire and safety code requirements.
- 5. Manufacturer's qualifications.
- 6. Installer's qualifications.
- 7. Manufacturer's warranty.

102800 Toilet, Bath, and Laundry Accessories

- 1. Submittal Drawings:
 - a. Show size, configuration, and fabrication, anchorage and installation details.
 - b. Show mounting locations and heights.
- 2. Manufacturer's Literature and Data:
 - a. Description of each product.
 - b. Installation instructions.
- 3. Samples:
 - a. Full sized, complete assembly of each product specified.
 - b. Approved samples may be incorporated into project.
- 4. Certificates: Certify each product complies with specifications.
 - a. Soap dispensers: Certify soap dispensers are fabricated of material that will not be affected by liquid soap, aseptic detergents, and hexachlorophene solutions.
- 5. Qualifications: Substantiate qualifications comply with specifications.
- 6. Operation and Maintenance Data: Care instructions for each exposed finish product.

104413 Fire Extinguisher Cabinets

- 1. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

211313 Wet-Pipe Sprinkler Systems

- A. Prepare detailed working drawings that are signed by a NICET Level III or Level IV Sprinkler Technician or stamped by a Registered Professional Engineer licensed in the field of Fire Protection Engineering. As the Government review is for technical adequacy only, the installer remains responsible for correcting any conflicts with other trades and building construction that arise during installation. Partial submittals will not be accepted. Material submittals shall be approved prior to the purchase or delivery to the job site. Suitably bind submittals in notebooks or binders and provide an index referencing the appropriate specification section. In addition to the hard copies, provide submittal items in Paragraphs 1.4(A)1 through

1.4(A)5 electronically in pdf format on a compact disc or as directed by the COR. Submittals shall include, but not be limited to, the following:

1. Qualifications:

- a. Provide a copy of the installing contractor's fire sprinkler and state contractor's license.
- b. Provide a copy of the NICET certification for the NICET Level III or Level IV Sprinkler Technician who prepared and signed the detailed working drawings unless the drawings are stamped by a Registered Professional Engineer licensed in the field of Fire Protection Engineering.
- c. Provide documentation showing that the installer has been actively and successfully engaged in the installation of commercial automatic sprinkler systems for the past ten years.

2. Drawings: Submit detailed 1:100 (1/8 inch) scale (minimum) working drawings conforming to the Plans and Calculations chapter of NFPA 13. Drawings shall include graphical scales that allow the user to determine lengths when the drawings are reduced in size. Include a plan showing the piping to the water supply test location.

3. Manufacturer's Data Sheets: Provide data sheets for all materials and equipment proposed for use on the system. Include listing information and installation instructions in data sheets. Where data sheets describe items in addition to those proposed to be used for the system, clearly identify the proposed items on the sheet.

4. Calculation Sheets:

- a. Submit hydraulic calculation sheets in tabular form conforming to the requirements and recommendations of the Plans and Calculations chapter of NFPA 13.

5. Valve Charts: Provide a valve chart that identifies the location of each control valve. Coordinate nomenclature and identification of control valves with COR. Where existing nomenclature does not exist, the chart shall include no less than the following: Tag ID No., Valve Size, Service (control valve, main drain, aux. drain, inspectors test valve, etc.), and Location.

6. Final Document Submittals: Provide as-built drawings, testing and maintenance instructions in accordance with the requirements in Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. In

addition, submittals shall include, but not be limited to, the following:

- a. A complete set of as-built drawings showing the installed system with the specific interconnections between the system switches and the fire alarm equipment. Provide a complete set in the formats as follows. Submit items 2 and 3 below on a compact disc or as directed by the COR.
 - 1) One full size (or size as directed by the COR) printed copy.
 - 2) One complete set in electronic pdf format.
 - 3) One complete set in AutoCAD format or a format as directed by the COR.
- b. Material and Testing Certificate: Upon completion of the sprinkler system installation or any partial section of the system, including testing and flushing, provide a copy of a completed Material and Testing Certificate as indicated in NFPA 13. Certificates shall be provided to document all parts of the installation.
- c. Operations and Maintenance Manuals that include step-by-step procedures required for system startup, operation, shutdown, and routine maintenance and testing. The manuals shall include the manufacturer's name, model number, parts list, and tools that should be kept in stock by the owner for routine maintenance, including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization, including address and telephone number, for each item of equipment.
- d. One paper copy of the Material and Testing Certificates and the Operations and Maintenance Manuals above shall be provided in a binder. In addition, these materials shall be provided in pdf format on a compact disc or as directed by the COR.
- e. Provide one additional copy of the Operations and Maintenance Manual covering the system in a flexible protective cover and mount in an accessible location adjacent to the riser or as directed by the COR.

220511 Common Work Results for Plumbing

- A. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 05 11, COMMON WORK RESULTS FOR PLUMBING", with applicable paragraph identification.

- B. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements and will fit the space available.
- C. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.
- D. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.
- E. Installing Contractor shall provide lists of previous installations for selected items of equipment. Contact persons who will serve as references, with telephone numbers and e-mail addresses shall be submitted with the references.
- F. Manufacturer's Literature and Data: Manufacturer's literature shall be submitted under the pertinent section rather than under this section.
 - 1. Electric motor data and variable speed drive data shall be submitted with the driven equipment.
 - 2. Equipment and materials identification.
 - 3. Firestopping materials.
 - 4. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
 - 5. Wall, floor, and ceiling plates.
- G. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation. Final review and approvals will be made only by groups.
- H. Coordination Drawings: Complete consolidated and coordinated layout drawings shall be submitted for all new systems, and for existing systems that are in the same areas. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1:32 (3/8 inch equal to one foot). Clearly identify and dimension the proposed locations of the principal items of

equipment. The drawings shall clearly show the proposed location and adequate clearance for all equipment, controls, piping, pumps, valves and other items. All valves, trap primer valves, water hammer arrestors, strainers, and equipment requiring service shall be provided with an access door sized for the complete removal of plumbing device, component, or equipment. Equipment foundations shall not be installed until equipment or piping layout drawings have been approved. Detailed layout drawings shall be provided for all piping systems. In addition, details of the following shall be provided.

1. Mechanical equipment rooms.
2. Interstitial space.
3. Hangers, inserts, supports, and bracing.
4. Pipe sleeves.
5. Equipment penetrations of floors, walls, ceilings, or roofs.

I. Maintenance Data and Operating Instructions:

1. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment. Include complete list indicating all components of the systems with diagrams of the internal wiring for each item of equipment.
2. Include listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment shall be provided. The listing shall include belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.

J. Completed System Readiness Checklist provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 22 08 00 COMMISSIONING OF PLUMBING SYSTEMS.

K. Submit training plans, trainer qualifications and instructor qualifications in accordance with the requirements of Section 22 08 00 COMMISSIONING OF PLUMBING SYSTEMS.

22 05 19 METERS AND GAGES FOR PLUMBING PIPING

- A. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 05 19, METERS AND GAGES FOR PLUMBING PIPING", with applicable paragraph identification.
- B. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights,

materials, applications, standard compliance, model numbers, size, and capacity.

1. Water Meter.
2. Pressure Gages.
3. Thermometers.
4. Product certificates for each type of meter and gage.
5. BACnet communication protocol.

C. Operations and Maintenance manual shall include:

1. System Description.
2. Major assembly block diagrams.
3. Troubleshooting and preventive maintenance guidelines.
4. Spare parts information.

D. Shop Drawings shall include the following: One line, wiring and terminal diagrams including terminals identified, protocol or communication modules, and Ethernet connections.

22 05 23 GENERAL-DUTY VALVES FOR PLUMBING PIPING

A. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING", with applicable paragraph identification.

B. Manufacturer's Literature and Data Including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.

1. Ball Valves.
2. Butterfly Valves.
3. Balancing Valves.
4. Check Valves.
5. Thermostatic Mixing Valves.

C. Test and Balance reports for balancing valves.

D. Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts:

1. Include complete list indicating all components of the systems.
2. Include complete diagrams of the internal wiring for each item of equipment.
3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
4. Piping diagrams of thermostatic mixing valves to be installed.

- E. Completed System Readiness Checklist provided by the Commissioning Agent and completed by the Contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.
- F. Submit training plans and instructor qualifications in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.

22 07 11 PLUMBING INSULATION

A. Shop Drawings:

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
 - a. Insulation materials: Specify each type used and state surface burning characteristics.
 - b. Insulation facings and jackets: Each type used.
 - c. Insulation accessory materials: Each type used.
 - d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
 - e. Make reference to applicable specification paragraph numbers for coordination.

B. Samples:

1. Each type of insulation: Minimum size 100 mm (4 inches) square for board/block/ blanket; 150 mm (6 inches) long, full diameter for round types.
2. Each type of facing and jacket: Minimum size 100 mm (4 inches square).
3. Each accessory material: Minimum 120 ML (4 ounce) liquid container or 120 gram (4 ounce) dry weight for adhesives / cement / mastic.

22 08 00 COMMISSIONING OF PLUMBING SYSTEMS

- A. The commissioning process requires review of selected Submittals. The Commissioning Agent will provide a list of submittals that will be reviewed by the Commissioning Agent. This list will be reviewed and approved by the VA prior to forwarding to the Contractor. Refer to Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES for further details.
- B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the

commissioning process are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

22 11 00 FACILITY WATER DISTRIBUTION

- A. Manufacturer's Literature and Data:
 - 1. All items listed in Part 2 - Products.

22 13 00 FACILITY SANITARY AND VENT PIPING

- A. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 13 00, FACILITY SANITARY AND VENT PIPING", with applicable paragraph identification.
- B. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
 - 1. Piping.
 - 2. Floor Drains.
 - 3. Cleanouts.
 - 4. Trap Seal Protection.
 - 5. Penetration Sleeves.
 - 6. Pipe Fittings.
 - 7. Traps.
 - 8. Exposed Piping and Fittings.
- C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane or the floor drain.

22 14 00 FACILITY STORM DRAINAGE

- A. Manufacturer's Literature and Data:
 - 1. Piping.
 - 2. Roof Drains.
 - 3. Cleanouts.
 - 4. All items listed in Part 2 - Products.
- B. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane.

22 40 00 PLUMBING FIXTURES

- A. Submit plumbing fixture information in an assembled brochure, showing cuts and full detailed description of each fixture.

23 05 11 COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION

- A. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

- B. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.
- C. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.
- D. Upon request by Government, provide lists of previous installations for selected items of equipment. Include contact persons who will serve as references, with telephone numbers and e-mail addresses.
- E. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation. Final review and approvals will be made only by groups.
- F. Samples: Samples will not be required, except for insulation or where materials offered differ from specification requirements. Samples shall be accompanied by full description of characteristics different from specification. The Government, at the Government's expense, will perform evaluation and testing if necessary. The Contractor may submit samples of additional material at the Contractor's option; however, if additional samples of materials are submitted later, pursuant to Government request, adjustment in contract price and time will be made as provided under Section 01 00 00, GENERAL REQUIREMENTS.
- G. Layout Drawings:
 - 1. Submit complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Refer to Section 01 00 00, GENERAL REQUIREMENTS.
 - 2. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1:32 (3/8-inch equal to one foot). Clearly identify and dimension the proposed locations of the principal items of equipment. The drawings shall clearly show locations and adequate clearance for all equipment, piping, valves, control panels and other items.

Show the access means for all items requiring access for operations and maintenance. Provide detailed layout drawings of all piping and duct systems.

3. Do not install equipment foundations, equipment or piping until layout drawings have been approved.

4. In addition, for HVAC systems, provide details of the following:

- a. Mechanical equipment rooms.
- b. Interstitial space.
- c. Hangers, inserts, supports, and bracing.
- d. Pipe sleeves.
- e. Duct or equipment penetrations of floors, walls, ceilings, or roofs.

H. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.

1. Submit belt drive with the driven equipment. Submit selection data for specific drives when requested by the Resident Engineer.
2. Submit electric motor data and variable speed drive data with the driven equipment.
3. Equipment and materials identification.
4. Fire-stopping materials.
5. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers. For boiler plants, refer to Section 23 21 11, BOILER PLANT PIPING SYSTEMS, for additional requirements.
6. Wall, floor, and ceiling plates.

I. HVAC Maintenance Data and Operating Instructions:

1. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment.
2. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment. Include in the listing belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.

J. Provide copies of approved HVAC equipment submittals to the Testing, Adjusting and Balancing Subcontractor.

23 05 12 GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT

A. Shop Drawings:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.

2. Include electrical ratings, dimensions, mounting details, materials, horsepower, RPM, enclosure, starting characteristics, torque characteristics, code letter, full load and locked rotor current, service factor, and lubrication method.

B. Manuals:

1. Submit simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets and application data.

C. Certification: Two weeks prior to final inspection, unless otherwise noted, submit four copies of the following certification to the Resident Engineer:

1. Certification that the motors have been properly applied, installed, adjusted, lubricated, and tested.

23 05 41 NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT

A. Manufacturer's Literature and Data:

1. Vibration isolators:
 - a. Floor mountings
 - b. Hangers
 - c. Snubbers
 - d. Thrust restraints
2. Bases.
3. Seismic restraint provisions and bolting.
4. Acoustical enclosures.

B. Isolator manufacturer shall furnish with submittal load calculations for selection of isolators, including supplemental bases, based on lowest operating speed of equipment supported.

C. Seismic Requirements: Submittals are required for all equipment anchors, supports and seismic restraints. Submittals shall include weights, dimensions, standard connections, and manufacturer's certification that all specified equipment will withstand seismic Lateral Force requirements as shown on drawings.

23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC

- A. Submit names and qualifications of TAB agency and TAB specialists within 60 days after the notice to proceed. Submit information on three recently completed projects and a list of proposed test equipment.
- B. For use by the Resident Engineer staff, submit one complete set of applicable AABC or NEBB publications that will be the basis of TAB work.
- C. Submit Following for Review and Approval:

1. Design Review Report within 90 days for conventional design projects after the system layout on air and water side is completed by the Contractor.
 2. Systems inspection report on equipment and installation for conformance with design.
 3. Duct Air Leakage Test Report.
 4. Systems Readiness Report.
 5. Intermediate and Final TAB reports covering flow balance and adjustments, performance tests, vibration tests and sound tests.
 6. Include in final reports uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements.
- D. Prior to request for Final or Partial Final inspection, submit completed Test and Balance report for the area.

23 07 11 HVAC, PLUMBING, AND BOILER PLANT INSULATION

A. Shop Drawings:

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
- a. Insulation materials: Specify each type used and state surface burning characteristics.
- b. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
- c. Insulation accessory materials: Each type used.
- d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
- e. Make reference to applicable specification paragraph numbers for coordination.

C. Samples:

1. Each type of insulation: Minimum size 100 mm (4 inches) square for board/block/ blanket; 150 mm (6 inches) long, full diameter for round types.
2. Each type of facing and jacket: Minimum size 100 mm (4 inches square).
3. Each accessory material: Minimum 120 ML (4 ounce) liquid container or 120 gram (4 ounce) dry weight for adhesives / cement / mastic.

23 08 00 COMMISSIONING OF HVAC SYSTEMS

- A. The commissioning process requires review of selected Submittals that pertain to the systems to be commissioned. The Commissioning Agent will provide a list of submittals that will be reviewed by the Commissioning Agent. This list will be reviewed and approved by the VA prior to forwarding to the Contractor. Refer to Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES for further details.
- B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

23 09 23 DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

- A. Manufacturer's literature and data for all components including the following:
 - 1. A wiring diagram for each type of input device and output device including DDC controllers, modems, repeaters, etc. Diagram shall show how the device is wired and powered, showing typical connections at the digital controllers and each power supply, as well as the device itself. Show for all field connected devices, including but not limited to, control relays, motor starters, electric or electronic actuators, and temperature pressure, flow and humidity sensors and transmitters.
 - 2. A diagram of each terminal strip, including digital controller terminal strips, terminal strip location, termination numbers and the associated point names.
 - 3. Control dampers and control valves schedule, including the size and pressure drop.
 - 4. Installation instructions for smoke dampers and combination smoke/fire dampers, if furnished.
 - 5. Control air-supply components, and computations for sizing compressors, receivers and main air-piping, if pneumatic controls are furnished.
 - 6. Catalog cut sheets of all equipment used. This includes, but is not limited to DDC controllers, panels, peripherals, airflow measuring stations and associated components, and auxiliary control devices such as sensors, actuators, and control dampers. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted. Each submitted piece of literature and drawings should

clearly reference the specification and/or drawings that it supposed to represent.

7. Sequence of operations for each HVAC system and the associated control diagrams. Equipment and control labels shall correspond to those shown on the drawings.
8. Color prints of proposed graphics with a list of points for display.
9. Furnish PICS for each BACNET compliant device.

B. Product Certificates: Compliance with Article, QUALITY ASSURANCE.

C. As Built Control Drawings:

1. Furnish three (3) copies of as-built drawings for each control system. The documents shall be submitted for approval prior to final completion.
2. Furnish one (1) stick set of applicable control system prints for each mechanical system for wall mounting. The documents shall be submitted for approval prior to final completion.
3. Furnish one (1) CD-ROM in CAD DWG and/or .DXF format for the drawings noted in subparagraphs above.

D. Operation and Maintenance (O/M) Manuals):

1. Submit in accordance with Article, INSTRUCTIONS, in Specification Section 01 00 00, GENERAL REQUIREMENTS.
2. Include the following documentation:
 - a. General description and specifications for all components, including logging on/off, alarm handling, producing trend reports, overriding computer control, and changing set points and other variables.
 - b. Detailed illustrations of all the control systems specified for ease of maintenance and repair/replacement procedures, and complete calibration procedures.
 - c. One copy of the final version of all software provided including operating systems, programming language, operator workstation software, and graphics software.
 - d. Complete troubleshooting procedures and guidelines for all systems.
 - e. Complete operating instructions for all systems.
 - f. Recommended preventive maintenance procedures for all system components including a schedule of tasks for inspection, cleaning and calibration. Provide a list of recommended spare parts needed to minimize downtime.

- g. Licenses, guaranty, and other pertaining documents for all equipment and systems.
 - h. Training Manuals: Submit the course outline and training material to the Owner for approval three (3) weeks prior to the training to VA facility personnel. These persons will be responsible for maintaining and the operation of the control systems, including programming. The Owner reserves the right to modify any or all of the course outline and training material.
- E. Submit Performance Report to Resident Engineer prior to final inspection.

23 21 13 HYDRONIC PIPING

A. Manufacturer's Literature and Data:

- 1. Pipe and equipment supports.
- 2. Pipe and tubing, with specification, class or type, and schedule.
- 3. Pipe fittings, including miscellaneous adapters and special fittings.
- 4. Flanges, gaskets and bolting.
- 5. Valves of all types.
- 6. Strainers.
- 7. Flexible connectors for water service.
- 8. Pipe alignment guides.
- 9. Expansion joints.
- 10. Expansion compensators.
- 11. All specified hydronic system components.
- 12. Water flow measuring devices.
- 13. Gages.
- 14. Thermometers and test wells.
- 15. Electric heat tracing systems.
- 16. Seismic bracing details for piping.
- 17. Factory preinsulated piping components and installation instructions.
- 18. Pipe fittings, and mechanical couplings, if used, for preinsulated chilled water piping.
- 19. Anchors and thrust blocking for preinsulated chilled water piping.

B. Manufacturer's certified data report, Form No. U-1, for ASME pressure vessels:

- 1. Convertors.
- 2. Air separators.

3. Expansion tanks.

C. Manufacturer's certificates for underground preinsulated chilled water piping:

1. That the field representative for the factory insulated pipe installation is technically qualified and experienced in installation of the manufacturer's system and is qualified to provide the required site reports.
2. Upon completion of the work and before final acceptance, the Contractor shall deliver a notarized statement, signed by a principal officer of both the manufacturing firm and the contracting firm, stating that the installation is satisfactory and in accordance with the plans, specifications, and manufacturer's standards.

D. Submit prior to welding of steel piping a certificate of Welder's certification. The certificate shall be current and not more than one year old.

R. Calculations for thrust blocking for underground preinsulated piping.

F. Coordination Drawings: Refer to Article, SUBMITTALS of Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

G. As-Built Piping Diagrams: Provide drawing as follows for chilled water, condenser water, and heating hot water system and other piping systems and equipment. .

1. One wall-mounted stick file with complete set of prints. Mount stick file in the chiller plant or control room along with control diagram stick file.
2. One complete set of reproducible drawings.
3. One complete set of drawings in electronic format (Autocad, pdf, or other approved format).

23 23 00 REFRIGERANT PIPING

A. Shop Drawings:

1. Sufficient information for components noted, including valves and refrigerant piping accessories, clearly presented, shall be included to determine compliance with drawings and specifications for components noted below:
 - a. Tubing and fittings
 - b. Valves
 - c. Strainers
 - d. Moisture-liquid indicators

- e. Filter-driers
- f. Flexible metal hose
- g. Liquid-suction interchanges
- h. Oil separators (when specified)
- i. Gages
- j. Pipe and equipment supports
- k. Refrigerant and oil
- l. Pipe/conduit roof penetration cover
- m. Soldering and brazing materials
- 2. Layout of refrigerant piping and accessories, including flow capacities, valves locations, and oil traps slopes of horizontal runs, floor/wall penetrations, and equipment connection details.
- B. Certification: Copies of certificates for welding procedure, performance qualification record and list of welders' names and symbols.
- C. Design Manual: Furnish two copies of design manual of refrigerant valves and accessories.

23 31 00 HVAC DUCTS AND CASINGS

- A. Manufacturer's Literature and Data:
 - 1. Rectangular ducts:
 - a. Schedules of duct systems, materials and selected SMACNA construction alternatives for joints, sealing, gage and reinforcement.
 - b. Duct liner.
 - c. Sealants and gaskets.
 - d. Access doors.
 - 2. Round and flat oval duct construction details:
 - a. Manufacturer's details for duct fittings.
 - b. Duct liner.
 - c. Sealants and gaskets.
 - d. Access sections.
 - e. Installation instructions.
 - 3. Volume dampers, back draft dampers.
 - 4. Upper hanger attachments.
 - 5. Fire dampers, fire doors, and smoke dampers with installation instructions.
 - 6. Sound attenuators, including pressure drop and acoustic performance.

7. Flexible ducts and clamps, with manufacturer's installation instructions.
8. Flexible connections.
9. Instrument test fittings.
10. Details and design analysis of alternate or optional duct systems.

B. Coordination Drawings: Refer to article, SUBMITTALS, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

23 34 00 HVAC FANS

- A. Manufacturers Literature and Data:
2. Centrifugal fans, motors, drives, accessories and coatings.
 3. Prefabricated roof curbs.
 4. Power roof and wall ventilators.
- B. Certified Sound power levels for each fan.
- C. Motor ratings types, electrical characteristics and accessories.
- D. Roof curbs.
- E. Belt guards.
- F. Maintenance and Operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS.
- G. Certified fan performance curves for each fan showing cubic meters per minute (CFM) versus static pressure, efficiency, and horsepower for design point of operation and at 110 percent of design static pressure. Include product application data to indicate the effect of capacity control devices such as inlet vane dampers on flow, pressure and kW (horsepower).

23 36 00 AIR TERMINAL UNITS

- A. Manufacturer's Literature and Data:
1. Air Terminal Units: Submit test data.
 2. Air flow control valves.
- B. Certificates:
1. Compliance with paragraph, QUALITY ASSURANCE.
 2. Compliance with specified standards.
- C. Operation and Maintenance Manuals: Submit in accordance with paragraph, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

23 37 00 AIR OUTLETS AND INLETS

- A. Manufacturer's Literature and Data:
1. Air intake/exhaust hoods.
 2. Perforated distribution plates.
 3. Diffusers, registers, grilles and accessories.

- B. Coordination Drawings: Refer to article, SUBMITTALS, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

23 40 00 HVAC AIR CLEANING DEVICES

- A. Manufacturer's Literature and Data:
1. Extended surface filters.
 2. Holding frames. Identify locations.
 3. Side access housings. Identify locations, verify insulated doors.
 4. HEPA filters.
 5. Magnehelic gages.
- B. Air Filter performance reports.
- C. Suppliers warranty.
- D. Field test results for HEPA filters as per paragraph 2.3.E.3.

23 81 00 DECENTRALIZED UNITARY HVAC EQUIPMENT

- A. Manufacturer's literature and data:
1. Sufficient information, including capacities, pressure drops and piping connections clearly presented, shall be included to determine compliance with drawings and specifications for units noted below:
 - a. Unitary air conditioners:
 - 1) Self-contained units
 - 2) Split systems
 - 3) Rooftop units
 2. Unit Dimensions required clearances, operating weights accessories and start-up instructions.
 3. Electrical requirements, wiring diagrams, interlocking and control wiring showing factory installed and portions to be field installed.
 4. Mounting and flashing of the roof curb to the roofing structure with coordinating requirements for the roof membrane system.
- B. Certification: Submit proof of specified ARI Certification.
- C. Performance Rating: Submit catalog selection data showing equipment ratings and compliance with required sensible-to-heat-ratio, energy efficiency ratio (EER), and coefficient of performance (COP).
- D. Operating and Maintenance Manual: Submit three copies of Operating and Maintenance manual to Resident Engineer three weeks prior to final inspection.

23 81 43 AIR-SOURCE UNITARY HEAT PUMPS

- A. Manufacturer's Literature and Data.
1. Unitary Heat pumps, Air-to-Air:
 - a. Packaged units
 - b. Split system

- B. Certification: Submit, simultaneously with shop drawings, a proof of certification that this product has been certified by ARI.
- C. Performance Rating: Submit catalog selection data showing equipment ratings and compliance with required cooling and heating capacities EER and COP values as applicable.

23 82 00 CONVECTION HEATING AND COOLING UNITS

- A. Manufacturer's Literature and Data:
 - 4. Cabinet unit heaters.
 - 6. Finned-tube radiation.
 - 7. Radiant ceiling panels.
- B. Certificates:
 - 1. Compliance with paragraph, QUALITY ASSURANCE.
 - 2. Compliance with specified standards.
- C. Operation and Maintenance Manuals: Submit in accordance with paragraph, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.
- D. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.

23 82 16 AIR COILS

- A. Manufacturer's Literature and Data for Heating and Cooling Coils:
Submit type, size, arrangements and performance details. Present application ratings in the form of tables, charts or curves.
- B. Provide installation, operating and maintenance instructions.
- C. Certification Compliance: Evidence of listing in current ARI Directory of Certified Applied Air Conditioning Products.

260519 Low-Voltage Electrical Power Conductors and Cables

- 1. Shop Drawings
- 2. Certifications

260526 Grounding and Bonding for Electrical Systems

- 1. Shop Drawings
- 2. Test Reports
- 3. Certifications

260533 Raceway and Boxes for Electrical Systems

- 1. Shop Drawings
- 2. Certifications

260541 Underground Electrical Construction

- 1. Shop Drawings
- 2. Certifications

260573 Overcurrent Protective Device Coordination Study

1. Product data on the software program to be used for the study
2. Complete study as described in paragraph 1.6.
3. Certifications

260800 Commissioning of Electrical Systems

1. Specific submittal requirements related to the commissioning process are specified in Section 019100 General Commissioning Requirements.

260923 Lighting Controls

1. Shop Drawings
2. Manuals
3. Certifications

262200 Low-Voltage Transformers

1. Shop Drawings
2. Manuals
3. Certifications

262413 Distribution Switchboards

1. Certified manufacturer's factory test reports.
2. Shop Drawings
3. Manuals
4. Certifications

262416 Panelboards

1. Shop Drawings
2. Manuals
3. Certifications

262726 Wiring Devices

1. Shop Drawings
2. Manuals
3. Certifications

262911 Motor Controllers

1. Shop Drawings
2. Manuals
3. Certifications

262921 Enclosed Switches and Circuit Breakers

1. Shop Drawings
2. Manuals
3. Certifications

264100 Facility Lightning Protection

1. Shop Drawings

2. Certifications

264313 Surge Protective Device

1. Shop Drawings

2. Manuals

3. Certifications

265100 Interior Lighting

1. Shop Drawings

2. Manuals

3. Certifications

265600 Exterior Lighting

1. Shop Drawings

2. Manuals

3. Certifications

270511 Requirements for Communications Installations

1. Shop Drawings

270526 Grounding and Bonding for Communications Systems

1. Shop Drawings

2. Manuals

270533 Raceways and Boxes for Communications Systems

1. Shop Drawings

2. Manuals

270800 Commissioning of Communications Systems

1. Certifications

271000 Structured Cabling

1. Shop Drawings

2. Manuals

3. Certifications

271100 Communications Equipment Room Fittings

1. Shop Drawings

2. Manuals

271500 Communications Horizontal Cabling

2. Shop Drawings

3. Manuals

4. Certifications

274131 Master Antenna Television Equipment and Systems

1. Shop Drawings

2. Manuals

3. Certifications

275116 Public Address and Mass Notification Systems

1. Shop Drawings
2. Manuals
3. Certifications

280500 Common Work Results for Electronic Safety and Security

1. Shop Drawings
2. Manuals
3. Certifications

280513 Conductors and Cables for Electronic Safety and Security

1. Shop Drawings

280526 Grounding and Bonding for Electronic Safety and Security

1. Shop Drawings

280528.33 Conduits and Backboxes for Electronic Safety and Security

1. Shop Drawings

280800 Commissioning of Electronic Safety and Security Systems

1. Certifications

281300 Physical Access Control System

1. Shop Drawings
2. Manuals
3. Certifications

281316 Physical Access Control System and Database Management

1. Shop Drawings
2. Manuals
3. Certifications

282300 Video Surveillance

1. Shop Drawings
2. Manuals
3. Certifications

283100 Fire Detection and Alarm

1. Drawings
2. Manuals
3. Certifications

312000 Earth Moving

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Rock Excavation Report:
 1. Certification of rock quantities excavated.
 2. Excavation method.

3. Labor.
4. Equipment.
5. Land Surveyor's or Civil Engineer's name and official registration stamp.
6. Plot plan showing elevations.
- C. Contractor shall submit procedure and location for disposal of unused satisfactory material. Proposed source of borrow material. Notification of encountering rock in the project. Advance notice on the opening of excavation or borrow areas
- E. Qualifications of the commercial testing laboratory or Contractor's Testing facility shall be submitted.

312319 Dewatering

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Drawings and Design Data:
 1. Submit drawings and data showing the method to be employed in dewatering excavated areas 30 days before commencement of excavation.
 2. Material shall include: location, depth and size of wellpoints, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.
 3. Include a written report outlining control procedures to be adopted if dewatering problem arises.
 4. Capacities of pumps, prime movers, and standby equipment.
 5. Design calculations proving adequacy of system and selected equipment. The dewatering system shall be designed using accepted and professional methods of design and engineering consistent with the best modern practice. The dewatering system shall include the deep wells, wellpoints, and other equipment, appurtenances, and related earthwork necessary to perform the function.
 6. Detailed description of dewatering procedure and maintenance method.
 7. Materials submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water.
- C. Inspection Reports.
- D. All required permits.

320523 cement and Concrete for Exterior Improvements

- A. Submittal Procedures: Section 01 33 23, PRODUCT DATA.
- B. Manufacturer's Literature and Data:
 - 1. Description of each product.
 - 2. Installation instructions.
- C. Test reports: Certify products comply with specifications.
 - 1. Concrete materials.
 - 2. Select subbase materials.
 - 3. Field test reports.
- D. Certificates: Certify products comply with specifications.
 - 1. Expansion joint filler.
 - 2. Reinforcement.
 - 3. Curing materials.
 - 4. Concrete protective coating.
- E. Qualifications: Substantiate qualifications comply with specifications.
 - 1. Installer.
 - 2. Land surveyor.
- F. Concrete mix design.
- G. Select subbase job-mix design.
- H. Proposed hot and cold weather concreting methods.
- I. Land surveyor's construction staking notes, before placing concrete.
 - 1. Identify discrepancies between field conditions and Drawings.

321216 Asphalt Paving

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Data and Test Reports:
 - 1. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.
 - 2. Asphalt Base/Surface Course: Aggregate source, gradation, soundness loss, percentage of wear, and other tests required by State Highway Department.
 - 3. Job-mix formula.
- C. Certifications:
 - 1. Asphalt prime and tack coat material certificate of conformance to State Highway Department requirements.
 - 2. Asphalt cement certificate of conformance to State Highway Department requirements.

- 3. Job-mix certification - Submit plant mix certification that mix equals or exceeds the State Highway Specification.
- D. One copy of State Highway Department Specifications.
- E. Provide MSDS (Material Safety Data Sheets) for all chemicals used on ground.

321723 Pavement Markings

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish Manufacturer's Certificates and Data certifying that the following materials conform to the requirements specified.
- B. Paint.
- C. Reflective Glass Beads

323113 Chain Link Fence and Gates

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, furnish the following:
 - 1. Manufacturer's Literature and Data: Chain link fencing, gates and all accessories.
 - 2. Manufacturer's Certificates: Zinc-coating complies with specifications.

329000 Planting

- 1. Submit product data for each type of product indicated, including soils:
 - a. Include quantities, sizes, quality, and sources for plant materials.
 - b. Include EPA approved product label, MSDS (Material Safety Data Sheet) and manufacturer's application instructions specific to the Project.
- 2. Submit samples and manufacturer's literature for each of the following for approval before work is started.
 - a. Organic and Compost Mulch: 1-pint (0.5-liter) volume of each organic and compost mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup. □
 - b. Erosion Control Materials: 12 by 12 inches (300 by 300 mm). □
 - c. Root Barrier: Width of panel by 12 inches (300 mm). □
- 3. Submit edging materials and accessories in manufacturer's standard size, to verify color selected.
- 4. Landscape Membranes: 12 by 12 inches (300 by 300 mm).
- 5. Tree Wrap: Width of panel by 12 inches (300 mm). □

6. Qualification data for qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
7. Prior to delivery, provide notarized certificates attesting that each type of manufactured product, from the manufacturer, meet the requirements specified and shall be submitted to the Contracting Officer's Representative for approval:
 - a. Plant Materials (Department of Agriculture certification by State Nursery Inspector declaring material to be free from insects and disease). □
 - b. Seed and Turf Materials notarized certificate of product analysis. □
 - c. Manufacturer's certified analysis of standard products. □
 - d. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
8. Material Test Reports: For existing native surface topsoil and imported or manufactured topsoil.
9. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

331000 Water Utilities

1. All Product date.

333000 Sanitary Sewer Utilities

A. Manufacturers' Literature and Data shall be submitted for the following as one package:

1. Pipe, Fittings, and, Appurtenances.
2. Jointing Material.
3. Manhole and Structure Material.
4. Frames and Covers.
5. Steps and Ladders.

334000 Storm Sewer Utilities

- A. Manufacturers' Literature and Data shall be submitted, as one package, for pipes, fittings and appurtenances, including jointing materials, hydrants, valves and other miscellaneous items.