



**BERNICE SPECKMAN COMMUNITY CENTER
ADA UPGRADES**

PROJECT SPECIFICATIONS

**BID SUBMISSION
April 14, 2021**

Prepared By:

Greenman-Pedersen, Inc.
400 Rella Boulevard, Suite 207
Montebello, New York 10901
Tel (845) 368-4050 / Fax (845) 368-4070

THIS PAGE IS INTENTIONALLY LEFT BLANK

**ADA Upgrades
At the Bernice Spreckman Community Center**

**TABLE OF CONTENTS
Section 00 01 10**

	DIVISION 01 – GENERAL REQUIREMENTS
011200	Contract Summary of Work
013100	Project Management and Coordination
013200	Project Scheduling
013300	Submittal Procedures
014000	Quality and Code Requirements
014500	Cutting and Patching
015000	Temporary Facilities and Controls
016000	Product Requirements
017700	Contract Closeout Requirements
017820	Operation and Maintenance Manuals
017830	As Built Documents
	DIVISION 02 – EXISTING CONDITIONS
022230	Selective Demolition
	DIVISION 03 - CONCRETE
033001	Cast In Place Concrete
	DIVISION 04 - MASONRY
042200	Unit Masonry
	DIVISION 05 - METALS
051200	Structural Steel
	DIVISION 07 -
078400	Firestopping
079000	Joint Sealers
	DIVISION 08 -
081100	Custom Steel Frames
082110	Flush Wood Doors
084100	Metal Framed Storefronts
087100	Door Hardware
	DIVISION 09 -
092210	Non-Structural Metal Framing
092600	Gypsum Board
093000	Ceramic Tile

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

095110	Suspended Acoustical Ceiling
096500	Resilient Flooring
099000	Paints and Coatings
	DIVISION 10 -
101700	Plastic Toilet Compartments
108000	Toilet Accessories
	DIVISION 21 – FIRE PROTECTION
210529	Pipe Hangers and Supports
211300	Sprinkler and Standpipe Piping
211313	Sprinkler Systems
	DIVISION 22 – PLUMBING
220500	Common Work Results for Plumbing
220523	Valves
220529	Pipe Hangers and Supports
220553	Pipe and Valve Identification
220576	Drainage Accessories
220577	Floor and Area Drains
220700	Piping Insulation
220800	Cleaning and Testing
221100	Domestic Water Piping
221119	Water Supply Accessories
221300	Plumbing Waste and Vent Piping
	DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING (HVAC)
230000	Basic Heating, Ventilation, and Air Conditioning Requirements
230594	Balancing of Systems
230719	Insulation
233113	Metal Ductwork
233300	Ductwork Accessories
233416	Centrifugal Fans
	DIVISION 26 – ELECTRICAL
260010	General Provisions for Electrical Work
260519	Wiring, General – 600 Volts and Under
260526	Service Grounding and Bonding
260529	Fasteners, Attachments and Supporting Devices
260534	Outlet Junction Boxes
260925	Wireless Lighting Control Devices
262726	Wiring Devices
262815	Overcurrent Protective Devices
265100	LED Interior Building Lighting

SECTION 011200

CONTRACT SUMMARY OF WORK

1. GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, Information for Bidders, the Drawings and Individual Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes a summary of each contract for the Project, including responsibilities for coordination and temporary facilities and controls.
- B. Specific requirements for the work of each contract are also indicated in individual Specification Sections and on Drawings for each contract.
- C. Related Sections:
 - 1. Section 013100 - Project Management and Coordination.
 - 2. Section 015000 - Temporary Facilities and Controls.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by the Owner, the condition at which roofing is insulated and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

1.4 CONTRACTOR'S PROJECT MANAGER

- A. Contractor shall identify a project manager who shall be responsible for coordination with the Owner.
- B. Project Scheduler: The contractor shall provide a project scheduler to coordinate the scheduling activities of the Contract, to prepare an overall CPM schedule, and to monitor and update the CPM schedule periodically:

1.5 COORDINATION ACTIVITIES

- A. Coordination activities of Contractor's project manager include, but are not limited to, the following:
 - 1. Provide overall coordination of the Work.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

2. Coordinate use of access shared with other contractors to workspaces and workspaces shared with other contractors.
3. Provide overall coordination of temporary facilities and controls.
4. Coordinate construction and operations of the Work with work performed by other Contractors and the Owner's construction forces.
5. Prepare Coordinated Composite Drawings to coordinate the work of the Project.
6. Coordinate sequencing and scheduling of the Work, including attendance at an Initial Coordination Meeting.
7. Provide quality assurance and quality control services specified in Section 014000 – Quality and Code Requirements.
8. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
9. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
10. Provide progress cleaning of all Contract work areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
11. Coordinate cutting and patching.
12. Coordinate protection of the Work.
13. Coordinate firestopping.
14. Coordinate completion of punch list items.
15. Coordinate preparation of As-built drawings and specifications.
16. Print and submit all required project turnover documents.
17. Responsibilities of project manager for construction contract includes coordination for temporary facilities and controls.

1.6 SUMMARY OF WORK

- A. The work shall be as shown and called for in the contract documents, including, but not limited to:
1. Renovation and expansion of restrooms in full compliance with ADA including new partitions, fixtures, piping, ventilation, electrical, lighting, etc.
 2. Replacement of existing entrance doors and sidewalk repairs for compliance with ADA.
 3. Relocation of interior doors and related return duct relocation for compliance with ADA.

1.7 PERMITS

Contractor shall obtain all necessary permits from the Authorities-Having-Jurisdiction.

2.PRODUCTS (Not Used)

3.EXECUTION

ADA Upgrades

Bernice Spreckman Community Center, City of Yonkers

- 3.1 Project Working Hours: All work shall be performed during normal working hours defined as 8:00 AM to 5:00 PM Monday through Friday, excluding holidays, except for the following:
 - A. Transport of Equipment and Materials must be performed at a specific time approved by the Owner's Project Manager.
- 3.2 Contractor shall confirm mobilization timing from award.

END OF SECTION

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and individual Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on the Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Refer to Section 011200 – Contract Summary of Work for certain areas of responsibility that are assigned to a specific discipline.
- C. Related Sections:
 - 1. Section 011200 - Contract Summary of Work, for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
 - 2. Section 013200 - Project Scheduling and Progress Documentation, for preparing and submitting Contractor's construction schedule.
 - 3. Section 017700 – Contract Closeout Requirements, for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from the Owner, Design Professional, or Contractor seeking information from each other during construction.

1.4 COORDINATION

- A. Coordination for Single Contract Project: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. The Contractor shall utilize the bid milestone schedule included in the Contract Documents to prepare a CPM schedule in accordance with Section 013200 – Project Scheduling and Progress Documentation. The Contractor shall submit the proposed CPM schedule to the Owner within 10 days of the Notice to Proceed.
 2. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 3. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 4. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 5. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 6. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Coordination of the Owner's Project Management CPM schedule.
 2. Coordination of the commissioning process and activities.
 3. Preparation of the schedule of values.
 4. Entering dates each required submission item listed on the Contractor's Submission Schedule will be submitted, coordinated with the CPM Schedule.
 5. Installation and removal of temporary facilities and controls.
 6. Delivery and processing of submittals.
 7. Progress meetings.
 8. Pre-installation conferences.
 9. Project closeout activities.
 10. Startup and adjustment of systems.
- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.5 COORDINATED COMPOSITE DRAWINGS

- A. Coordinated Composite Drawings, General: Prepare coordinated composite drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordinated composite drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordinated composite drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordinated composite drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - d. Indicate required installation sequences.
 - e. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to the Design Professional indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Digital Data Files: Prepare coordination digital data files in accordance with the following requirements:
1. File Preparation Format: The Contractor shall coordinate with the Design Professional and use the same digital data software program, version, and operating system as the original Drawings.

1.6 CONTRACTOR PERSONNEL

- A. Key Personnel Names: Within 7 days after receipt of the Notice to Proceed, submit a list of key personnel assignments with resume and job qualifications, including project manager, project scheduler, job superintendent and other personnel in attendance at the Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers, and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to the Project.
- B. The Contractor shall personally supervise the work and shall have at all times a representative (job Superintendent or job/project Foreman) at the job site with the authority to act for the Contractor. The representative shall not be removed from the job without the Consultant's consent. If the Contractor's representative ceases to be acceptable to the Consultant, they shall be removed from the job within 24 hours of receipt of Consultant's request and be replaced immediately by one who is acceptable to the consultant. The representative shall have documentable elevator modernization experience and shall be fluent in the English language.
- C. A fulltime Superintendent will be provided for all times that the construction services are being performed OR the supervision of the project be shared between both a Superintendent and a job/project Foreman.
- D. The Contractor shall provide all necessary staffing commitment to ensure sufficient resources to complete project within schedule duration regardless of any other ongoing work.
- E. The Contractor shall provide a listing of project sub-contractors within 48 hours of Contract Award.

1.7 SUPERVISION

- A. The Contractor shall be held responsible for proper coordination of all phases of the work, including that of his sub-contractors.
- B. The Contractor shall comply with all the health and safety regulations of the governing codes, laws and ordinances. Contractor shall take all necessary steps and precautions to protect health and minimize danger from all hazards to life and property. The Contractor is responsible for conducting all work activity associated with this project in strict conformance with all applicable OSHA standards and/or local and state regulations. The Contractor is solely liable for enforcement of these safe practices in his operation.
- C. Before proceeding with any work, carefully check and field verify all pertinent dimensions and sizes and assume full responsibility for fitting the equipment and materials to the structure. Carefully check the existing spaces to verify that the equipment to be provided will fit into the space available. Should the equipment not fit the existing structure, all additional relocations and sub-framing members required to accommodate the elevators shall be provided as part of the work of this section. Submit all structural shop drawings and calculations for the Consultant's review.
- D. Contractor shall familiarize himself with the Contract Documents, installation procedures and construction schedules for those phases of work performed by his subcontractors. If the contractor's work or the work of any of his subcontractors depends upon the execution of the work of another subcontractor or upon his own work, he shall so coordinate all phases of work so as to avoid conflicts in installation procedures and construction schedules.
- E. As work progresses, Contractor shall consult with his subcontractors, examine the work installed by them and resolve all conflicts without expense to owner.

1.8 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, the Contractor shall prepare and submit an RFI in the form specified.
 - 1. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name.
 - 2. Project number.
 - 3. Date.
 - 4. Name of Contractor.
 - 5. Name of Design Professional.
 - 6. RFI number, numbered sequentially.
 - 7. RFI subject.
 - 8. Specification Section number and title and related paragraphs, as appropriate.
 - 9. Drawing number and detail references, as appropriate.
 - 10. Field dimensions and conditions, as appropriate.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

11. Contractor's suggested resolution. If Contractor's solution(s) impacts the date of Substantial Completion or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: The Owner's generated form with substantially the same content as indicated above.
- D. Design Professional's Action: The Design Professional will review each RFI, determine action required, and respond. Allow a reasonable amount of working days for the Design Professional's response for each RFI. RFIs received by the Design Professional after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the date for Substantial Completion or the Contract Sum.
 - e. Requests for interpretation of the Design Professional's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
 2. The Design Professional's action may include a request for additional information, in which case the Design Professional's time for response will date from time of receipt of additional information.
 3. The Design Professional's action on RFIs that may result in a change to the date of Substantial Completion or the Contract Sum may be eligible for the Contractor to submit a Claim in accordance with procedures in General Conditions, Article 10 – Claims and Disputes.
 - a. If the Contractor believes the RFI response warrants change in the date of Substantial Completion or the Contract Sum, notify the Owner in writing within fifteen (15) days of receipt of the RFI response.
- E. On receipt of the Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify the Owner and Design Professional within five days if the Contractor disagrees with response.
- F. RFI Log: Coordinate and cooperate with the Owner to prepare, update and maintain the use of the Contract Manager RFI log. The RFI log will include not less than the following:
1. Project name.

2. Name and address of Contractor.
3. Name and address of Design Professional.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Design Professional's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.9 PROJECT MEETINGS

- A. General: The Owner will schedule and conduct meetings at the Project site, unless otherwise indicated.
 1. Attendees: The Owner will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 2. Agenda: The Owner will prepare the meeting agenda and distribute the agenda to all invited attendees.
 3. Minutes: The Contractor will record significant discussions and agreements and distribute the meeting minutes to everyone concerned.
- B. Construction Kick-off Meeting: The Owner will schedule and conduct a construction kick-off meeting before starting construction, at a time convenient to the Owner and Design Professional, upon issuance of the Notice to Proceed.
 1. The meeting shall review responsibilities and personnel assignments.
 2. Attendees: The Owner, Owner's Commissioning Authority, Design Professional, and their consultants; the Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the meeting shall be familiar with the Project and authorized to make binding decisions on matters relating to the Work.
 3. Agenda: The meeting agenda will include items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.
 - h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Sustainable design requirements.
 - m. Preparation of As-builts and turnover documents.
 - n. Use of the premises.
 - o. Work restrictions.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- p. Working hours.
 - q. Owner's occupancy requirements.
 - r. Responsibility for temporary facilities and controls.
 - s. Procedures for moisture and mold control.
 - t. Procedures for disruptions and shutdowns.
 - u. Construction waste management and recycling.
 - v. Parking availability.
 - w. Office, work, and storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Security.
 - aa. Progress cleaning.
 - bb. Safety.
4. Minutes: The Contractor will record and distribute meeting minutes.
- C. Progress Meetings: The Owner will conduct progress meetings at regular weekly intervals. The frequency may be changed to address current conditions.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: The Owner's Commissioning Authority, and Design Professional, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to make binding decisions on matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of the Project. The Contractor will provide:
 - a. The Project Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next scheduled progress meeting period.
 - 2) Provide a 2-week look-ahead schedule.
 - 3) Provide RFI log
 - 4) Provide Shop Drawing/ Submissions log
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
4. Minutes: The Contractor will provide the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Coordinate with the Owner to revise the Project Schedule after each progress meeting where revisions to the schedule have been made or recognized. The Owner will issue revised schedule concurrently with the report of each meeting.
- D. Preinstallation Meetings: The Owner may conduct pre-installation meetings at the Project site before each construction activity that requires coordination with other construction and major assemblies of the Work requiring tight control and coordination.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow shall attend the meeting. The Owner to advise the Contractor, Design Professional and Owner's Commissioning Authority of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
- 3. The Contractor will record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: The Contractor will distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the meeting cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the meeting at earliest feasible date.
- E. Project Closeout Conference: The Owner may schedule and conduct a Project closeout conference, at a time convenient to the Owner and Design Professional, but no later than thirty (30) days prior to the scheduled inspection date for Substantial Completion.
- 1. The Owner will conduct the conference to review requirements and responsibilities related to the Project closeout.
 - 2. Attendees: The Owner, Design Professional, and their consultants; the Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with the Project and authorized to make binding decisions on matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay the Project closeout, including the following:
 - a. Submission of turnover documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Requirements for demonstration and training.
 - d. Preparation of Contractor's punch list.
 - e. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - f. Coordination of separate contracts.
 - g. Owner's partial occupancy requirements.
 - h. Installation of Owner's furniture, fixtures, and equipment.
 - i. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: The Contractor will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013200
PROJECT SCHEDULING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and individual Specification Sections and Bid Milestone Schedule, apply to this Section.

1.2 SUMMARY

- A. This is a single prime contract therefore the Contractor is responsible for the scheduling and documentation requirements as outlined in this section.
- B. Section includes administrative and procedural requirements to plan, schedule and document the progress of construction during the performance of the Work, including the following:
1. Project schedule and reports.
 2. Material location reports.
 3. Field condition reports.
 4. Special reports.
- C. Related Sections:
1. Section 011200 – Contract Summary of Work, for preparing a combined CPM Schedule.
 2. Section 013100 - Project Management and Coordination.
 3. Section 013300 – Submittal Procedure, for submitting schedules and reports.
 4. Section 014000 – Quality and Code Requirements, for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in both electronic (PDF) file format and as electronic backup file in native software format.
- B. Project Schedule: Schedule, of size required to display entire schedule for entire construction period.
1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (baseline or updated) and date on label.
- C. Material Location Reports: Submit at monthly intervals.
- D. Field Condition Reports: Submit at time of discovery of differing conditions.

- E. Special Reports: Submit at time of unusual event.
- F. Qualification Data: For project scheduler.

1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: The Owner may conduct conference at the Project site to comply with requirements in Section 013100 - Project Management and Coordination. Review methods and procedures related to the Project Schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss coordination, including phasing, work stages, area separations, interim milestones and Beneficial Occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review time required for review of submittals and resubmittals.
 - 6. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 7. Review time required for completion and startup procedures.
 - 8. Review and finalize list of construction activities to be included in schedule.
 - 9. Review submittal requirements and procedures.
 - 10. Review procedures for updating schedule.

1.5 COORDINATION

- A. Coordinate preparation and processing of Project Schedules and Reports with the performance of the Work.
- B. Coordinate Project Schedule with the Contractor's Submission Schedule, progress reports, and other required schedules and reports.
 - 1. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 PROJECT SCHEDULE, GENERAL

- A. Project Schedule:
 - 1. Include milestones indicated in the Contract Documents in the Project Schedule, including, but not limited to, the Notice to Proceed, interim milestones, Substantial Completion, and Contract close-out.
 - 2. Substantial Completion date shall not be changed by submission of a schedule that shows an early completion date, unless approved by the Owner.

3. No time for weather will be apportioned for foreseeable occurrences in a specific regional area. The Contractor shall be responsible to determine reasonable averages and make allowances in the performance of the Work.
- B. Activities: Treat each numbered activity as a consumable resource for each principal element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 15 days, unless specifically allowed by the Owner.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 - Submittal Procedures in schedule. Coordinate submittal review times in the schedule with dates entered in the Contractor's Submission Schedule.
 4. Startup and Testing Time: Include not less than 15 days for startup and testing.
 5. Punch List Inspections.
 6. Close Out Activities.
 7. Substantial Completion: Indicate completion on the date established for Substantial Completion, and allow time for the Owner's administrative procedures necessary to execute the Notice of Substantial Completion (NOSC).
 8. Incomplete Work items and Contract Closeout: Include not more than 60 days for incomplete Work items and Contract Closeout Requirements.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents, or approved by the Owner prior to use and show how date constraints affect the sequence of the Work.
1. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities.
- D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered RFIs.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
- E. Recovery Schedule: When periodic update indicates the Work is 15 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which the Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required achieving compliance, and dating by which recovery will be accomplished, subject to Owner's approval.
- F. Computer Scheduling Software: Prepare schedules using current version of MS Project.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- G. Changes in the Work: For each proposed change and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall schedule.
- H. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 - 1. Identification of activities that have changed, including the reason each adjustment was necessary.
 - 2. Changes in early and late finish dates.
 - 3. Changes in activity durations in workdays.
 - 4. Changes in the critical path.
 - 5. Changes in total float or slack time.
 - 6. Changes in the duration for Substantial Completion.

2.2 REPORTS

- A. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 PROJECT WORK SCHEDULE

- A. Within one (1) week of being awarded the project, the Contractor shall furnish a project work schedule in MS Project format.
- B. The Contractor shall adhere to all weekend work times as stipulated by the local municipality.
- C. Any work items identified in the Contract Documents as Out of Hours may include performing work on weekends. This includes occupied staff spaces that may need to be picked up on weekends; The Contractor will have no claim for extra rate if work is performed on weekends.
- D. Schedule and Reports Updating: Prior to each scheduled progress meeting, update schedule to reflect actual construction progress and activities. Issue schedule and reports two days before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the CPM reports of each such meeting. As a minimum, schedule update submissions shall occur bi-weekly.
 - 2. Include reports with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate final remaining duration for each activity.
- B. Distribution: Submit one electronic copy, in format specified, to the Owner and distribute copies of approved schedule and reports to the Owner, Design Professional, separate contractors, testing and inspecting agencies, and other parties identified by the Owner with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules and reports to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and individual Specification Sections and Contractor's Submission Schedule, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections:
 - 1. Section 013200 – Construction Progress Documentation, for submitting schedules and reports, includes Contractor's construction schedule.
 - 2. Section 017700 – Contract Closeout Requirements, for documents required to closeout contract.
 - 3. Section 017823 – Operation and Maintenance Manuals, for submitting operation and maintenance manuals.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require the Design Professional's responsive action. Action submittals are those submittals indicated in individual specification sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require the Design Professional's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual specification sections as informational submittals.
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- D. Required Submittal List: The Design Professional itemizes the list of submission items needed to be submitted by the Contractor in order to insure the design intent will be satisfied and inclusive of all Project turnover documents and/or Contract Closeout Requirements.
- E. Contractor's Submission Schedule: The itemized list of project submission requirements printed as a report. The Contractor enters the date each item needs to be submitted in order to meet the CPM schedule and returns this document to the Owner.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: The Contractor's Submission Schedule is attached to this section, prepared by the Design Professional. The Contractor is to coordinate and cooperate with the Owner and Design Professional to arrange in chronological order by dates required by the construction schedule. Coordinate time required for review, ordering, manufacturing, fabrication, and delivery to establish dates. Coordinate additional time required for making corrections or modifications to submittals noted by the Design Professional and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate the Contractor's Submission Schedule with list of subcontracts, the schedule of values, and coordinated CPM schedule.
 2. Initial Submittal: Submit in accordance with start-up CPM schedule. Include submittals required during the first 10 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently in accordance with the complete CPM schedule.
 - a. Coordinate with the Owner and Design Professional revised Contractor's Submission Schedule to reflect changes in current status and timing for submittals.
- B. Format for Submittals: Submit required submittals in electronic (PDF) file format.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Design Professional's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by the Design Professional for the Contractor's use in preparing submittals.

Coordination: Coordinate preparation and processing of submittals with the performance of the Work.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Commissioning Authority will review submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the Design Professional review and approval.
3. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
4. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
5. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Submit Operation and Maintenance Manuals concurrent with action submittal.
 - b. The Owner or Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Processing Time: Allow time for submittal review, including time for re-submittals, as follows. Time for review shall commence on the Design Professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The Design Professional will advise the Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Re-submittal Review: Allow 15 days for review of each re-submittal.
 4. Sequential Review: Where sequential review of submittals by the Design Professional's consultants, the Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- C. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by the Design Professional.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name of Design Professional.
 - d. Name of Construction Manager (if applicable).
 - e. Name of Contractor.
 - f. Name of subcontractor.
 - g. Name of supplier.
 - h. Name of manufacturer.
 - i. Submittal number including revision identifier.
 - 1) Submittal number shall be the submittal item number and Submittal Package number designated in the Contractor's Submission Schedule.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- D. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 3. Provide means for insertion to permanently record the Contractor's review and approval markings and action taken by the Design Professional.
 4. Include the following information on an inserted cover sheet:

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- a. Project name.
 - b. Date.
 - c. Name and address of Design Professional.
 - d. Name of Construction Manager (if applicable).
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Name of subcontractor.
 - h. Name of supplier.
 - i. Name of manufacturer.
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Other necessary identification.
5. Include the following information as keywords in the electronic file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- E. Options: Identify options requiring selection by the Design Professional.
- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless the Design Professional observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- H. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. The Design Professional will return submittals, without review, received from sources other than the Contractor.
 1. Transmittal Form: Use the Contractor's office form.
 2. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Indication of full or partial submittal.
 - j. Drawing number and detail references, as appropriate.
 - k. Transmittal numbered consecutively.
 - l. Submittal and transmittal distribution record.
 - m. Remarks.
 - n. Signature of transmitter.

3. On an attached separate sheet, prepared on the Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by the Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- I. Re-submittals: Make re-submittals in same form and format.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from the Design Professional's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals that are marked with approval notation from the Design Professional's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Submit electronic submittals via email as electronic (PDF) files, to the Design Professional. If applicable, the Design Professional will forward submittals to the Commissioning Authority for systems being commissioned. The Owner may request paper copies of certain submittals for onsite coordination.
 - a. The Design Professional, through the Owner, will return annotated file. Annotate and retain one copy of file as an electronic Project turnover document file.
 - b. The Commissioning Authority through the Design Professional will return annotated file.
 2. Operation and Maintenance Manual Submittals: Submit concurrent with the Action Submittal, as related in individual Specification Sections.
 3. Closeout Submittals: Comply with requirements specified in Section 017700 – Contract Closeout Requirements and as listed in the Contractor's Submission Schedule.
 4. Permits, Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Permits, Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Submittal Package number and Submittal Item number.
 - b. Manufacturer's catalog cuts.
 - c. Manufacturer's product specifications.
 - d. Standard color charts.
 - e. Statement of compliance with specified referenced standards.
 - f. Testing by recognized testing agency.
 - g. Application of testing agency labels and seals.
 - h. Notation of coordination requirements.
 - i. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - 5. Submit Product Data concurrent with Samples.
 - 6. Submit Product Data in electronic (PDF) file format.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Submittal Package number and Submittal Item number.
 - b. Identification of products.
 - c. Schedules.
 - d. Compliance with specified standards.
 - e. Notation of coordination requirements.
 - f. Notation of dimensions established by field measurement.
 - g. Relationship and attachment to adjoining construction clearly indicated.
 - h. Seal and signature of professional engineer if specified.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Submittal Package number and Submittal Item number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: For turnover purpose, submit six full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The Design Professional, through the Owner, will return submittal with options selected.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit six sets of Samples. The Design Professional, through the Owner, will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a turnover sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least six sets of paired units that show approximate limits of variations.
- E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Submit subcontract list in PDF electronic file, to the Owner.
- F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- G. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- H. OSHA Certificates: Upon the Owner's request, submit certificates of the OSHA 10-hour Construction Safety and Health Course – S1537-A, for all laborers, workers and mechanics working on site.
- I. Installer Certificates: Upon the Owner's request, submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- J. Manufacturer Certificates: Upon the Owner's request, submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- K. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- L. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to the Design Professional.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date

of the Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGN PROFESSIONAL'S ACTION

- A. General: The Design Professional will not review submittals that do not bear the Contractor's approval stamp and will return them without action.
- B. Action Submittals: The Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it through the Owner. The Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. Informational Submittals: The Design Professional will review each submittal and will return it if it does not comply with requirements.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from the Design Professional.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- G. On projects that have commissioning, the Commissioning Authority will receive copies of the submittals through the Design Professional and will provide comments on the submittals via the Design Professional.

3.3 CONTRACTOR'S SUBMITTAL SCHEDULE

- A. The Contractor's Submission Schedule: The Contractor's Submission Schedule, prepared by the Design Professional is attached following the end of this section. The Contractor shall provide the dates each item needs to be submitted to the Owner no later than 10 days after receipt of Notice to Proceed. The schedule shall include the date of all shop drawings, samples, materials that shall be submitted and the date approval is required. The Contractor shall adhere to the submittal processing time as describe in paragraph 1.5 above when developing the submittal schedule. The Contractor is to coordinate and cooperate with the Owner and Design Professional to complete scheduling in accordance with the approved CPM schedule.

END OF SECTION

SECTION 014000

QUALITY AND CODE REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and New York State (NYS) Statement of Special Inspections and Tests, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit the Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality assurance and quality control services required by the Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Section 013200 – Project Scheduling, for developing a schedule of required tests and inspections.
 - 2. Individual Specification Sections, for specific inspections and tests requirements.

1.3 DEFINITIONS

- A. Quality Assurance Services: Activities, actions, and procedures performed during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements.

- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Product Testing: Tests and inspections that are performed by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Installer/Applicator/Erector: The Contractor or another entity engaged by the Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
- H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
 - 1. Indicate manufacturer and model number of individual components.
 - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.5 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality Control Plan: For quality assurance and quality control activities and responsibilities.
- B. Contractor's Quality Control Manager Qualifications: For supervisory personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.

3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality control service.

1.6 CONTRACTOR'S QUALITY CONTROL PLAN

- A. Quality Control Plan, General: Submit quality control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to the Owner. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality assurance and quality control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality assurance and quality control procedures similar in nature and extent to those required for Project.
 1. Project quality control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: Include in quality control plan a comprehensive schedule of the Work requiring tests or inspections, including the following:
 1. The Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and the Contractor-elected tests and inspections.
 2. Special inspections required by authorities having jurisdiction and indicated on the "NYS Statement of Special Inspections and Tests."
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work the Owner has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.8 PERMITS, LICENSES, AND CERTIFICATES:

- A. The Contractor shall obtain, maintain and pay for all applications, permits, filings, and licenses necessary for the execution of the Work and for the use of such Work when completed as required by any and all authorities having jurisdiction. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of authorities having jurisdiction bearing on performance of the Work.
- B. The Contractor shall promptly assist the Owner in securing all approvals from authorities having jurisdiction. Without limitation, the Contractor shall assist the Owner in making application for Project approval, variances or other approvals, Letters of Completion, Temporary Certificates of Occupancy, and Certificates of Occupancy, including completion of all necessary applications and supporting documentation.
- C. The Contractor shall comply with all regulations governing conduct, access to the premises, operation of equipment and systems and conduct while in or near the premises and shall perform the Work in such a manner as not to unreasonably interrupt or interfere with the conduct of business of the Institution.
- D. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, material certificates/affidavits, approvals, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- E. Municipal Permits: The Contractor shall secure and pay for a building permit and all work permits, applications, filings, and approvals that are associated with the Work of the Contract and pay all other permits, fees, licenses and inspections necessary for the proper execution and completion of the Contract as required by applicable authorities having jurisdiction.
 - 1. The Contractor shall secure required building permit or work permits and approvals prior to commencement of the Work, provide a copy to the Owner and post a copy of the permit at the Project site.
 - 2. The Contractor shall be responsible to maintain updated permits and approvals.
 - 3. Upon Substantial Completion of the Work of the Contract, the Contractor shall secure all required approvals from applicable authorities having jurisdiction. The Contractor shall provide a copy to the Owner.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
- F. **Testing Agency Qualifications:** An independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329, and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
- G. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by the Owner.
 - 2. Notify the Owner seven days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain the Owner's approval of mockups before starting work, fabrication, or construction. Allow seven days for initial review and each re-review of each mockup.
 - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 7. Demolish and remove mockups when directed by the Owner.

1.10 QUALITY CONTROL

- A. **Owner Responsibilities:** Where quality control services are indicated as the Owner's responsibility, the Owner will engage a qualified testing agency to perform these services.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. The Owner will furnish the Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to the Owner are the Contractor's responsibility. Perform additional quality control activities required to verify that the Work complies with requirements, whether specified or not.
 1. Unless otherwise indicated, provide quality control services specified and those required by authorities having jurisdiction. Perform quality control services required of the Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as the Contractor's responsibility, engage a qualified testing agency to perform these quality control services.
 - a. Contractor shall not employ same entity engaged by the Owner, unless agreed to in writing by the Owner.
 3. Notify testing agencies at least 24 hours in advance of time (excluding weekends and holidays) when Work that requires testing or inspecting will be performed.
 4. Where quality control services are indicated as the Contractor's responsibility, submit a written report, in duplicate, of each quality control service.
 5. Testing and inspecting requested by the Contractor and not required by the Contract Documents are the Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 - Submittal Procedures.
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting:
 1. Regardless of whether original tests or inspections were the Contractor's responsibility, provide quality control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents, or costs attributable to the Contractor's lack of coordination in properly scheduling the Work requiring testing and inspection will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- F. Testing Agency Responsibilities: Cooperate with the Owner and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify the Owner and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a written report, in duplicate, of each test, inspection, and similar quality control service through Contractor.
 5. Does not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of the Contractor.
- G. Associated Services: The Contractor shall cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. The Contractor shall provide the following:
1. Access to the Work, including equipment required to access the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to the Owner, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- 1.11 NYS SPECIAL INSPECTIONS AND TESTS
- A. Special Inspections and Tests: The Owner will engage a qualified testing agency to conduct special inspections and tests required by authorities having jurisdiction as the responsibility of the Owner, as indicated in the NYS Statement of Special Inspections and Tests, attached to this Section, and as follows:
1. Notifying Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

2. Submitting a written report of each test, inspection, and similar quality control service to the Owner with copy to the Contractor and to authorities having jurisdiction. Frequency of reporting shall be determined in consultation with the Owner.
 3. Submitting a final report of special tests and inspections at Substantial Completion, this includes a list of unresolved deficiencies.
 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents or code requirements.
 5. Retesting and re-inspecting corrected work.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve a Contractor of responsibility for compliance with the Contract Document requirements.
1. Specified tests, inspections, and related actions do not limit Contractor's quality control procedures that facilitate compliance with the Contract Document requirements.
 2. Inspections and tests performed by the testing agency shall in no way relieve the Contractor of the responsibility to construct in accordance with the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to the Design Professional.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for the Owner's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION

SECTION 014500 CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This Section includes administrative and procedural requirements for cutting and patching.
 - 1. Related Sections: The following Sections contain requirements that relate to this Section:
 - a. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
 - b. Division 2 Section "Minor Demolition" for demolition of selected portions of the building for remodeling.
 - c. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - d. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 Sections and Division 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.02 DEFINITIONS

- A. Cutting and Patching is defined as the work necessary to incorporate the new Work of the Project with the existing building and/or site.
- B. Cutting and Patching shall use any materials which are necessary to achieve incorporation of the new work with the existing conditions and, except where otherwise noted or impractical in terms of current building methodologies, shall use materials which are the same as those being cut and patched.
- C. Cutting and Patching includes reconstruction of portions of the building as may be required to make transitions between new Work and the existing construction.
- D. Cutting and Patching, shall, by its nature, involve demolition, removals, and salvaging of existing materials for reuse and reinstallation regardless of whether same are indicated in the Construction Documents.
- E. Cutting and Patching shall include, but not be limited to, General Construction work, limited Structural work, Plumbing work, Mechanical work and Electrical work.

1.03 DESCRIPTION AND APPLICATION - SINGLE PRIME CONTRACT

- A. The work of this Project includes the renovation and or addition to an existing building and, as such, will require Cutting and Patching in order to execute the Work.
- B. Cutting and Patching is implied by the nature of the Work and, in general, is not specifically identified on the Drawings or described in other sections of the Specifications.
- C. The Contractor is responsible for any and all Cutting and or Patching which may be required to execute the intent of the Construction Documents.
 - 1. Perform Cutting and Patching as the conditions of the Work require whether or not the Construction Documents indicate Cutting and Patching.
 - 2. Except where otherwise noted, perform Cutting and Patching to incorporate the new work with the existing construction such that, when completed, the transition between the new

- work and the existing construction is not visually and tactually perceptible.
3. Perform Cutting and Patching using the appropriate methods and materials; employing the appropriate skilled labor and techniques as each situation may require.
 4. Maintain the structural integrity of the existing construction which shall remain after the completion of the Work.
 5. Maintain existing Plumbing, Mechanical, Electrical, security, fire protection, communication, and other similar systems which are to remain in effect after the completion of the Work.
 6. Restore, to original or better condition, any existing Plumbing, Mechanical, Electrical, security, fire protection, communication, and other similar systems which are affected by the activities of the Work.
 7. Restore, to original or better condition, any existing construction, finishes, structural elements or other components of the building which are affected by the activities of the Work.
 8. Perform any refinishing, painting, coating, or similar surface treatment as required to produce an indistinguishable transition between the new Work and the existing construction.
- D. Salvage and Preservation:
1. An express goal of this Project to minimize the impact of the new Work upon the existing building.
 2. Where practical, and where not prohibited by the Construction documents, building code, or good practice, existing components, which are not readily replaced and which are suitable for reuses, shall be carefully removed, salvaged, suitably stored and, at the appropriate time, reinstalled.
 - a. Items which the Owner wishes to save shall be carefully removed and protected and stored in a location, on site, as directed by the Owner.
 3. Items which the Owner does not wish to save shall be legally disposed.
 4. Unique or irreplaceable components of the existing building or site which are not to be used in the new work shall, prior to commencing the Work, be identified, listed and presented to the Owner for response.

1.04 RELATED DOCUMENTS

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

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 3. List products to be used and firms or entities that will perform Work.
 4. Indicate dates when cutting and patching will be performed.
 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.
- C. Materials and Products
1. Materials and Products as may be listed herein are not inclusive of all the materials required to execute the Cutting and Patching required for this project
 2. Provide whatever materials and products that are necessary for the execution of the Cutting and Patching work whether or not such materials and products are included in any of the Section of the Project Specifications.
 3. Where products or materials are specified in the Project Specifications provide items which comply with the specifications, otherwise provide products and materials of the quality and type which are appropriate for each specific cutting and patching condition.
 4. Except for materials and products submitted and accepted pursuant to other sections of these specifications, furnish the following:
 - a. Product Data: Provide data on plaster materials, characteristics, and limitations of products specified.
 - b. Samples: Where required by the Architect based upon the nature of the cutting and patching condition, submit three samples, 6 x 6 inch in size illustrating finish color and texture.
 5. Shop Drawings:
 - a. Where required by the Architect based upon the nature of the cutting and patching condition, furnish detailed shop drawing indicating the proposed work incorporating the affected existing conditions.
 - b. Include field measurements of existing conditions and those of the related new construction. Include photographs of conditions which cannot be adequately described by other means.
- D. Project Record Documents: Record actual locations of Cutting and Patching and include in the record drawings required for Project Closeout.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing any portion of the cutting and patching work with minimum 5 years of experience.
- B. Plumbing, Mechanical and Electrical work shall be designed under the direct supervision of a Professional Engineer experienced in design of this Work and licensed in the state of New York.
- C. Design Structural Work under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the state of New York.
1. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 2. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - a. Foundation construction.
 - b. Structural concrete
 - c. Structural steel.
 - d. Lintels.
 - e. Timber and primary wood framing.
 - f. Structural decking.
 - g. Miscellaneous structural metals.

- h. Equipment supports.
 - i. Piping, ductwork, vessels, and equipment.
- D. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Electrical wiring systems.
- E. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
 - 1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Processed concrete finishes.
 - b. Stonework and stone masonry.
 - c. Ornamental metal.
 - d. Matched-veneer woodwork.
 - e. Firestopping
 - f. Window wall system.
 - g. Stucco and ornamental plaster.
 - h. Acoustical ceilings.
 - i. Finished wood flooring.
 - j. Fluid-applied flooring.
 - k. Carpeting.
 - l. Aggregate wall coating
 - m. Wall covering.
 - n. HVAC enclosures, cabinets, or covers.
- F. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.
- G. Engineered work or systems designed by the Contractor's engineer(s) shall be reviewed for coordination and compliance by the Engineer of record for the Project.

1.07 MOCK-UP

- A. Provide as may be required by the Architect for one or more cutting and patching conditions, a mock-up, 5 feet long by 5 feet wide, illustrating a sample of the area to be cut and patched.
- B. Locate where directed.

- C. Mock-up may remain as part of the Work.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion, except where other, superceding warranties apply.
- C. Perform work in a manner which shall not void, diminish or compromise any warranties associated with this project or which pre-existed this project.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.
- B. Some materials and products are mentioned in this section since they are common to typical patching applications. Other materials and products may be required to perform patching work. The fact that certain patching materials or products are not indicated within this section does not, in any way, preclude the use of such materials where conditions require.
- C. Plaster: Comply with ASTM C 842
 - 1. Base Coat: Ready-mixed, sand aggregate gypsum plaster base
 - 2. Finish Coat: Ready-mixed gypsum finish plaster.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
 - 1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 INSTALLATION

- A. When using products or materials which are not specified which the Specifications, Install in accordance with manufacturer's instructions.
- B. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- C. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 - 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
 - 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- D. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 - 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- E. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.
 - 1. Unless otherwise indicated, provide 3-coat work.
 - 2. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arises.
 - 3. Cut, patch, point-up, and repair plaster to accommodate other construction.

3.04 CLEANING AND PROTECTION

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition
- B. Protect patched areas in the same manner as for new work of an equivalent type.
- C. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
 - 1. Section 011200 – Contract Summary of Work, for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the Owner, the Design Professionals, occupants of the Project, testing agencies, and authorities having jurisdiction.
- B. Electric Power Service from Existing System: Electric power from the Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage; including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
 - 1. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these

operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

- C. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of the work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air filtration system discharge.
4. Other dust-control measures.
5. Waste management plan.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations and requirements of authority having jurisdiction for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before the Owner's acceptance, regardless of previously assigned responsibilities. Temporary use of permanent facilities during construction may be allowed at the sole discretion of the Owner.

1.7 DELIVERY OF MATERIALS AND EQUIPMENT

- A. Location for short term and long term storage of materials and equipment will be identified by the Owner. The contractor is responsible to store his materials in a neat and safe manner and secured within the locations assigned for storage.
- B. Equipment and materials shall be stored off the ground, under fire retardant tarps. The contractor shall provide wall and floor protection with tempered Masonite.
- C. Delivered materials which are damaged or unsuitable for installation shall be removed from the job site and replaced with acceptable materials.
- D. The contractor shall provide a flagman to be present during the transport of equipment into and within the building.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- E. The contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger the safety of the structure.
- F. Any building element or component that is not part of this contract that is disturbed by the execution of the work by the contractor shall be returned to the existing condition.
- G. Contractor shall provide at least 72 hours advanced notification to the owner for the delivery of project materials.

1.8 MATERIALS

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
- B. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively

1.9 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 2 - EXECUTION

2.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.
- D. Rubbish Removal:
 - 1. The Contractor shall:
 - a. Keep the Work free from rubbish at all times.
 - b. Clean all enclosed structures daily.
 - c. Remove rubbish from the site at least once per week.
 - 2. The Contractor shall not:
 - a. Burn rubbish.

- b. Drop or throw rubbish from one (1) level to another inside or outside any building. All rubbish shall be lowered by way of chutes, taken down by hoists, or lowered in receptacles.

2.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service. Arrange with utility company, the Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Electric Power Service: Connect to the Owner's existing electric power service. Maintain equipment in a condition acceptable to the Owner. Obtain all required permits.
- C. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - ii. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 - iii. Install lighting for the Project identification sign
- E. Water Service: Connect to the Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to the Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- F. Sanitary Facilities: Use of building facilities is permitted. All restrooms shall be kept in operation during construction. Contractor will be solely responsible for maintaining cleanliness of restrooms arising out of their use and those of their subcontractors.
- G. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Substantial Completion inspection date is scheduled. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as specified in the Contract Documents.
 - 2. Maintain and touch-up signs so they are legible at all times.
Temporary Signs: Provide other signs as required to inform public and individuals seeking entrance to the Project. Provide temporary, directional signs for construction personnel and visitors.

2.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- E. Protection Plan: Provide a Protection Plan for occupied spaces and unoccupied spaces.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by the Owner from fumes and noise.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
 - 2. Construct dustproof partitions with fire rated gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
 - 3. Where fire-resistance-rated temporary partitions are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 4. Insulate partitions to control noise transmission to occupied areas.
 - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 6. Protect air-handling equipment.
 - 7. Provide walk-off mats at each entrance through temporary partition
- H. Fire Safety during Construction: Comply with all requirements identified herein as well as the more stringent requirements of the applicable codes (New York State Building and Fire Codes).
 - 1. No smoking: Smoking shall be prohibited throughout the project/construction site. "No Smoking" signs shall be conspicuously posted at all entrances and throughout the site.
 - 2. The Contractor is responsible for all fire safety efforts until completion and acceptance of the Work described in the Contract Documents that include but are not limited to the following:
 - a. Training. Job site personnel shall be trained in fire safety practices and procedures and the proper use of fire protection equipment, including hand-held fire extinguishers, hose lines, fire alarm and sprinkler systems.
 - b. Fire Protection Devices. Fire protection and detection equipment shall be maintained and serviced.

- c. Hot Work Operations. Welding, cutting, open torches, torch-applied roof system activities, and other hot work operations shall be conducted under a permit system. A fire watch and fire extinguishers shall be provided. The Contractor shall confirm ANY scope condition where brazing or burning/use of Hot Work will be required on project. The Contractor must provide adequate Dedicated Fire Watch coverage at all times while such work is being performed.
- I. The Work includes the conduct of demolition and construction activities at high roof elevations. The Contractor is responsible for exercising all necessary precaution and providing all necessary personal protective equipment and safety devices for employees to ensure a safe working environment.

2.4 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Remove standing water from decks.
 - 6. Do not install material that is wet.
 - 7. Discard, replace or clean stored or installed material that begins to grow mold.
 - 8. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

2.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves right to take possession of the Project identification signs.
 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 – Contract Closeout Requirements.

END OF SECTION

SECTION 016000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and Contractor's Submittal Schedule, apply to this section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in the Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Sections:
 - 1. Section 01300 – Submittal Procedure, for product submittals.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work of the Contract and purchased new for the Project. The term "product" includes the terms "material," "equipment," and "system."
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Procurement Exemption Approval Product Specification: A specification in which a specific manufacturer's product is named including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes as a single source or sole source provider.

1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Design Professional's Action: If necessary, the Design Professional will request additional information or documentation for evaluation within one week of receipt of a comparable product request. The Design Professional will notify the Contractor through the Owner of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 013300 - Submittal Procedure.
 - b. Use product specified if the Design Professional does not issue a decision on use of a comparable product request within time allocated.
- B. Procurement Exemption Approval Product Specification Submittal: Comply with requirements in Section 013300 - Submittal Procedure. Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If the Contractor is given option of selecting between two or more products for use on the Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, the Design Professional will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at the Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to the Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger the Project structure.
3. Store products that are subject to damage by the elements under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic protected from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. The owner will not be responsible for any contractor materials and equipment stored on-site.
8. All contractor material shall be stored on Masonite and covered with fire-retardant tarps.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to the Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for the Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to individual specification sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 013300 – Submittal Procedure.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. The Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," the Design Professional will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. Provide products that do not contain asbestos.

B. Product Selection Procedures:

1. Product: Where Specifications include a procurement exemption approval and name a single source, sole source, manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for the Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications include a procurement exemption approval and name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for the Contractor's convenience will not be considered.
3. Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

C. Visual Matching Specification: Where Specifications require "match sample", provide a product that complies with requirements and matches sample. The Owner's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's full range", select a product that complies with requirements. The Design Professional will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: The Architect or Engineer will consider the Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, the Design Professional may return requests without action, except to record noncompliance with these requirements:
1. Action Submittal shall be provided in accordance with Submittal Procedures within 60 days after Notice to Proceed.
 2. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 3. Detailed comparison of qualities of proposed product with those named in the Specifications, including attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 4. Evidence that proposed product provides specified warranty.
 5. List of similar installations for completed projects with project names and addresses and names and addresses of design professionals and owners, if requested.
 6. Samples, if requested.
- B. Comparable Products Costs: Any costs savings to an approved Comparable Product identified and realized by the Contractor shall be shared equal between the Owner (50%) and Contractor (50%).

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017700

CONTRACT CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and Notice of Substantial Completion (NOSC) Form, apply to this section.

1.2 SUMMARY

- A. Section includes administrative requirements for preparation and submission of final Contract Closeout Documents, including, but not limited to, the following:

- 1. Contract Closeout Meeting
- 2. Notice of Substantial Completion (NOSC) Requirements
 - a. List of Incomplete Work Items
 - b. Contract Turnover Documents
 - 1) As-built Drawings
 - 2) As-built Specifications
 - 3) As-built Schedule
 - 4) Permits, Licenses, Certificates
 - c. General Guarantee
 - d. Operation and Maintenance Manuals
- 3. Final Cleaning
- 4. Contract Closeout

- B. Related Sections:

- 1. Section 014000 – Quality and Code Requirements
- 2. Section 017830 – As-built Documents

1.3 CONTRACT CLOSEOUT MEETING

- A. Contract Closeout Meeting: The Owner will schedule and conduct a Contract closeout meeting, at a time convenient to the Owner and Design Professional, but no later than thirty (30) days prior to the scheduled inspection date for Substantial Completion.
 - 1. The Owner will conduct the meeting to review requirements and responsibilities related to Contract closeout.

2. Attendees: Representatives of the Owner, testing agency, commissioning authority, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to make binding decisions on matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Contract closeout, including the following:
 - a. Status of Contract Turnover Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Requirements for submitting final operation and maintenance manual.
 - d. Requirements for Permits, Licenses and Certificates.
 - e. Preparation of Contractor's list of incomplete Work items.
 - f. Procedures for processing Application for Payment at Substantial Completion and final payment.
 - g. Submittal procedure.
 - h. Responsibility for removing temporary facilities and controls.
4. Minutes: The Owner or Design Professional will record and distribute meeting minutes.

1.4 NOTICE OF SUBSTANTIAL COMPLETION (NOSC)

- A. Substantial Completion: After the Work of the Contract is determined by the Owner, to be at Substantial Completion, the Contractor shall submit a written request to the Owner for a date of inspection.
- B. Documentation: The Notice of Substantial Completion (NOSC) form shall be executed at the end of inspection documenting incomplete Work items and submission of documents in accordance with this section that includes but is not limited to:
 - a. Preparation of a list of Work to be completed and corrected, the value of Work items on the list, and completion date of each Work item.
 - b. Submittal of contract turnover documents.
 - c. Termination and removal of temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - d. Completion of final cleaning requirements.
- C. SAMPLE FORM - NOTICE OF SUBSTANTIAL COMPLETION

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

NOTICE OF SUBSTANTIAL COMPLETION																															
CONTRACT NUMBER: _____		CONTRACTOR: _____																													
CONTRACT NAME: _____		LOCATION: _____																													
PROJECT MANAGER (PM): _____		DESIGN PROFESSIONAL (DP): _____																													
<p>With the exception of the list of incomplete Work and Status of Contract Turnover Documents, the Owner accepts the Work as Substantial Completion on (date) _____ in accordance with the General Conditions.</p>																															
ITEM	LIST OF INCOMPLETE WORK	SCHEDULED COMPLETION DATE																													
1.	_____	_____																													
2.	_____	_____																													
3.	_____	_____																													
4.	_____	_____																													
5.	_____	_____																													
6.	_____	_____																													
<p>NOTE: Attach additional pages if necessary.</p>																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; padding: 5px;">Status of Contract Turnover Documents:</th> <th style="width: 15%; padding: 5px;">Provided- Yes/No</th> <th style="width: 15%; padding: 5px;">Due Date</th> <th style="width: 20%; padding: 5px;">Not Applicable</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">As-Built Drawings & Specifications transmitted to DP</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">Permits, Licenses and certificates transmitted to Owner</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">O&M Manual submitted to Owner</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">Identify other documents</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">Identify other documents</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">Final Cleaning</td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> <td style="padding: 5px;"></td> </tr> </tbody> </table>				Status of Contract Turnover Documents:	Provided- Yes/No	Due Date	Not Applicable	As-Built Drawings & Specifications transmitted to DP				Permits, Licenses and certificates transmitted to Owner				O&M Manual submitted to Owner				Identify other documents				Identify other documents				Final Cleaning			
Status of Contract Turnover Documents:	Provided- Yes/No	Due Date	Not Applicable																												
As-Built Drawings & Specifications transmitted to DP																															
Permits, Licenses and certificates transmitted to Owner																															
O&M Manual submitted to Owner																															
Identify other documents																															
Identify other documents																															
Final Cleaning																															

1.5 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Submit list of incomplete items in *EXCEL* spreadsheet electronic format. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 2. Include the following information at the top of each page:
 - a. Project name & number.
 - b. Date.
 - c. Name of Contractor & Contract number.
 - d. Page number.
- B. Reinspection: Submit a written request for reinspection. On receipt of request, the Owner will either proceed with inspection or notify the Contractor of unfulfilled requirements. After inspection, the Owner will notify the Contractor of items, either on the Contractor's list or additional items identified, that must be completed or corrected.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis to proceed with commencement of Contract Closeout Documents.

1.6 CONTRACT TURNOVER DOCUMENTS

- A. Procedure: Contract turnover documents shall be transmitted to the Owner or if stated to the Design Professional, fifteen (15) days prior to requesting inspection date for Substantial Completion.
- B. As-built Drawings: Transmit one paper copy set of marked-up As-built Drawings to the Design Professional, with copy of transmittal to Owner. Print each Drawing, whether or not changes and additional information were recorded.
- C. As-built Specifications: Transmit one paper copy set of marked-up as-built specifications, including addenda and contract modifications to the Design Professional, with copy of transmittal to Owner.
- D. As-built Schedule: Submit one electronic (PDF) copy, certified by the Contractor, of the schedule that reflects the exact manner in which the project was actually constructed, to the Owner.
- E. Permits, Licenses and Certificates Documents: Submit one copy of original permits, licenses, certifications, inspection reports, material certificates/affidavits, approvals, and related documents required by authorities having jurisdiction to obtain Letter of Completion, Certificate of Occupancy, or Code Compliance Certificate. Coordinate and respond to requirements from

the Owner, Municipality and all other authorities having jurisdiction for issuance of approval/documents required for the Owner use and occupancy.

1. Cooperate and help coordinate with agency testing materials as specified in Section 014000 – Quality and Code Requirements. Testing Agency is required to submit final report of special inspections.

- F. Miscellaneous Record Submittals: Refer to Individual Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one electronic (PDF) copy of each submittal.
- G. Reports: Submit written report indicating items incorporated in Contract Documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Final Manuals Submittal: Submit an electronic copy of a compiled set of complete Operation and Maintenance Manuals in final form as indicated in Section 017823 – Operation and Maintenance Manuals, to the Owner fifteen (15) days prior to requesting date of inspection for Substantial Completion.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 1. Use cleaning products that meet Green Seal GS-37, or if GS-37 is not applicable, use products that comply with allowable VOC levels.

PART 3 - EXECUTION

3.1 DEMOBILIZATION

- A. Deliver tools, spare parts, extra materials, and similar items to location designated by the Owner. Label with manufacturer's name and model number where applicable.
- B. Make final changeover of permanent locks and deliver keys to the Owner. Advise the Owner's personnel of changeover.

- C. Terminate and remove temporary facilities from the Project site, along with mockups, construction tools, and similar elements.

3.2 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for contract turnover document purposes. Post changes and modifications to contract turnover documents as they occur; do not wait until the end of the Project.
- B. Maintenance of Turnover Documents and Samples: Store turnover documents and Samples in the field office apart from the Contract Documents used for construction. Contract turnover documents shall not be used for construction purposes. Maintain turnover documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to contract turnover documents for the Owner's reference during normal working hours during performance of Contract.

3.3 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations as applies to Work of the contract.
 - a. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
 - c. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Sweep concrete floors broom clean in unoccupied spaces.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain. Replace if soil or stains remain after shampooing.
 - f. Remove labels that are not permanent.
 - g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
 - h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - i. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

j. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in all other applicable sections.

3.4 CONTRACT CLOSEOUT

- A. Provide Close Out Materials in the following format prior to the final acceptance of the work in this section:
1. (3) hardcopy Binders which must include a table of Contents listing each item as a section from the attached highlighted listing
 2. (3) accompanying CD-ROM copies containing all Close Out materials in the Hard Copy Binder.
 3. Electronic files of each Close Out item listed on the attached, highlighted checklist document.
- B. Close-out Checklist: The items listed in Table 01770-1 are to be provided to the DP before final acceptance of the work.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

Item	Description	Status	Party
1	Work Permit		GC
2	Record Drawings in CAD		GC/ DP
3	Punchlist items completed; GC to provide form with acceptance by DP and Owner (sign-offs required).		GC
4	Copies of Warranties and Guarantees.		GC
5	Release of Liens (GC and sub-contractors) received.		GC
6	Approved Building Department sign-off .		GC

TABLE 017700-1 DP = Design Professional
GC = General Contractor

END OF SECTION

SECTION 017820

OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections and Contractor's Submission Schedule, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance manual for systems, subsystems, and equipment.
 - 2. Product maintenance data.
 - 3. Systems and equipment maintenance data.
- B. Related Sections:
 - 1. Section 013300 – Submittal Procedures
 - 2. Section 017700 – Contract Closeout Requirements

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Required Manuals: see Section 017700 – Contract Closeout Requirements for additional requirements.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to the Design Professional.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Organize the manual into separate sections by CSI number based on the table of contents of the project manual, for each system and subsystem, and a separate section for each piece of equipment not part of a system. The manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents:
 - a. Operation data.
 - b. Product maintenance data.
 - c. Systems and equipment data
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Design Professional.
 - 7. Names and contact information for major consultants to the Design Professional that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one media volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents by CSI Section number and then by system, subsystem, and equipment. .
- E. Manuals, Electronic Copy: Submit electronic (PDF) copy of the manual, to the Design Professional, concurrent with Action Submittal.

2.2 OPERATION DATA

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Section and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Operating standards.
 3. Operating procedures.
 4. Operating logs.
 5. Wiring Diagrams.
 6. Control diagrams.
 7. Piped system diagrams.
 8. License requirements including inspection and renewal dates.
 9. Precautions against improper use.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 PRODUCT MAINTENANCE DATA

- A. Content: Organize data into a separate section, within the O & M Manual, for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in section identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Guarantees: Include copies of warranties and guarantees lists of circumstances and conditions that would affect validity of warranties.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE DATA.

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in a separate section within the O & M Manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- C. **Manufacturers' Maintenance Documentation:** Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available
- E. **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. **Scheduled Maintenance and Service:** Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. **Maintenance and Service Record:** Include manufacturers' forms for recording maintenance.
 - 3.
- F. **Spare Parts List and Source Information:** Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. **Warranties:** Include copies of warranties and lists of circumstances and conditions that would affect validity of warranties.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. **Operation and Maintenance Documentation** shall be provided for review, concurrent, with Action Submittal specified in Individual Specification Section.
 - 1. Correct or modify the manual to comply with the Design Professional's comments. Submit copies of each corrected manual within 15 days of receipt of Design Professional's comments and prior to commencing demonstration and training.

- B. Product Maintenance Data: Assemble a complete set of maintenance data, in a separate section, within the O & M Manual, indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Data: Assemble a complete set of operation and maintenance data, in a separate section, within the O & M Manual, indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate section within the O & M Manual, for each system and subsystem, in the form of an instructional manual for use by operating personnel.
- D. Manufacturers' Data: Where manual contain manufacturers' standard printed data; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in As-built Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.

END OF SECTION

SECTION 017830
AS BUILT DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Drawings and Individual Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for As-built documents, including the following:
 - 1. As-built Drawings
 - 2. As-built Specifications
 - 3. As-built Schedule
 - 4. Record Product Data
 - 5. Miscellaneous record submittals
- B. Related Sections:
 - 1. Section 013200– Construction Progress Documentation
 - 2. Section 013000 – Submittal Procedure; Required Submittal List
 - 3. Section 017700 – Contract Closeout Requirements
- C. Administrative and procedural requirements for contract turnover documents as provided in Individual Specifications Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Required Documents: Section 01770 – Contract Closeout Requirements, describes administrative requirements for submission, number and type of copies required for contract closeout requirements.

PART 2 - PRODUCTS

2.1 AS-BUILT DRAWINGS

- A. As-built Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings onsite. Review As-built Drawings and shop drawings monthly with the Owner, for approval.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Preparation: Daily mark As-built Drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up As-built Drawings.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities
 - e. Revisions to routing of piping and conduits
 - f. Revisions to electrical circuitry
 - g. Duct size and routing
 - h. Actual equipment locations.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order.
 - k. Changes made by Bulletin.
 - l. Changes made following the Owner's written orders.
 - m. Details not on the original Contract Drawings.
 - n. Field records for variable and concealed conditions.
 - o. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up as-built prints.
4. Mark as-built sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 AS-BUILT SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and turnover Drawings where applicable.

2.3 AS-BUILT SCHEDULE

- A. Final Schedule: Submit to the Owner a final schedule update. The As-built Schedule shall reflect the exact manner in which the project was actually constructed including actual start and finish dates, activities, sequences and logic.
 1. The Contractor shall certify the final schedule update as being a true reflection of the way the project was actually constructed.

2.4 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to the Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, As-built Specifications, and As-built Drawings where applicable.

2.5 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by Individual Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals.
 1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Maintain Change Log: Maintain and submit written change log to the Owner, monthly for review indicating items incorporated in contract turnover documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- B. Recording: Maintain one copy of each submittal during the construction period for contract turnover document purposes. Post changes and modifications to contract turnover documents as they occur; do not wait until the end of the Project.
- C. Maintenance of Turnover Documents and Samples: Store turnover documents and Samples in the field office apart from the Contract Documents used for construction. Contract turnover documents are not to be used for construction purposes. Maintain turnover documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to contract turnover documents for the Owner's reference during normal working hours during performance of Contract.

END OF SECTION

SECTION 022230

SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of designated building equipment and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.
- D. Identification of utilities.
- E. By definition, for the purposes of this Section, "Demolition" shall include work described as "Removals", "Removal and Salvage" and may include cutting and patching as described in another Section.

1.02 RELATED SECTIONS

- A. Section 011000 - Summary: Work sequence, continued occupancy of the building and handling of regulated materials.
- B. Section 014500 - Cutting and Patching
- C. Section 015000 - Temporary Facilities and Controls: Temporary enclosures.
- D. Section 017000 - Execution Requirements: Re-installation of removed components.
- E. Section 017800 - Closeout Submittals: Project record documents.

1.03 DEMOLITION PLANS

- A. The Demolition Plan(s) included in the Drawings shows only the general extent of the demolition required for the Project. Additional demolition and removals, not specifically indicated on the construction documents may be necessary for the proper execution of the Work and shall be assumed to be included in the Work of this Section.
- B. Prior to proceeding with any demolition, review the Demolition Plan comparing it to the new Work indicated in the other Contract Documents to ascertain the specific extent and nature of the demolition.
 - 1. Determine the need for temporary shoring, bracing or other form of stabilization which may be necessary to support the remaining structure until new work is installed or until work of future Phases of the project are completed.
 - 2. Determine the relationship of the new work to the demolition to ascertain where new structural support or reinforcement may be required to accommodate the new work and which is necessary to support the existing structure to remain.
 - 3. Determine the relationship of existing Plumbing, HVAC, Electrical, Communications and Security systems to the requirements of the new work to ascertain what portions of the existing system must be maintained for incorporation into the new work. Review, where applicable, demolition drawings for the Plumbing, HVAC and Electrical Work and refer to notes regarding demolition which may be contained in the Drawings or Specifications

- C. Coordinate the demolition work required for each stage of the Project with the requirements for future stages in order to identify the extent of the demolition for each stage.
 - 1. Provide temporary support or other provisions to maintain the integrity of the existing structure until the work of future phases is complete.

1.04 SUBMITTALS

- A. See Section on Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate demolition, removal sequence, and location of salvageable items; location and construction of temporary facilities.
 - 1. Failure to provide a Demolition Shop Drawing shall not relieve the contractor of compliance with the project requirements.
- C. Project Record Documents: Accurately record actual locations of capped utilities.

1.05 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition work, dust control, products requiring electrical disconnection and reconnection, and mechanical (HVAC and plumbing) equipment requiring disconnection and reconnection.
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress from any building exit or site exit.
- D. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.
 - 1. In buildings where Asbestos Containing Materials (ACM) have been identified, review the Owner's documents and coordinate work according such that no ACM is disturbed during the course of demolition.
 - 2. Where asbestos abatement is to be performed as part of this project, coordinate the scheduling of the demolition work so that the asbestos abatement work has been completed prior to the commencement of the demolition work.
 - 3. Follow provisions of the specifications and applicable laws regarding asbestos and lead paint if these materials are encountered.

1.06 SEQUENCING

- A. Sequence work under the applicable provisions of Section 011000.
- B. In areas of the building which are currently in use, perform demolition immediately prior to the time when new work is scheduled thereby permitting the Owner the maximum time to use the existing portions of the building.
- C. Coordinate planned sequence of the demolition with the Owner's Asbestos Abatement Plan.

1.07 SCHEDULING

- A. Schedule work under the provisions of Section 013250 Construction Progress Schedule.
- B. Schedule work to coincide with new construction.

- C. Schedule work to permit the Owner access to and use of all part of the existing building up to the time where the Project Schedule indicates that new work shall commence.
- D. Describe demolition removal procedures and schedule.
- E. Perform noisy, malodorous, or dusty work which is deemed disruptive to the operation of the occupied portions of the building:
 - 1. "OFF Hours" unless other arrangements are approved, in writing, by the Owner's Representative.
 - a. Comply with the provisions for work outside of "OFF Hours" as described in Section 01100 Summary.
 - b. Do not perform such work during periods of after school or evening activities, unless permitted, in writing, by the Owner's Representative.
 - c. Obtain, from the Owner's Representative, the school's schedule of such activities and schedule the demolition accordingly.

1.08 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if, in the opinion of the Owner's Representative, the work is disruptive to, or in conflict with the use of the occupied portions of the building.
- C. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide, erect, and maintain temporary barriers at locations indicated and at other locations as may be required to isolate the area of demolition and allow the balance of the building to be used by the Owner.
- B. Erect and maintain weatherproof closures for exterior openings.
- C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued building occupancy.
- D. Protect existing construction, finishes, plumbing, mechanical, electrical, communication, fire detection and other building systems that are not to be demolished.
 - 1. Where demolition disrupts the operation of an essential safety related building systems (communications, fire detection, security, emergency lighting, etc.) provide temporary means to maintain the operation of the system until the operation of the system(s) is restored.
- E. Prevent movement of structure; provide bracing and shoring.
- F. Notify affected utility companies before starting work and comply with their requirements.

- G. Mark location and termination of utilities.
- H. Provide appropriate temporary signage including signage for exit or building egress.

3.02 DEMOLITION

- A. Disconnect, remove or cap as indicated on the drawings, and identify designated utilities within demolition areas.
 - 1. Where existing utilities are not identified on the drawings as being capped or removed, terminate or relocate same in a code complying manner as required to accommodate the new work.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members and maintain the structural integrity of all structure which shall remain.
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
- E. Remove temporary facilities.

3.03 SCHEDULES

- A. Remove, store and protect the following materials and equipment:
 - 1. Items identified on the drawings or on schedules.
- B. Remove the following equipment and materials for Owner's retention. Deliver to location designated by Architect.
 - 1. Items identified on the drawings or schedules to be removed or salvaged and returned to the Owner.
- C. Owner will remove and keep the following material and equipment:
 - 1. Existing unfixed furniture, furnishings, wall mounted items, furnishings, unfixed finish materials and similar items.
- D. Protect the following materials and equipment to remain in place:
 - 1. Items identified as to remain in place, or if not so identified, which, in their existing condition, do not conflict with the new work.

END OF SECTION

SECTION 033001

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

N/A

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-05 of the American Concrete Institute.

1.03 DEFINITIONS (Amendments to ACI 301, Section 1.2):

- A. Exposed Construction: Exposed to view.

1.04 SUBMITTALS

- A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.
- B. Shop Drawings: Placing drawings for bar reinforcement.
- C. Product Data:
 - 1. Concrete design mix(es) with name and location of batching plant.
 - 2. Portland Cement: Brand and manufacturer's name.
 - 3. Fly Ash: Name and location of source, and DOT test numbers.
 - 4. Air-entraining Admixture: Brand and manufacturer's name.
 - 5. Water-reducing Admixture: Brand and manufacturer's name.
 - 6. Aggregates: Name and location of source, and DOT test numbers.
 - 7. Lightweight Coarse Aggregate: Brand and manufacturer's name
 - 8. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
 - 10. Bonding Agent (Adhesive): Brand and manufacturer's name, and preparation and application instructions.
 - 11. Expansion Joint Filler: Brand and manufacturer's name.
- D. Samples:

N/A
- E. Quality Control Submittals:
 - 1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

- A. Concrete batching plant shall be currently approved as a concrete supplier by the New York State Department of Transportation.
- B. Fly ash supplier shall be currently approved as a fly ash supplier by the New York State Department of Transportation.
- C. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.
- D. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
 - 1. Batching and mixing facilities and equipment.
 - 2. Sources of materials.

1.06 STORAGE

- A. Store materials so as to insure the preservation of their quality and fitness for the Work. Materials, even though accepted prior to storage, are subject to inspection and shall meet the requirements of the Contract before their use in the Work.

PART 2 PRODUCTS

2.01 MATERIALS (Amendments to ACI 301, Section 4, for Normal Weight Concrete and Section 7, for Lightweight Concrete):

- A. Water-reducing Admixture: ASTM C 494, Type A, and on the New York State Department of Transportation's current "Approved List".
- B. Fly Ash: ASTM C 618, including Table 1A (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.
- C. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.
 - 1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.
 - 3. "Kure N Seal W" by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
 - 4. Day-Chem Cure & Seal 26 percent (J-22) by Dayton Superior Corp., 721 Richard St., Miamisburg, OH 45342, (800) 745-3700.
 - 5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.

- D. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate. Approved products include:
 - 1. Lapidolith by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
 - 2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.
 - 3. Pena-Lith by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
 - 4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
 - 5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 - 6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
- E. Type 1 Expansion Joint Filler: Preformed, resilient, non-extruding cork units; ASTM D 1752, Type II.
- F. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer.
- G. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
 - 1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 - 2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
 - 3. Epogrip by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517.

2.02 PROPORTIONING (Amendments to ACI 301, Sections 4 & 7):

- A. Compressive Strength: Minimum 4500 psi, unless shown or specified otherwise.
 - 1. Minimum 4500 psi for garage floor slabs, and exterior slabs, ramps and stairs.
- B. Weight: Normal
- C. Durability: Concrete shall be air-entrained. Design air content shall be 6 percent by volume, with an allowable tolerance of plus or minus 1.5 percent for total air content. Entrained air shall be provided by use of an approved air-entraining admixture. Air-entrained cement shall not be used.
- D. Slump:
 - 1. 4000 psi Normal Weight Concrete: Between 2 inches and 3 inches.

- E. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Director.
- F. Selection of Proportions: Concrete proportions shall be established on the basis of previous field experience or laboratory trial batches, unless otherwise approved in writing by the Director. Proportion mix with a minimum cement content of 611 pounds per cubic yard for 4500 psi concrete.
 - 1. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.
 - a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.
 - b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

2.03 REINFORCEMENT (Amendments to ACI 301, Section 3):

n/a

2.04 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

- A. Obtain bond at construction joints by the use of bonding agent (adhesive) or the use of cement grout.

2.05 PRODUCTION (Amendments to ACI 301, Section 5):

- A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Keep excavations free of water. Do not deposit concrete in water.
- C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 FORMWORK (Amendments to ACI 301, Section 2):

- A. Chamfer all exposed external corners of concrete.

3.03 PLACING REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. n/a

3.04 PLACING CONCRETE (Amendments to ACI 301, Section 5):

- A. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.
- B. Do not allow concrete to free fall more than 4 feet.

3.05 FINISHING FORMED SURFACES (Amendments to ACI 301, Section 5.3.3):

- A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Smooth Rubbed Finish for exterior concrete surfaces exposed to view.

3.06 FINISHING SLABS (Amendments to ACI 301, Section 5.3.4):

- A. Slabs On Grade: Provide key type joints unless otherwise shown. Tool exposed joints.
- B. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Broom or Belt Finish for:
 - a. Exterior slabs. Texture, as approved by the Director's Representative.
- C. Finishing, General: Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.

3.07 CURING AND PROTECTION (Amendments to ACI 301, Section 5.3.6):

- A. Maintain concrete surfaces in a moist condition for at least 7 days after placing, except where otherwise indicated. Do not use curing compound.

3.08 CHEMICAL HARDENER (DUSTPROOFING)

- A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed.
- B. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer's instructions.

- C. Prepare surfaces and apply chemical hardener in accordance with manufacturer's printed instructions and recommendations.

3.09 FIELD QUALITY CONTROL (Amendments to ACI 301, Section 1):

- A. Make available to the City of Yonkers's Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

END OF SECTION

SECTION 042200

CONCRETE UNIT MASONRY

PART 1 GENERAL

1.02 RELATED WORK SPECIFIED ELSEWHERE

1.03 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings for precast concrete lintels.
 - 2. Submit placing drawings for bar reinforcement.
- B. Product Data: Catalog sheets, specifications, and installation instructions for the following:
 - 1. Masonry wall reinforcement.
 - 2. Bar reinforcement.
 - 3. Buck anchors.
 - 4. Hardware cloth.
 - 5. Control joint filler.
 - 6. Premolded control joint strips.
- C. Samples:
 - 1. Hollow Load-bearing Units (Normal Weight): 6 of each size.
- D. Quality Control Submittals:
 - 1. Test Reports: Certified test reports for concrete masonry units showing that materials for delivery to the Project meet the requirements of these Specifications.
 - 2. Certificates: Bar reinforcement manufacturer's certification that bar material conforms with ASTM A 615 and specified grade.

1.04 QUALITY ASSURANCE

- A. Pre-Installation Meeting: After approval of all submittals and a minimum of 14 days prior to the start of Work, a meeting will be held at the Site for the purpose of reviewing mortar and CMU colorations, reviewing the Contract Documents, and discussing the requirements and procedures for the Work. The following persons must attend the meeting: The Contractor, the person Supervising this phase of the Work, the Owner's Representative, and the Design Structural Engineer. The Owner's Representative will provide a meeting agenda and administer the meeting.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units off the ground on platforms that allow air circulation under stacked units.
- B. Cover and protect masonry units against wetting prior to use.
- C. Handle masonry units on pallets or flat bed barrows.

1.06 PROJECT CONDITIONS

- A. Environmental Requirements; Cold Weather Conditions:
 - 1. At temperatures below 40 degrees F, maintain mortar temperature between 40 degrees F and 120 degrees F. If necessary, heat mixing water and sand to produce the required results.
 - 2. At temperatures between 40 degrees F and 32 degrees F, protect masonry from rain and snow for 24 hours after laying.
 - 3. At temperatures between 32 degrees F and 20 degrees F, provide wind breaks and cover the masonry to prevent wetting and freezing. Maintain masonry above freezing for not less than 24 hours using auxiliary heat or insulating blankets.
 - 4. At temperatures below 20 degrees F, provide heated enclosures for laying the masonry. At the end of the workday, maintain the enclosures and keep the Work from freezing for not less than 24 hours.
 - 5. Do not lower freezing point of mortar by use of antifreeze, calcium chloride or other additives.
 - 6. Do not use frozen materials or materials coated with ice or frost.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Hollow Load-Bearing Units: ASTM C 90.
- J. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required. All concrete masonry units must be certified to contain a minimum of 30 percent pre-consumer (post-industrial) recycled content.

2.02 PRECAST CONCRETE LINTELS

- A. Lintels In Interior Walls Carrying Wall Loads Only: Lightweight concrete, 3000 psi minimum compressive strength at 28 days.
- B. Lintels Exposed On Exterior and Lintels Carrying Floor or Roof Loads: Normal weight concrete, 4000 psi minimum compressive strength at 28 days.

- C. Finishes:
 - 1. Surfaces Not Exposed To View: Smooth form finish.
 - 2. Interior Surfaces Exposed To View: Grout cleaned finish or match the finish of adjacent concrete masonry units.
 - 3. Exterior Surfaces Exposed To View: Smooth rubbed finish.
 - 4. Surfaces To Be Plastered: Roughened surface that will afford firm plaster bond.
- D. Reinforcement: Reinforce precast concrete lintels as shown, or if not shown, as required to support the load in accordance with ACI Standard "Building Code Requirements for Reinforced Concrete" (ACI 318).
 - 1. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.
 - 2. Fabric Reinforcement: ASTM A 185, welded wire fabric.
 - 3. Steel Wire: ASTM A 82, cold-drawn plain steel wire.
- E. Bearing: 8 inches minimum bearing at each end, unless otherwise shown on the Drawings.

2.03 ACCESSORIES

- A. Masonry Wall Reinforcement: Joint reinforcement factory fabricated from cold-drawn steel wire, ASTM A 82, truss or ladder design, with 9 gage deformed steel wire longitudinal rods welded to 9 gage steel wire cross ties spaced 16 inches oc; width 1-1/2 to 2 inches less than total wall thickness. Furnish factory-fabricated corner and tee sections for corners and wall intersections.
 - 1. Finish for Exterior Walls: 1.5 oz per sq ft hot dipped galvanized after fabrication, ASTM A 153, Class B-2.
 - 2. Finish for Interior Walls: 0.8 oz per sq ft mill galvanized, ASTM A 641, Class 3, except interior walls exposed to moist environment shall have finish specified for exterior walls.
 - 3. Provide units with adjustable 2 piece rectangular ties where horizontal joints of facing wythe do not align with those of back-up.
- B. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.
 - 1. Rebar Positioner: Fabricate from galvanized steel wire, 9 gage or 6.5 gage as required. Design to fit concrete masonry units, and number, size and location of rebars indicated. Products; Steel-Wich Telescoping Rebar Positioner or No. 376 Rebar Positioner or No. 377 Rebar Positioner by Heckmann Building Products, Inc., 1501 N. 31st Ave., Melrose Park, IL 60160, (800) 621-4140, www.heckmannbuildingprods.com.
- C. Metal Lath: Galvanized, expanded metal lath weighing not less than 3.4 pounds per square yard.
- D. Hardware Cloth: 16 gage, 1/2 inch square mesh, galvanized steel wire mesh.

2.04 SOURCE QUALITY CONTROL

- A. Tests: Sample and test concrete masonry units in accordance with ASTM C 140 and ASTM C 426. Have tests performed by a qualified independent testing laboratory.

PART 3 EXECUTION

3.01 PREPARATION

- A. Lay out walls and partitions with one course of unit masonry, or other suitable means, to define the spaces, locations of doors and other openings, and to serve as a guide for other trades in the installation of conduits, pipes, etc.
- B. Allow other trades sufficient opportunity to install built-in Work before proceeding with the walls and partitions. Do not cover pipes, conduit, or ductwork in masonry until directed by the Owner's Representative.
- C. Clean off supporting surface under first course of masonry just prior to laying the masonry units.
- D. Protection:
 - 1. Protect face materials against staining.
 - 2. Remove misplaced mortar immediately.
 - 3. Protect sills, ledges, off-sets, and similar items from mortar drippings and other damage during construction.
 - 4. Protect newly laid masonry from exposure to precipitation, excessive drying, freezing, soiling, backfill, and other harmful elements.
 - 5. Cover top of walls with non-staining waterproof covering when Work is not in progress. Place with minimum 2-foot overhang of protective covering on each side of wall and securely anchor.

3.02 INSTALLATION

- A. Install concrete masonry units plumb and true to line in level courses accurately spaced.
- B. Lay masonry units in running bond, with vertical joints located at center of units in course below, unless otherwise indicated on the Drawings.
- D. Lay only dry masonry units.
- E. Adjust units to final position while mortar is soft and plastic. Remove units disturbed after mortar has stiffened; clean joints and units of mortar and re-lay in fresh mortar.
- F. Lay out Work to avoid use of less than half-size units. Where cutting of masonry units is necessary, cut with a power saw.

- G. Where fresh masonry joins partially or totally set masonry, clean bond surfaces of set masonry, removing loose mortar and foreign material prior to laying fresh masonry.
- H. If it is necessary to stop off a horizontal run of masonry, rack back one-half unit length in each course. Toothing will not be permitted unless approved in writing by the Owner's Representative.
- I. Cavity Wall Construction: Keep cavities clean of mortar droppings.

3.03 INSTALLATION TOLERANCES

- A. Variation from the Plumb:
 - 1. In the lines and surfaces of columns, walls, and arises:
 - a. In 10 feet: 1/4 inch.
 - b. In any story or 20 feet maximum: 3/8 inch.
 - c. In 40 feet or more: 1/2 inch.
 - 2. For external corners, control joints, and other conspicuous lines:
 - a. In any story or 20 feet maximum: 1/4 inch.
 - b. In 40 feet or more: 1/2 inch.
- B. Variation from the Level or Grades indicated on the Drawings:
 - 1. For exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:
 - a. In any bay or 20 feet maximum: 1/4 inch.
 - b. In 40 feet or more: 1/2 inch.
- C. Variation of the Linear Building Lines from Established Position in Plan and Related Portion of Columns, Walls, and Partitions:
 - 1. In any bay or 20 feet maximum: 1/2 inch.
 - 2. In 40 feet or more: 3/4 inch.
- D. Variation in Cross-sectional Dimensions of Columns and in the Thickness of Walls: Minus 1/4 inch; plus 1/2 inch.
- E. Surface Plane Tolerance for Concrete Unit Masonry to Receive High-build Glazed Coating or Thin-set Tile: 1/8 inch in 10 feet in all directions.

3.04 MORTAR BEDS

- A. Hollow Units:
 - 1. Lay with full mortar coverage on horizontal and vertical face shells.
 - 2. Bed webs in mortar also at the following locations:
 - a. All courses of piers, columns and pilasters.
 - b. Starting course on footings and solid foundation walls.
 - c. Adjacent to cells or cavities to be reinforced or filled.
 - d. Within 1'-6" of each side of openings.

- B. Solid Units: Lay with full mortar coverage on horizontal and vertical joint surfaces.

3.05 JOINTS

- A. Horizontal and Vertical Face Joints:
 - 1. Nominal Thickness: 3/8 inch, unless otherwise indicated.
 - 2. Construct uniform joints.
 - 3. Strike joints flush in surfaces to be plastered, stuccoed, or covered with other masonry or other surface applied finish other than paint and high-build glazed coating.
 - 4. Cut joints flush and tool slightly concave on both sides of other walls and partitions, including inner wythe of exterior cavity walls.
 - 5. Point joints tight in unparged masonry below ground.
- B. Fill horizontal joint between top of masonry partitions and underside of concrete slabs and beams with mortar, unless otherwise shown on the Drawings.
- C. Remove mortar protruding into cells or cavities to be reinforced or filled.

3.06 HORIZONTAL JOINT REINFORCEMENT

- A. Reinforce horizontal joints of concrete unit masonry with continuous masonry wall reinforcement at the following locations:
 - 1. Exterior walls.
 - 2. Interior load-bearing walls.
 - 3. Straight runs of interior non-load-bearing partitions and walls that exceed 20 feet in length or exceed 12 feet in height, including partitions and walls having door and window openings.
 - 4. Joint immediately above and below openings in walls and partitions for a length 4 feet longer than opening.
- B. Install masonry wall reinforcement in horizontal joints as follows:
 - 1. Space reinforcement every 16 inches vertically, except space 8 inches in parapet walls.
 - 2. Straighten kinks or bends in the wires caused by handling, without injury to the material, before placing in masonry.
 - 3. Place longitudinal wires over face shell mortar beds.
 - 4. Embed entire length of longitudinal wires fully in mortar.
 - 5. Provide minimum mortar cover of 5/8 inch on exterior side of exterior walls and 1/2 inch at other locations.
 - 6. Lap ends of adjoining strips of reinforcement 6 inches or more.
 - 7. Install factory fabricated corner and tee sections at corners and wall intersections respectively.
 - 8. Cut reinforcement one inch short of each side of control and expansion joints.
 - 9. Install additional lengths of reinforcement in first unreinforced joint above and below openings, centered on opening.

3.07 TYING ADJACENT WYTHES

- A. N/A

3.08 BONDING WITH MASONRY

3.09 TYING INTERSECTING WALLS AND PARTITIONS

- A. Except where masonry bond is specified, terminate abutting walls and partitions flush against the face of the abutted walls. Tie intersections at every second course as follows:
1. Load-Bearing Walls: Install tiebars. Embed bent ends in cells filled with mortar. Install pieces of metal lath under the cells to support the mortar fillings.
 2. Non-Load-Bearing Walls: Install ties of masonry wall reinforcement tee sections or strips of hardware cloth embedded in mortar.
 - a. Center standard length masonry wall reinforcement tee sections on the walls.
 - b. Width of hardware cloth strips shall be the width of the abutting wall less 1-1/2 inches; length shall be 24 inches or twice the width of the abutted wall, whichever is greater. Center the strips on the abutting wall and extend across intersection to 3/4 inch from the farthest face of the abutted wall.
- B. Fill vertical joint at abutted walls and partitions solid with mortar at intersection. If a control joint is located at the intersection, rake out both sides of joint to a depth of 3/8 inch.

3.10 ANCHORING

- A. Anchor walls adjoining or intersecting structural framing and dependent upon structural framing for lateral support to structural members with flexible anchors. Build wire tie section into wall and secure other piece of anchor to structural member.
1. Space anchors 16 inches oc, unless otherwise shown on the Drawings.
- B. Anchoring Partitions and Infill Abutting Existing Construction: Install buck anchors in bed joints 16 inches oc vertically. Embed one bent end in cell filled with mortar. Install piece of metal lath under the cell to support the mortar filling. Expansion bolt other bent end to existing construction.

3.11 WEEP HOLES

- A. N/A

3.12 BUILT-IN WORK

- A. Avoid cutting and patching.

- B. Build-in bolts, anchors, nailing blocks, inserts, frames, vents, flashings, conduit and other items as masonry Work progresses.
- C. Fit masonry units closely around built-in Work. Fill voids around built-in items with mortar for anchorage. Solidly fill space between masonry and metal frames with mortar.
- D. Unless otherwise shown on the Drawings, construct 1/4 inch to 3/8 inch wide open joint around outside perimeter of exterior door and window frames and other framed exterior wall openings to receive sealant. Rake joints and tool smooth to a uniform depth of 1/4 inch.
- E. Installing In-Wall Flashings:
 - 1. Clean contact surfaces and remove projections that might puncture the flashing. Place flashing on bed of mortar and cover with mortar.
 - 2. Where bar reinforcement punctures the wall flashing, cut the flashing as close as possible to form a tight fit around the reinforcement.
 - 3. Apply trowel grade asphalt roof cement completely around the penetrations.
 - 4. Place flashings on bed of mortar and cover with mortar.
 - 5. At base of wall only, extend flashing 1/2 inch beyond the face of the wall and turn down at 45 degrees to form a drip at building foundation wall.
 - 6. At all other locations, after the Owner's Representative has inspected and approved flashing, cut flashing 1/4 inch beyond the face of the wall and turn down at 45 degrees to form a drip. Retool joint as required.
 - 7. Extend thru wall flashing a minimum of 16 inches vertically up from relieving angle and concrete shelf.
 - 8. Installing Compression Bar: Install a continuous metal compression bar over the flashing where indicated on the Drawings and secure one foot on center. Apply a bead of Type 1 Sealant along the top edge of the flange.
 - 9. Form inside and outside corners using splice pieces. Splice pieces to be a minimum of 12 inches on each side of corner, install in accordance with the manufacturer's printed details, lap ends and edges a minimum of 6 inches, apply trowel grade asphalt roof cement between all flashing layers.
- F. Installing Thru-Wall Cap Flashing Receivers:
 - 1. Set the receiver so there is mortar above and below the built-in portion.
 - 2. Do not mallet, bend or deform the exposed portion.
 - 3. Lap all end joints so they interlock at the first raised rib. Apply Type 3 sealant between the mating surfaces of the built-in portion of the receiver before interlocking end joints.
- G. Installing Cap Flashing in Receivers:
 - 1. Insert the cap flashing into the receiver-locking slot. Apply upward pressure along the entire length of the cap flashing so that it is securely locked into position

- H. Fire Hose and Master Mixing Valve Cabinets: Install and build-in cabinets furnished by the plumbing contractor.
- I. Fire extinguisher Cabinets: Install and build-in cabinets where shown.

3.13 CHASES

- A. Build chases in; do not cut.
- B. Minimum Installation Distance From Jambs of Openings: One concrete masonry unit length.

3.14 CONTROL JOINTS

- A. Install control joints at locations shown on the Drawings. If locations of control joints are not shown, provide vertical control joints spaced not to exceed 35 feet; locate joints at points of natural weakness in the masonry Work.
- B. Mortar Control Joints: Fill abutting cells of masonry units with mortar after installing asphalt felt at one side of joint to break the bond. Rake out joints to a depth of 3/8 inch.
- C. Premoulded Control Joint Strips: Install joint strip as the Work progresses. Compress strips as masonry units are laid.

3.15 EXPANSION JOINTS

- A. Install expansion joints at locations shown on the Drawings. Keep joints free of mortar and debris.
- B. Build flanges of metal expansion strips into masonry. Lap joints between metal strips 4 inches in direction of flow. Solder joints between metal strips below grade and at junctures with horizontal expansion joints.

3.16 LINTELS

- A. Install precast concrete lintels over all openings 14 inches or more in width in masonry walls, except where steel lintels are shown.
- B. Center lintel over opening. Set in full bed of mortar under each end.

3.17 REINFORCING WALLS AND PARTITIONS WITH BAR REINFORCEMENT AND GROUT

- A. Place bar reinforcement in cells and cavities in the masonry where shown on the Drawings. Secure bars in designed locations with rebar positioners.

- B. Grouting: Completely fill cells and cavities in the masonry with grout where shown on the Drawings. Puddle or slightly vibrate grout during placement.
 - 1. Placement Procedure: Use low-lift grouting procedure. Place in lifts or layers up to maximum of 5 feet in height, except where otherwise shown on the Drawings. Stop level of grout in each lift approximately 1-1/2 inches from top of masonry, except the last lift shall finish flush with the top of masonry.

3.18 FIELD QUALITY CONTROL

- A. Tests: 6 sample masonry units of each kind specified may be selected by the Owner's Representative from the masonry units delivered to the site for testing purposes. Package and ship selected sample units to the Division of Construction's Albany address for transmittals indicated in Section 013300.

3.19 POINTING AND CLEANING

- A. Cut off mortar projections remaining from tooling joints.
- B. Dry brush masonry Work after mortar has set, at end of each day's Work and after final pointing.
- C. At completion of masonry Work, fill holes in joints (except weep holes) and tool.
- D. Remove and replace CMU that are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjacent units. Install new units to match adjoining units in fresh mortar, point joints to eliminate any evidence of block replacement.
- E. Cut out and repoint defective joints.
- F. Leave Work and surrounding surfaces clean and free of mortar spots and droppings.

3.20 CONCRETE MASONRY UNIT SCHEDULE

- A. Unless shown otherwise on the Drawings, use the various kinds of concrete masonry units specified at the locations indicated below:
 - 1. Hollow Load-Bearing Units (Normal Weight):
 - a. Use for exposed exterior Work.
 - b. Use for Work in which the same masonry units are exposed on both the interior and exterior.

END OF SECTION

SECTION 051200

STRUCTURAL STEEL

PART 1 GENERAL

1.01 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

1.02 RELATED WORK SPECIFIED ELSEWHERE

1.03 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall meet the requirements of the following:
 - 1. Design, Fabrication, and Erection: "Specification for Structural Steel Buildings, Allowable Stress Design and Plastic Design", June 22, 2010, by the American Institute of Steel Construction (AISC Specification).
 - 2. Standard Practice: Fabrication and erection practices shall comply with the "Code of Standard Practice for Steel Buildings and Bridges", April 14, 2010, by the American Institute of Steel Construction (AISC Code).
 - 3. Welding: "Structural Welding Code - Steel, AWS D1.1", by the American Welding Society (AWS Code).
 - 4. High-Strength Bolting: "Specification for Structural Joints Using High Strength Bolts", December 31, 2009, by the Engineering Foundation's Research Council on Structural Connections (Specification for Structural Joints).
 - 5. Cleaning Steel: Comply with the appropriate specifications (SSPC SP-X) by the Steel Structures Painting Council.

1.04 DEFINITIONS

- A. AISC Manual: Where reference is made to the AISC Manual, it shall mean the Manual of Steel Construction, Fourteenth Edition, of the American Institute of Steel Construction.

1.05 REQUIREMENTS FOR CONNECTIONS

- A. General:
 - 1. Size connections for the loads indicated on the Drawings. If the loads are not indicated, use a connection whose capacity is half the total uniform load capacity shown in the "Allowable uniform loads in kips for beams laterally supported" tables in the AISC Manual for the given shape, span, and steel specification of the beam in question, unless otherwise indicated.
 - 2. All bolted connections shall have a minimum of two bolts.

- B. Shop Connections: Welded or high strength bolted, unless otherwise indicated. Field connections required to be welded or fully-tensioned high-strength bolted shall meet the same requirements when fabricated in the shop.
- C. Field Connections:
 - 1. The following field connections shall be welded or fully-tensioned high strength bolted as indicated on the Drawings or, when not indicated, shall be either welded or fully-tensioned high strength bolted at the Contractor's option:
 - a. Column bracing.
 - b. Connections for support of machinery.
- D. Standard Beam Connections:
 - 1. Unless otherwise shown on the Drawings or required in the Specifications, all beam connections shall be framed in accordance with Part 4 of the AISC Manual, with sizes and lengths of angles and welds and with fasteners spacings as shown therein.
 - 2. Standard beam connections shown on the Drawings shall be fabricated as detailed. Substitutions will not be approved.
- E. High-Strength Bolted Connections: Amend the Specification for Structural Joints as follows:
 - 1. In Item 3(b) of the specification, change the second sentence to read "Burrs shall be removed."
 - 2. In Item 3(c) of the specification, delete the last two sentences, and add the following sentence: "Flame cut surfaces shall be ground smooth."
 - 3. In Item 7(b)(1) of the specification, add the following to the last sentence: ", except that oversize holes shall not be used in connections with galvanized faying surfaces."
 - 4. In Item 7(b)(2) of the specification, add the following to the last sentence: ", except that short slotted holes shall not be used in connections with galvanized faying surfaces when the force on the joint is in a direction other than normal to the axis of the slot."
 - 5. In Item 7(b)(3) of the specification, add the following to the last sentence: ", except that long slotted holes shall not be used in connections with galvanized faying surfaces when the force on the joint is in a direction other than normal to the axis of the slot."
 - 6. Change Item 7(c)(3) of the specification to read as follows: "All fully-tensioned high-strength bolts shall have a hardened washer under the element (nut or bolt head) turned in tightening, regardless of the method of tightening."
 - 7. In Item 8(b) of the specification, change the first sentence to read: "A tension measuring device shall be required at all work sites where high-strength bolts are being installed."
 - 8. In Item 8(c) of the specification, delete the second and third sentences and add the following sentence: " The snug-tight condition is defined as the tightness attained by either a few impacts of an impact wrench or the full effort of a worker with an ordinary spud wrench that brings the connected plies into firm contact."

9. Change the last sentence in Item 8(c) to read "Unless otherwise required in the Specifications, bolts required to be fully-tensioned shall be identified on the Drawings. All other bolts need only be tightened to the snug tight condition."
 10. In Item 9(b) of the specification, delete "Arbitration" from the heading. Also change the first paragraph to read: "When high-strength bolts have been installed by any of the tightening methods in Item 8(d), the following inspection procedure shall be used."
 11. In Item 9(c) of the specification, delete "arbitration" from the last sentence.
 12. In Item 9 of the specification, the inspection of bolt tightening shall be as specified under Item 9(b). Furnish the calibration device and the inspection torque wrench, and make them available, upon request, to representatives of the State or designated inspection laboratory during the entire period when steel is being fabricated and erected. The inspection torque wrench shall be capable of indicating that the job inspecting torque has been reached by a second method in addition to direct observation of the wrench dial. The inspection wrench calibration and the bolt tightening inspection shall be performed by the Contractor, and shall be witnessed by a representative of the Director or the designated inspection laboratory.
- F. Design, Fabrication and Erection (Amendments to the AISC Specification):
1. In Item A6. of the specification, change "American Welding Society" to "American Welding Society (Latest Adoption Date)". Delete the date from all referenced AWS Codes.
 2. In Item J1.8. of the specification, change the last sentence to read: "Weld access holes and beam copes in other shapes shall be ground smooth, but need not be inspected by dye penetrant or magnetic particle methods."
 3. In Item J1.8. of the specification, delete "or with A307 bolts" from the second paragraph.
 4. In Item J2. of the specification, change the introductory sentence to read: "All provisions of the American Welding Society Structural Welding Code-Steel, AWS D1.1, except Sections 2.3.2.4, 2.5, 8.13.1 and 9, apply to work performed under this Specification."
 5. In Item J3.2.c of the specification, change the first sentence to two sentences as follows: "Oversized holes are permitted in any or all plies of slip-critical connections, except those with galvanized faying surfaces. Oversized holes shall not be used in slip-critical connections with galvanized faying surfaces, or in bearing-type connections."
 6. In Item J3.2.d. of the specification, change the second sentence to two sentences as follows: "Short-slotted holes are permitted without regard to direction of loading in slip-critical connections, except those with galvanized faying surfaces. The length of the slot shall be normal to the direction of the load in slip-critical connections with galvanized faying surfaces and in bearing-type connections."

7. In Item J3.2.e of the specification, change the second sentence to two sentences as follows: "Long-slotted holes are permitted without regard to direction of loading in slip-critical connections, except those with galvanized faying surfaces. The length of the slot shall be normal to the direction of the load in slip-critical connections with galvanized faying surfaces and in bearing-type connections."
 8. In Item M2.2. of the specification, delete the first two paragraphs.
 9. In Item M2.5. of the specification, change the second sentence of the fifth paragraph to read: "Burrs shall be removed."
 10. Delete Item M4.5. of the specification in its entirety.
 11. In Item M5.4. of the specification, delete "Slip-critical" from the heading and delete "slip-critical" from the first sentence.
- G. Fabrication and Erection (Amendments to the AISC Code):
1. In Item 4.1. of the code, delete the last sentence of the first paragraph.
 2. In Item 5.1. of the code, change the first paragraph to read: "Contract Drawings are not considered released for construction. Orders for materials may be placed only after approval of erection drawings or written approval of the Director."

1.06 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for all structural steel. Machine duplicated copies of Contract Drawings will not be accepted as shop drawings. Shop drawings shall be standard 24 by 36 inch size sheets. The fabricator's name, address, and telephone number shall be indicated in the title block on each drawing.
1. Include anchor bolt and base plate plans, erection drawings, and detail drawings for all members.
 2. Indicate shop and field welds by standard AWS welding symbols in accordance with AWS A2.4.
 3. When shop drawings are marked "Approved as Noted", promptly resubmit copies of corrected shop drawings for formal approval and record.
 4. Contract Drawings are not considered released for construction. Orders for materials may be placed only after approval of erection drawings or written approval of the Director.
- B. Product Data:
1. Shop Paint: Manufacturer's name and printed product literature, including storage and application instructions.
- C. Quality Control Submittals:
1. Certificates: Submit evidence, in triplicate, of steel material compliance with this Specification. Evidence shall consist of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.

2. Fabricator's and Erector's Qualifications Data: Name and experience of fabricator and erector.

1.07 QUALITY ASSURANCE

- A. Fabricator's and Erector's Qualifications: The fabricator and erector shall be experienced in structural steel work and shall be subject to the approval of the Director.
- B. Inspection: Shop and field quality assurance inspection may be made by the State. If quality assurance inspection is made by the State, it shall not relieve the fabricator and erector of responsibility for their own quality control programs.
- C. Galvanizing: Stamp galvanized items with galvanizer's name, weight of coating, and applicable ASTM number.

1.08 WELDING PROCESS

N/A

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of anchor bolts and other anchorage devices to be built into other construction to avoid delay.
- B. Upon delivery to the site, promptly cover and protect steel items (which are not required to receive shop paint) from rusting.
- C. Store shop paint in accordance with paint manufacturer's printed instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Structural Steel: ASTM A 36, except as specified or shown otherwise.
- B. Anchor Bolts, Miscellaneous Rods and Anchors, and Other Detail Material Not Proportioned for Calculated Stress: ASTM A 36; or ASTM A 675, Grade 70.
- C. Shop Paint (General): Steel primer selected from the following:
 1. TNEMEC 10-99 (Red), 10-99G (Green) or 10-1009 (Gray).
 2. Rust-Oleum 769.
 3. Valspar 13-R-53.
 4. Sherwin-Williams "Kromik".

D. Bedding Mortar:

1. Shrink-Resistant Grout (Non-Staining): Factory-packaged, non-ferrous mortar grouting compound selected from the following:
 - a. Masterflow 713 by Master Builders, 23700 Chagrin Blvd., Cleveland, OH 44122 (800) 227-3350.
 - b. SonogROUT by Sonneborn, Chemrex, Inc., 57-46 Flushing Ave., Maspeth, NY 11378, (800) 433-9517.
 - c. Five Star Grout by Five Star Products, Inc., 425 Stillson Rd., Fairfield, CT 06430, (800) 243-2206.
 - d. Crystex by L&M Construction Chemicals, 14851 Calhoun Rd., Omaha, NB 68152, (800) 362-3331.
 - e. Non-Corrosive, Non-Shrink Grout by A.C. Horn, Inc., Tamm Industries, 7405 Production Dr., Mentor, OH 44060, (800) 862-2667.

2.02 FABRICATION

- A. Do not commence fabrication until the fabricator has been approved and the fabrication schedule has been coordinated with the designated Quality Assurance inspection agency (independent inspection laboratory or the State).
 1. Give the Director's Representative one week advance notice of the commencement of fabrication.
- B. Progress shop fabrication from "Approved" or "Approved as Noted" detail drawings only.
 1. When detail drawings are "Approved as Noted", progress fabrication in strict accordance with notes thereon.
 2. Fabrication progressed from "DISAPPROVED" or "RETURNED FOR CORRECTION" detail drawings will be rejected. The contractor shall have no claim against the State for any costs or delays due to rejection of items fabricated from "DISAPPROVED" or "RETURNED FOR CORRECTION" detail drawings.
- C. Finish column ends at base plates and at load carrying cap plates to a true plane square to the column, with a maximum American National Standards Institute surface roughness value of 500 microinches.
- D. Pipe and Tube Columns: Shop weld a closure plate to top of columns to form a watertight closure.
- E. Loose Lintels: Furnish lintels of length to have 6 inches minimum bearing at each end.
- F. Make provisions for connections of other Work, including all cutting and punching of structural members where required by the Drawings, or for which information is furnished prior to approval of the shop drawings.

- G. Prepare material in accordance with Section 3 of the AWS Code. Do not use gas or air carbon-arc cutting to cut or enlarge bolt holes.
- H. Galvanizing: Unless otherwise specified or noted, items indicated to be galvanized shall receive a zinc coating by the hot-dip process, after fabrication, complying with the following:
N/A
- I. Cleaning Steel: Thoroughly clean all structural steel. Remove oil, grease, and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning". Remove loose mill scale, loose rust, weld slag and spatter, and other detrimental material in accordance with SSPC SP-2 "Hand Tool Cleaning", SSPC SP-3 "Power Tool Cleaning", or SSPC SP-7 "Brush-Off Blast Cleaning".
- J. Shop Painting:
 - 1. Galvanized Items:
 - a. N/A
 - 2. Apply one coat of shop paint to all steel surfaces except as follows:
 - a. Do not paint steel members designated "NP" on the Drawings".
 - b. Do not shop paint steel surfaces to be field welded, contact surfaces of high-strength bolted slip critical connections, and steel to be encased in cast-in-place concrete.
 - c. Apply 2 coats of shop paint, before assembly, to steel surfaces inaccessible after assembly, except surfaces in contact.
 - d. Do not paint galvanized items which are not to be finish painted under Section 099101.
 - 3. Apply paint and compound on dry surfaces in accordance with the manufacturer's printed instructions, and to the following minimum thickness per coat:
 - a. Shop Paint (General): 4.0 mils wet film.
 - b. Shop Paint for Galvanized Steel: 3.0 mils wet film.
 - c. Cold Galvanizing Compound: 2.0 mils dry film.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect steel in accordance with the AISC Specification, the AISC Code, the AWS Code and the Specification for Structural Joints, except as otherwise specified.
- B. Prepare and place shrink-resistant grout in accordance with grout manufacturer's printed instructions.
 - 1. Comply with manufacturer's instructions for preparation of surfaces in contact with grout, and for curing and protection of grout.
- C. Do not use gas or air carbon-arc cutting to cut or enlarge bolt holes.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- D. Do not make corrections or alterations to fabricated steel without prior written approval by the Director's Representative.

3.02 SCHEDULE OF GALVANIZED STRUCTURAL STEEL

N/A

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preservative treatment of wood.
- B. Miscellaneous framing, shims, battens, blocking and sheathing.

1.02 RELATED SECTIONS

1.03 REFERENCES

- A. AFPA WCD 1 T11 - Manual for Wood Frame Construction; American Forest and Paper Association.
- B. AWWA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
- C. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- D. SPIB (GR) - Standard Grading Rules for Southern Pine Lumber; Southern Pine Inspection Bureau, Inc..

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
- B. Exposed-to-View Rough Carpentry: Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Moisture Content: Kiln-dry or MC15.
- D. Specie and Grade: No. 2 Select Structural or Dense Select Structural, Southern Yellow Pine; preservative treated.
- E. Miscellaneous Blocking, Furring, and Nailers; preservative treated.
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.02 EXPOSED DIMENSION LUMBER

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Moisture Content: Kiln-dry or MC15.
- D. Specie and Grade: For all other exposed applications No. 2 Select Structural or Dense Select Structural, Southern Yellow Pine; preservative treated.

2.03 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot-dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
- B. Joist Hangers and other metal anchors or connection devices: Hot dipped galvanized steel, sized to suit framing conditions. Provide recommended devices manufactured by Simpson or equal.

2.04 FACTORY WOOD TREATMENT

- A. Pressure Treatment of Lumber Above Grade: AWP Treatment C2 using waterborne preservative to 0.25 lb/cu ft retention.
 - 1. Kiln dry after treatment to maximum moisture content of 15 percent.
 - 2. Treat all wood to be used in an exterior environment.
 - 3. Treat wood in contact with masonry or concrete.
 - 4. Treat wood less than 18 inches above grade.
 - 5. Treat wood in contact with grade.
- B. Pressure Treatment of Lumber in Contact with Soil: AWP Treatment C2 using waterborne preservative designated in AWP C2 as suitable for ground contact use to 0.4 lb/cu ft retention.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Set wood members level, plumb, and true to line. Discard pieces with defects that would lower

required strength or result in unacceptable appearance or application.

- B. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA WCD 1 T11.
- C. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.02 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.03 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors or Walkways): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 078400

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping materials.
- B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not, and other openings indicated.
 - 1. Firestopping shall be applied where required by code and/or where required by authorized code officials.
 - 2. Firestopping shall be applied to all penetrations through fire rated assemblies including, but not limited to, pipes, conduits, structural members, ducts, cables, and similar items.
 - 3. The application of firestopping is understood and typical for penetrations through fire rated assemblies, floors, walls, chases and otherwise, and is, generally, not specifically identified on the Drawings.
 - 4. Firestopping shall be applied to all such penetrations whether or not it is indicated on the Drawings.

1.02 RELATED SECTIONS

- A. Section 014500 - Cutting and Patching
- B. Section 081100 - Custom Steel Frames
- C. Section 092600 - Gypsum Board Assemblies

1.03 REFERENCES

- A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 1997.
- B. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- D. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. See Section on Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, firestopping test or design number, and type of firestopping which is appropriate for each type of penetration. Provide in all locations where required by code and whether or not "firestopping" is indicated on the Drawings.
- C. Product Data: Provide data on product characteristics.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Certificate from authority having jurisdiction indicating approval of materials used.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs which provide the scheduled fire ratings when tested in accordance with methods indicated and ASTM E 119.
 - 1. Listing in the current classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 - 2. Current evaluation reports published by CABO, ICBO, or BOCA will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

1.06 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on project.
 - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
- B. Obtain approval of authority having jurisdiction before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.
- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING ASSEMBLIES

- A. Firestopping: Any material meeting the requirements and which will be inconspicuous when used in conjunction with scheduled finishes and architectural details.
 - 1. Coordinate selection of materials with scheduled finishes to be applied to the surface.
 - 2. Do not use firestopping materials or methods which will conflict with finish systems.
 - 3. Fire Ratings: See Drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.
- B. Verify if firestopping will be used in conjunction with an architectural detail and/or finish. Select firestopping method which will be inconspicuous.
- C. Verify method of firestopping to be used for each penetration. Drawings do not indicate type of firestopping.
- D. Verify what finishes, if any, are scheduled for each area and coordinate firestopping work so as not to conflict with the scheduled finishes.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Coordinate installation to permit the installation of finishes and other subsequent work
- D. Install labeling required by code.

3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces of firestopping materials.
- B. Protect adjacent surfaces from damage by material installation.
- C. Remove excess materials which may conflict with subsequent work and which are not necessary to provide required fire rating

END OF SECTION

SECTION 079000

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.

1.02 RELATED SECTIONS

- A. Section 078400 - Firestopping: Firestopping sealants.
- B. Section 099000 - Paints and Coatings

1.03 REFERENCES

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2000.
- B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 1998.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 1998.
- D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.
- E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam); 1997.

1.04 SUBMITTALS

- A. Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.
- C. Samples: Submit three samples, 3/8 x 6 inch in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Schedule: Installer/applicator shall submit a detailed schedule of all conditions requiring sealant and the proposed sealant assembly to be used for each condition.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years experience.

1.06 MOCK-UP

- A. Provide mock-up of sealant joints in conjunction with window
- B. Construct mock-up with specified sealant types and with other components noted.
 - 1. Provide mock-up for all exterior wall assemblies
 - 2. Provide mock-up for interior assemblies where sealant will be visible.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work wherever the particular mock up may remain part of the Work.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

- A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

- A. Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five-year period after Date of Substantial Completion.
 - 1. Where the manufacturer, as a standard feature, provides a warranty which exceeds five years, that warranty shall become the warranty which shall apply to this Project.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, watertight seal, and acoustical, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silicone Sealants:
 - 1. Bostik: www.bostik.com.
 - 2. Dow Corning Corp: www.dowcorning.com.
 - 3. GE Plastics: www.geplastics.com.
 - 4. Pecora Corporation: www.pecora.com.
 - 5. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 - 6. Tremco, Inc: www.tremcosealants.com.
 - 7. Substitutions: See Section 016000 - Product Requirements.
- B. Polyurethane Sealants:
 - 1. Bostik: www.bostik.com.
 - 2. Pecora Corporation: www.pecora.com.
 - 3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 - 4. Tremco, Inc: www.tremcosealants.com.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- C. Polysulfide Sealants:
 - 1. Morton International, Inc.
 - 2. Pecora Corporation: www.pecora.com.

3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 4. Substitutions: See Section 016000 - Product Requirements.
- D. Acrylic Sealants:
1. Tremco, Inc: www.tremcosealants.com.
 2. Substitutions: See Section 016000 - Product Requirements.
- E. Butyl Sealants:
1. Bostik: www.bostik.com.
 2. Tremco, Inc: www.tremcosealants.com.
 3. Substitutions: See Section 016000 - Product Requirements.
- F. Acrylic Emulsion Latex Sealants:
1. Bostik: www.bostik.com.
 2. Pecora Corporation: www.pecora.com.
 3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 4. Tremco, Inc: www.tremcosealants.com.
 5. Substitutions: See Section 016000 - Product Requirements.
- G. Preformed Compressible Foam Sealers:
1. Emseal Joint Systems, Ltd: www.emseal.com.
 2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
 3. Polytite Manufacturing Corporation: www.polytite.com.
 4. Substitutions: See Section 016000 - Product Requirements.

2.02 SEALANTS

- A. Type E2 - General Purpose Exterior Sealant: Acrylic, solvent release curing; ASTM C 920, Grade NS, Class 12-1/2, Uses M, G, and A; single or multi- component; paintable. To be used where sealant is to be painted along with the adjacent materials, otherwise use Type E1.
1. Applications: Use for Joints which will be field painted:
- B. Type E3 - Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
1. Color: Black.
 2. Size as required to provide weathertight seal when installed.
 3. Provide product recommended by manufacturer for traffic-bearing use.
 4. Applications: Use for:
 - a. Exterior wall expansion joints.
- C. Type I-1 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
1. Color: Standard colors matching finished surfaces, except where sealant is to be painted.
 - a. Color where sealant is to be painted: off-white color.
 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Joints between countertops, without sinks, and wall surfaces.
 - d. Other interior joints for which no other type of sealant is indicated.
- D. Type I-2 - Shower/Tile Sealant: White silicone; ASTM C 920, Uses M and A; single component, mildew resistant.
1. Applications: Use for:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between countertops with sinks and wall surfaces.
 - c. Joints in tile work.

- E. Type A-1 - Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
 - 1. Applications: Use for concealed locations only at assemblies which have acoustical insulation or sound resistant doors and frames.
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
 - b. Seal electrical, mechanical and other items which penetrate partitions identified to have acoustical insulation.
- F. Type SL-1 - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; single component.
 - 1. Approved by manufacturer for wide joints up to 1-1/2 inches.
 - 2. Color: Standard colors matching finished surfaces.
 - 3. Applications: Use for:
 - a. Expansion joints in floors.
- G. Type S-1 - Silicone Sealant: ASTM C 920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding.
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Movement Capability: Plus and minus 25 percent.
 - 3. Service Temperature Range: -65 to 180 degrees F (-54 to 82 degrees C).
 - 4. Shore A Hardness Range: 15 to 35.
 - 5. Applications: Use for:
 - a. Glazing applications, except where otherwise recommended by manufacturer of glazing or glazing framing system.
- H. Unspecified Sealants
- I. Provide sealants for each application which is not indicated in this Section but which is encountered during the Work. Provide sealants which are recommended by the manufacturer as the "best" product for the application.
 - 1. Where a sealant is not specified for a condition, provide a product which is compatible with the materials to be sealed and which is recommended by the sealant manufacturer for the specific application
 - a. Provide colors sealants for applications which will be exposed to view. Furnish products from manufacturer's standard colors; Architect to select colors.
 - b. Provide paintable sealant for applications which are scheduled for field painting.

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify each assembly to be sealed and assign the proper sealant to the assembly.
 - 1. Verify if finished assembly will be painted, concealed or exposed and assign appropriate products
- B. Verify that substrate surfaces are ready to receive work.
- C. Verify that environmental conditions are suitable for sealant installation
- D. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Perform acoustical sealant application work in accordance with ASTM C 919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.
- I. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

- A. Protect sealants until fully cured and, where applicable, painted.

3.06 SCHEDULE

ADA UPGRADES AT
Bernice Spreckman Community Center

- A. Applications of sealant shall be according to the general guidelines as indicated by the descriptions in Part 2 of this Section.
- B. Installer/applicator shall furnish a schedule as identified in Part 1 of this Section, under "Submittals".

END OF SECTION

SECTION 081100

CUSTOM STEEL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel frames: Interior applications for doors and framed openings.
 - 1. Provide fire rated and non fire-rated hollow metal frames as indicated on the Door and Frame Schedule on the drawings.
- B. Installation of new steel frames for doors and openings.

1.02 RELATED SECTIONS

- A. Section 082110 - Flush Wood Doors.
- B. Section 087100 - Door Hardware.

1.03 REFERENCES

- A. ANSI A250.6 - Hardware on Standard Steel Doors (Reinforcement--Application); 1997.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 1998.
- C. ASTM A 366/A 366M - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality; 1996.
- D. ASTM A 569/A 569M - Standard Specification for Commercial Steel, Sheet and Strip, Carbon (0.15 Maximum Percent), Hot-Rolled; 1997.
- E. ASTM A 591/A 591M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications; 1996.
- F. ASTM A 620/A 620M - Standard Specification for Drawing Steel (AS), Sheet, Carbon, Cold-Rolled; 1997.
- G. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 1997.
- H. DHI A115.1G - Installation Guide for Doors and Hardware; Door and Hardware Institute; 1994.
- I. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- J. SDI 105 - Recommended Erection Instructions for Steel frames; Steel Door Institute; 1992.

1.04 SUBMITTALS

- A. Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards; installation instructions.

- C. Certificates:
 - 1. Provide manufacturer's certification that products comply with referenced standards.
 - 2. Provide evidence of manufacturer's membership in the Steel Door Institute.
- D. Shop Drawings: Submit for approval of the following:
 - 1. Shop drawings showing all openings in the door schedule and/ or drawings; hardware locations, anchorage and fastening methods, door frame types, and finish requirements.
- E. Door, frame, and hardware schedule in accordance with SDI 111.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide all products from a single manufacturer who is a member of the Steel Door Institute.
- B. Fire-rated Assemblies: Manufactured in accordance with Underwriter's Laboratories Inc. and bearing their label.
- C. Manufacture products only after receipt of approved hardware schedule and templates.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon delivery, inspect all materials for damage; notify shipper and supplier if damage is found.
- B. Protect products from moisture, construction traffic, and damage.
- C. Store vertically under cover. Do not use non-vented plastic or canvas shelters. Should wrappers become wet, remove immediately.
- D. Place units on 4 inch high wood sills or in a manner that will prevent rust or damage. Provide 1/4 inch space between doors to promote air circulation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Any manufacturer who complies with the project requirements.

2.02 MATERIALS

- A. Steel Sheet for Frames:
 - 1. Cold rolled steel: ASTM A 366/A 366M or ASTM A 620/A 620M.
 - 2. Hot rolled steel: Pickled and oiled, ASTM A 569/A 569M, Type B.
- B. Steel Sheet for Anchors and Accessories: Electrolytically deposited zinc coated steel; ASTM A 591/A 591M, coating Class B, minimum.

2.03 FRAMES

- A. Comply with SDI 100. Include two copies of applicable requirements of SDI-100 with submittals required for this section.
 - 1. All welded connections shall be filled and ground smooth
 - 2. Except for applied glazing stops, all connectors and fasteners shall be concealed or countersunk, filled and ground smooth.

- B. Fire-Rated Openings: Comply with NFPA 80; UL or ITS (Warnock Hersey) listed.
 - 1. Affix permanent labels attesting to fire resistance.
 - 2. Provide manufacturer's certificate that oversized openings have been constructed in accordance with all other applicable requirements for labeled door construction.
- C. Frames: Provide 16 gage welded unit type frames at all new framed openings. Provide profiles as shown on drawings. Galvanize after welding and reinforcing.
- D. Frame Reinforcement: Except where referenced standards indicate more stringent requirements provide the following reinforcing.
 - 1. Butts: 1/4" thick steel plate welded at each end
 - 2. Strikes: 14 gauge
 - 3. Closers, Holders: 10 gauge
 - 4. All other reinforcements: 12 gauge
 - 5. Lights and Transoms: Provide tubular mullions and transom bars with heads and jambs.
- E. Galvanizing: Provide units of galvanized steel at exterior openings and at other locations where indicated. Galvanize frames after fabrication; use hot dip galvanizing process.

2.04 ACCESSORIES

- A. Silencers: Resilient rubber fitted into drilled hole.
- B. Bituminous Coating: Fibered asphalt emulsion. Apply to inside of all frames
- C. Primer: Zinc chromate type;
- D. Finishing: Provide factory- primed units; coordinate primer with finish paint requirements in Section 099000.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are suitable before beginning installation of frames.
 - 1. For wrap-around frames, verify that completed openings are of correct size and thickness.
 - 2. For butt type frames, verify that completed openings are of correct size.
- B. For frames to be installed in existing walls; verify that opening is correctly sized and is plumb and true.
- C. Correct unsatisfactory condition before preceding with installation.

3.02 INSTALLATION

- A. Installation includes both new frames and existing frames being relocated to new openings.
 - 1. When removing and existing frame and door, salvage hardware according to Hardware Schedule in Section 087100 - Door Hardware.
 - 2. Carefully remove frames, clean out all mortar, grout and similar material used to fill the back of the frame.
- B. Install frames plumb, level, rigid, and in true alignment as recommended in SDI 105 and A115.1G.

- C. Install existing frames in new opening in the same manner as new door frames. Provide new anchors.
- D. Install doors plumb and in true alignment and fasten to achieve the maximum operational effectiveness and appearance of the unit. Maintain clearances specified in ANSI A250.8 and NFPA 80 whichever is more restrictive.
- E. Fill welded wrap-around frames in masonry construction with grout as masonry is laid-up. Brace or fasten frame in such a way to prevent pressure of the grout from deforming frame.
 - 1. Mix grout to provide 4 inch maximum consistency and hand trowel into place.
 - 2. Do not use grout mixed to thin "pumpable" consistency.
- F. Set welded frames in place at stud partitions as partitions is being constructed; fill void between frame and studs with acoustic glass fiber insulation.
 - 1. Except where indicated otherwise, provide double wall studs at all jambs and double studs at heads for door openings exceeding 4'-0".
- G. For frames installed in new partitions and walls provide a minimum of three anchors per jamb for frames up to 7'-0" high; four anchors for frames over 7'-0" high but not exceeding 9'-0" high.
- H. When installing a new welded frame in an existing wall, provide a minimum of five anchors per jamb for frames up to 7'-0" high; six anchors for frames over 7'-0" high but not exceeding 9' 0" high.
- I. Where new doors and frames are being installed into existing walls, coordinate with cutting and patching requirements
- J. Anchors shall be concealed except exposed anchors may be used where necessary to secure a new frame to an existing wall.
 - 1. Where exposed wall anchors are necessary, install through the face of the frame, countersink fasteners and fill flush with metal filler and sand smooth.
- K. Fill welded wrap-around frames in plaster construction with plaster as work progresses.
- L. Install hardware in accordance with hardware manufacturer's recommendations and templates. Consult DHI A115.1G and ANSI A250.6 as necessary.

3.03 ADJUST AND CLEAN

- A. Clean and restore soiled surfaces. Remove scraps and debris, and leave site and a clean condition.

END OF SECTION

SECTION 082110

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; door types and locations and vision panel configurations as per door schedule, door types, and floor plans of the Drawings.

1.02 RELATED SECTIONS

- A. Section 081100 - Custom Steel Frames and Doors
- B. Section 087100 - Door Hardware

1.03 REFERENCES

- A. ASTM E 336 - Standard Test Method for Measurement of Airborne Sound Insulation in Buildings; 1997.
- B. ASTM E 413 - Classification for Rating Sound Insulation; 1987 (Reapproved 1994).
- C. ASTM E 1408 - Standard Test Method for Laboratory Measurement of the Sound Transmission Loss of Door Panels and Door Systems; 1991 (Reapproved 1995).
- D. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute; 1997, Seventh Edition, Version 1.0.
- E. NFPA 80 - Standard for Fire Doors and Windows; National Fire Protection Association; 1995.
- F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing and hardware.
- D. Samples: Submit two samples of pre-finished door construction, 8 x 8 inch in size cut from top corner of door.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Custom Grade.
- B. Finish doors in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Section 1500, grades identified in schedule.
- C. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 REGULATORY REQUIREMENTS

- A. Fire Door and Panel Construction: Conform to NFPA 252.
 - 1. Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Package, deliver and store doors in accordance with AWI P-200, Section 1300.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.08 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.09 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide warranty for the following term:
 - 1. Interior Doors: Life of installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Veneer Doors:
 - 1. Mohawk
 - 2. Eggers Industries.
 - 3. Southwood Door Company.
 - 4. Weyerhaeuser Co.

5. Substitutions: See Section 016000 - Product Requirements.

2.02 DOOR TYPES

- A. Flush Interior Doors: 1-3/4 inches thick; solid core construction, fire-rated as indicated on Door Schedule of the Drawings.

2.03 DOOR CORES

- A. Positive pressure, Category "A", 20 Minute Rated Doors: AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Type PC – Particleboard, LD-2.
- B. Positive pressure, Category "A", Fire Rated Doors: AWI Architectural Woodwork Quality Standards Illustrated, Section 1300, Type FD, hourly ratings as indicated.

2.04 DOOR FACINGS

- A. Interior Doors - Veneer: Custom grade wood veneer, Red Oak species, plain sliced, with book matched grain, for transparent finish.

2.05 ACCESSORIES

- A. Glazing Stops for Fire Rated Doors: Wood with metal clips, mitered corners; prepared for countersink style None - N/A screws.

2.06 FABRICATION

- A. Fabricate doors in accordance with AWI Quality Standards requirements.
- B. Fabricate fire rated doors in accordance with UL requirements. Attach fire rating label to door.
- C. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 1. Provide solid blocking for other through-bolted hardware.
- D. Vertical Exposed Edge of Stiles - Veneer Faces: Of same species as veneer facing.
- E. Fit door edge trim to edge of stiles after applying veneer facing.
- F. Bond edge banding to cores.
- G. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.
- H. Factory fit doors for frame opening dimensions identified on shop drawings.
- I. Cut and configure exterior door edge to receive recessed devices.
- J. Provide edge clearances in accordance with AWI 1600.

2.07 FINISH

- A. Factory finish doors in accordance with AWI P-200, Section 1500 to the following finish designations:
 - 1. Transparent Finish: TR-6, transparent catalyzed polyurethane, Premium quality, satin gloss sheen.
 - 2. Submit 2 samples for each stain color. Finish color to match adjacent doors in area of

work.

- B. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and AWI P-200 requirements.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting bottom edges to a maximum of 3/4 inch (19 mm).
 - 1. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Machine cut for hardware.
- E. Coordinate installation of doors with installation of frames and hardware.
- F. Install door louvers plumb and level refer to mechanical drawings for sizes.

3.03 INSTALLATION TOLERANCES

- A. Conform to AWI P-200, Section 1300 for maximum diagonal distortion.
- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inches surface area.
- C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inches surface area.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.05 SCHEDULE

- A. Refer to Door Schedule on Drawings for door types and locations.

END OF SECTION

SECTION 084100

METAL-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum doors and frames.
- B. Perimeter sealant.

1.02 RELATED SECTIONS

- A. Section 079000 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 087100 - Door Hardware: Hardware items other than specified in this section.

1.03 REFERENCES

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 1997.
- B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 1994 (part of AAMA 501).
- C. AAMA 605.2 - Voluntary Specification for High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels; American Architectural Manufacturers Association; 1998.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.
- E. AAMA 1503.1 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 1998.
- F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 1995 (ANSI/ASCE 7-95).
- G. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1996.
- H. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1997a.
- I. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 1996.
- J. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 1996.
- K. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the

Specimen; 1991.

- L. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1996.
- M. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1996.
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 1991 (Part of Steel Structures Painting Manual, Vol. Two).
- O. SSPC-Paint 25.1 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel; Society for Protective Coatings; 1997 (Supplement to Volume Two, Systems and Specifications, Seventh Edition).
- P. SSPC-Paint 25.1BCS - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Blast Cleaned Steel; Society for Protective Coatings; 1997 (Supplement to Volume Two, Systems and Specifications, Seventh Edition).

1.04 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand the following load requirements, as measured in accordance with ASTM E 330:
 - 1. Wind loads: Comply with requirements of ASCE 7.
 - 2. Positive wind load: 20-lbf/sq ft.
 - 3. Negative wind load: 20-lbf/sq ft.
 - 4. Member Deflection: Limit member deflection to 1/175 in any direction, with full recovery of glazing materials.
- B. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
- C. Thermal Performance: When tested according to AAMA1502.7 - 1981 and 1503.1 - 1980 Maximum "U": 0.62
- D. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.
- E. Condensation Resistance Factor for Thermally Broken Frames: CRF of 54, minimum when measured in accordance with AAMA 1502.7-1981 and 1503.1 - 1980.
- F. Water Leakage: None, when measured in accordance with ASTM E 331 with a test pressure difference of 8.00-lbf/sq ft.
- G. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- H. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

1.05 SUBMITTALS

- A. See Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details and any special conditions.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.
- E. Samples: Submit two samples 8" x 8" inches in size illustrating finished aluminum surface, glass, glazing materials.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. Report of field-testing for water leakage.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond to aluminum when exposed to sunlight or weather.

1.08 PROJECT CONDITIONS

- A. Coordinate the work with the construction of exterior walls.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A. See Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five-year period after Date of Substantial Completion.
- C. Provide 10-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide 10-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. BASIS OF DESIGN: Doors; Product United States Aluminum Corp
- B. Aluminum Framing System for Doors and Sidelights; Product "Series 451 " entrance framing system as manufactured by US Aluminum Company; Interior glazed. Tubular, extruded framing system assembled using manufacturer's screw-spline system.
- C. Equal products from one of the following manufacturers may be submitted for review. All products of this section shall be from a single manufacturer.
 - 1. Vistawall Architectural Products.
 - 2. Substitutions: as allowed by City of Yonkers

2.02 COMPONENTS

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Unitized, shop assembly.
 - 2. Custom fabricate according to design and configuration as shown on the Drawings.
 - 3. Finish: Superior performance organic coating; finish as selected by Architect
 - 4. Color: Dark bronze colored finish. Each of the finishes is delineated on the Drawings.
- B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 - 1. Framing members for interior applications need not be thermally broken.
 - 2. Glazing stops: Flush except at sections housing concealed hardware where the glazing shall be secured with surface applied stops
 - 3. Cross-Section for Door and Sidelight Frames: see Architectural drawings for sizes.
 - 4. Cross-Section for Window Frames: see Architectural drawings for sizes.
 - 5. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
 - a. Manufacturer to size reinforcement to meet system performance criteria.
- C. Doors: Glazed aluminum.
 - 1. Thickness: 1-3/4 inches.
 - 2. Top Rail: 3 inches wide.
 - 3. Vertical Stiles: 3 inches wide.
 - 4. Bottom Rail: 6 inches wide.
 - 5. Glazing Stops: Square.
 - 6. Finish: Same as aluminum frames.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).
- B. Structural Steel Sections: ASTM A 36/A 36M; galvanized in accordance with ASTM A 123/A 123M at 2.0 oz/sq ft.
- C. Fasteners: Stainless steel.
- D. Perimeter Sealant: Type as specified in Section 079000.

- E. Glass: .
 - 1. Glass in Doors and Sidelight Framing: Type tempered, laminated safety glazing; tinted.
- F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- G. Glazing Accessories: .
- H. Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25.1, zinc oxide, alkyd, linseed oil primer.
- I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.04 FINISHES

- A. Finish
 - 1. Dark Bronze coating not less than 0.7 mils thick.
- B. Baked-On Finish
 - 1. Manufacturer's Finish: Superior Performance Coating: AAMA 2605-98, "Fluropon®" Architectural Coatings – full strength "Kynar 500®" based coating.
 - a. Pretreatment: The aluminum shall be thoroughly cleaned and pretreated using a multi-stage cleaning and pretreatment system. Chemical conversion coating shall conform with ASTM D 1730, Type B, Method 5 (Amorphous Chromium Phosphate Treatment) or Method 7 (Amorphous Chromate Treatment). Coating weight shall be a minimum of 30 mg. per ft.² on exposed surfaces as specified in ASTM B 449, Section 6, Class 1. Processing shall conform with ASTM B 449, Section 5.
 - b. Primer: The cleaned and treated substrate shall be primed with Fluroprime® to a thickness of .2 - .4 mils. using Valspar approved factory application methods.
 - c. Paint: The Fluropon paint system shall contain 70% PVDF (Kynar 500®) resin and durable ceramic pigments. It shall be factory applied and oven baked for a topcoat film thickness of 1.0- 1.3 mils. Clear topcoats shall be applied at 0.3 -0.5 mils.
 - d. Color: Color shall be Red, approved by Architect, selection shall be from custom color range.
 - e. Components included: All aluminum exposed to view, location specified on Architectural drawings.
 - f. Equal products from other finish systems may be submitted for review.
- C. Location of Finishes are specified on Architectural drawings.
- D. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.05 HARDWARE

- A. Door Hardware: Door hardware not specified in this Section is specified in Section 087100.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- D. Window opening regulators on all single hung windows.
- E. ADA compliant push button actuator at exterior and interior.
- F. Provide electrified hinges, strike and closer to accommodate push button activation.

2.06 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E. Arrange fasteners and attachments to conceal from view.
- F. Reinforce components internally for door hardware and door operators.
- G. Reinforce framing members for imposed loads.
- H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
 - 1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install Door, Frame and window systems in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form watertight dam.
- G. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of mastic and secure.
- J. Install hardware using templates provided.

1. Refer to Section 087100 for installation requirements.
- K. Install glass in accordance with Section 088000, using glazing method required to achieve performance criteria.
- L. Install perimeter sealant in accordance with Section 079000.
 1. Install sealant in concealed locations as required by the manufacturer's installation instructions or as may be indicated on the Drawings.

3.03 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. Allow for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.
- B. Test installed storefront for water leakage in accordance with AAMA 501.2 (field hose test).

3.05 ADJUSTING

- A. Adjust operating hardware for smooth operation and for compliance with ICC/ANSI A117.1-1998 Accessibility Requirements

3.06 CLEANING AND PROTECTION

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by method acceptable to sealant manufacturer.
- D. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
- E. Protect finished work from damage.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood and hollow metal doors.
- B. Hardware for fire-rated and non fire-rated doors.
- C. Thresholds.
- D. Weatherstripping, seals and door gaskets.

1.02 RELATED SECTIONS

- B. Section 081100 - Custom Steel Doors

1.03 REFERENCES

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.
- B. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 1990.
- C. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Wood Flush Doors; Door and Hardware Institute; 1993.
- D. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.
- E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.
 - 2. Submit manufacturer's parts lists, templates, and installation requirements.
- C. Samples:
 - 1. Submit 2 samples of each type of hinge, latchset, lockset, closer, and panic device illustrating style, color, and finish.
 - 2. Samples will be retained by the Owner as maintenance stock
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Project Record Documents: Record actual locations of installed cylinders and their master key code.

- F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- G. Keys: Deliver with identifying tags to Owner's Representative by security shipment direct from hardware supplier.
- H. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Perform work in accordance with the following requirements:
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 5 years of documented experience.
- D. Hardware Supplier Qualifications: Company specializing in supplying institutional door hardware and the design of a keying system for a project of this type with 5 years of documented experience.
- E. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section and to plan a Keying System according to the needs of the Owner.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for requirements applicable to fire rated doors and frames.
- B. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.

1.07 PRE-INSTALLATION MEETING

- A. Convene one week prior to commencing work of this section.
 - 1. Review keying requirements with Owner's representative. New keying to be compatible with existing keying system.

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.09 COORDINATION

- A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.
- B. Furnish templates for door and frame preparation.
- C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- D. Coordinate Owner 's keying requirements during the course of the Work. Comply with the requirements indicated under "Keying" to establish Keying Plan for the project

1.10 WARRANTY

- A. Closeout Submittals, for additional warranty requirements.
- B. Provide 10-year warranty for door closers.
- C. Additional Warranties:

1.11 MAINTENANCE PRODUCTS

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.12 EXTRA MATERIALS

- A. Provide 4 extra key lock cylinders for each master keyed group.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Reference Manufacturers and Products: The Hardware Schedule for this project has been created using the referenced Products as indicated in this Section.
 - 1. Equal products from the other manufacturers indicated in this Section may be submitted for review.
 - a. The fact that another manufacturer is indicated does not, necessarily, indicate that the manufacturer has a product equal to the referenced product.
 - 2. Equal products from other manufacturers not indicated in this Section shall be submitted according to the requirements for substitutions
- B. Hinges: Referenced Manufacturer: Stanley
 - 1. H-1: Interior door with closer; FBB - 168; 4-1/2" x 4-1/2", ball bearing, plated steel, US32D, non rising pin; ANSI 8111. Three per leaf unless otherwise indicated.
 - 2. Equal Products from the following manufacturers may be submitted for review.
 - a. Bommer Industries, Inc: www.bommer.com.
 - b. Hager Companies: www.hagerhinge.com.
- C. Cylindrical Locks: Referenced Manufacturer: Schlage Lock Company
 - 1. C-1: Interior doors; Series "D" ANSI A 156.2 Series 4000 Grade 1, UL listed when used in a fire rated door; 626 satin chromium finish for all exposed parts; "Rhodes" lever handle, 6-pin tumbler cylinder; Function: Classroom Lock ND70PD
 - 2. C-2: Interior doors; Series "D" ANSI A 156.2 Series 4000 Grade 1, UL listed when used in a fire rated door; 626 satin chromium finish for all exposed parts; "Rhodes" lever handle, 6-pin tumbler cylinder; Function: Faculty Toilet Room Lock ND80PD
 - 3. Equal Products from the following manufacturers may be submitted for review.
 - a. Best Access Systems: www.bestlock.com.
 - b. Yale-Corbin U.S.: www.yalesecurity.com.
- D. Closers: Referenced Manufacturer: LCN Closers
 - 1. CP-1: Typical Parallel Arm Closer
- E. Door Stops/Holders: Referenced Manufacturer: Glynn-Johnson & Ives.

1. DS-1: Wall Mounted: Model 60C, Stainless steel, US26D finish with concave rubber bumper; installed with manufacturer recommended mechanical fastener; at stud walls provide solid wood blocking.
 2. DS-2: Floor Stop: Ives model FS-438.
 3. Equal Products from the following manufacturers may be submitted for review.
 - a. Glynn-Johnson.
 - b. Hager Companies.
 - c. Triangle Brass Manufacturing Co., Inc.
- F. Protection Plates: Referenced Manufacturer: Hager Companies
1. PP-1: Kickplate and Mop Plate: Kickplate: 12" high x width of door less 1-3/4"; install 1/4" from door bottom on push side. Mop Plate: 12" high x width of door less 1/2"; install 1/4" from door bottom on pull side. ANSI A156.6, J102. Stainless steel, US 32D, beveled 4 edges; Gauge: 0.050". Installed with evenly spaced oval stainless steel screws at 6" O.C. maximum in tapered holes.
 3. Equal Products from the following manufacturers may be submitted for review.
 - a. Hiawatha, Inc: www.hiawathainc.com.
 - b. Triangle Brass Manufacturing Co., Inc.
 - c. Rockwood.
- G. Substitutions: See Section 016000 - Product Requirements.

2.02 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

- A. Provide products that comply with the following:
1. Applicable provisions of Federal, State, and local codes.
 2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 3. Fire-Rated Doors: NFPA 80.
 4. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
 5. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.
- B. Finishes: Identified in schedule at end of section.

2.03 KEYING

- A. Planning of Keying System
1. A Keying System shall be developed encompassing the hardware to be installed for this Project and shall include interfacing new keying with existing keying. The Contractor's hardware supplier shall provide a AHC certified Hardware Consultant to perform the services indicated in this Section
 2. The Contractor's Hardware Consultant shall:
 - a. Develop a Keying System to suit the express needs of the Owner to coordinate new hardware with existing hardware..
 - b. Review the Hardware Schedule and project requirements and make recommendations for modifications where appropriate to achieve the intent of the hardware identified in the schedule. Present the proposed modifications to the Architect for review.
 - c. Reflect in the Contractor's Hardware Schedule submittal the decisions made by the Owner's Representative regarding keying requirements and by the Architect for modifications to the Hardware Schedule.
- B. Door Locks: Great grand master keyed.

- C. Supply keys in the following quantities:
 - 1. 4 master keys.
 - 2. 4 grand master keys.
 - 3. 4 great grand master keys.

2.04 KEY CABINET

- A. Cabinet Construction: Sheet steel construction, piano hinged door with cylinder type lock master keyed to building system.
- B. Cabinet Size: Size for project keys plus 25 percent growth.
- C. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
- D. Finish: Baked enamel, color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Verify that metal door frames and metal doors have been reinforced as specified for hardware installation. Identify non-complying items and do not proceed with hardware installation until authorized by the Owner's Representative.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to centerline of hardware item: Comply with referenced standards for location except where ANSI/CABO A 117.1, barrier free Requirements supercede the referenced standards or are indicated on the Drawings.
 - 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 - 2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."
 - 3. Wood doors: See Section 082110.

3.03 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 014000.
- B. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.
 - 1. Consultant shall issue a written report certifying the hardware installation and identifying non-complying work.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 017000.

- B. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 017000.
- B. Do not permit adjacent work to damage hardware or finish.

3.06 DOOR HARDWARE SCHEDULE

- A. Refer to door Schedule on the Drawings to determine application of Hardware Sets in this schedule.
- B. Each piece of hardware indicated is per each door leaf in opening, except for thresholds and where noted otherwise.
- C. SET 1: Single Interior Toilet Room Doors: Hinges: H-1 (4 per door); Cylindrical Locks: C-1; Closer: CP-1; Stops: DS-1; Protection Plates: PP-1; 1 set of silencers.
- D. SET 2: Single Interior Toilet Room Doors: Hinges: H-1 (3 per door); Cylindrical Locks: C-2; Closer: CP-1; Stops: DS-1; Protection Plates: PP-1; 1 set of silencers.
- A. SET 1: INTERIOR DOORS –MULTIPLE OCCUPANT TOILET ROOMS
 - 1. Butts: FBB 199
 - 2. Schlage ND-Series, ANSI A 156.2 4000 Grade 1 meeting A117.1 Accessibility Code. Lever handle "Sparta" with 619 satin nickel finish on all exposed parts. Function to be Passage Latch ND10S ANSI F76.
 - 3. Closer: Parallel Arm; Series 7700 with standard forearm; without hold open with delayed action closing.
 - 4. Protection Plates: both sides
 - 5. Stop: Wall mounted; concave rubber with satin stainless steel trim; 400 Series
 - 6. Threshold: marble as per drawings; Furnished as per Section 108100
- B. SET 2: EXTERIOR DOORS
 - 1. Butts: FBB 168
 - 2. Lockset: "L" Series Mortise lock with cylinder; Operation grade 2 security; function: entrance lock, Lever handle "Sparta" with 619 satin nickel finish on all exposed parts. LV9453 ANSI F20.
 - 3. Closer: Parallel Arm; Series 7700 with heavy-duty forearm; hold open with delayed action closing.
 - 4. Auxiliary Locks for Double Doors. Referenced Manufacturer: Varies.
 - a. AX-1 Auxiliary Surface mounted Slide Dead Bolt; Glynn-Johnson - 1708T
 - 5. Protection Plates: interior side only
 - 6. Threshold: 1/2" x 5" aluminum, #425; set in sealant; stainless steel screws in expansion bolts.
 - 7. Weatherstripping: 101 AV Door sweep on exterior; #137NA aluminum strip with neoprene bulb
 - 8. Electric strike, ADA compliant push button activation.
- C. SET 3: INTERIOR DOORS
 - 1. Butts: FBB 199
 - 2. Lockset: Schlage ND –Series, ANSI A 156.2 4000 Grade 1 meeting A117.1 Accessibility Code. Lever handle "Sparta" with 619 satin nickel finish on all exposed parts. Function to be ND91PD Office Function, ANSI F82.

ADA UPGRADES AT
Bernice Spreckman Community Center

3. Closer: Parallel Arm; Series 7700 with standard forearm; without hold open with delayed action closing.
4. Protection Plates: both sides
5. Stop: Floor stop: #441, Cast Aluminum
6. Electric strike, ADA compliant push button activation.

END OF SECTION

SECTION 092210

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- B. Related Requirements:
 - 1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.04 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For **dimpled steel studs and runners AND firestop tracks**, from ICC-ES.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.02 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: **ASTM A 653/A 653M, G60**, hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. **Use either steel studs and runners or dimpled steel studs and runners.**
 - 1. Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness AND Depth: MINIMUM 20 GAUGE. COORDINATE REQUIRED GAUGES, SPACING AND REINFORCEMENT WITH METAL STUD MANUFACTURER. COORDINATE WITH PARTITION TYPES ON DRAWINGS FOR DEPTHS AND OTHER REQUIRED GAUGES.
 - 2. Dimpled Steel Studs and Runners:
 - a. Minimum Base-Metal Thickness AND Depth: MINIMUM 20 GAUGE. EQUIVALENT, PROPERLY DOCUMENTED BY METAL STUD MANUFACTURER. COORDINATE REQUIRED GAUGES, SPACING AND REINFORCEMENT WITH METAL STUD MANUFACTURER. COORDINATE WITH PARTITION TYPES ON DRAWINGS FOR DEPTHS AND OTHER REQUIRED GAUGES.
- C. Slip-Type Head Joints: Where indicated, provide **one of** the following:
 - 1. Single Long-Leg Runner System: ASTM C 645 top runner with **2-inch-** deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within **12 inches** of the top of studs to provide lateral bracing.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) MARINOWARE DEFLECTION TRACK (DT).
 - 2) APPROVED EQUAL.
 - 2. Slotted Track: ASTM E 119, ASTM 3 814, ASTM E 1966, ULCS115-M95 used at the head of wall. 1" total vertical movement providing positive attachment for wall framing. Slotted track is formed from prime steel.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) MARINOWARE SLOTTED TRACK.
 - 2) APPROVED EQUAL.
 - 3. Double-Runner System: ASTM C 645 top runners, inside runner with **2-inch-** deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) DIETRICH METAL FRAMING (OT/TR SERIES).
 - 2) APPROVED EQUAL.

4. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Superior Metal Trim; Superior Flex Track System (SFT).
 - 2) APPROVED EQUAL.
- D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 1. Products: Subject to compliance with requirements, **available products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. Fire Trak Corp.; Fire Trak System **attached to studs with Fire Trak Posi Klip.**
 - b. APPROVED EQUAL.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Metal Thickness: **0.033 inch.**
- F. Cold-Rolled Channel Bridging: Steel, **0.053-inch** minimum base-metal thickness, with minimum **1/2-inch-** wide flanges.
 1. Depth: **[As indicated on Drawings] 1-1/2 inches.**
 2. Clip Angle: Not less than **1-1/2 by 1-1/2 inches, 0.068-inch-** thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base-Metal Thickness: **0.033 inch.**
 2. Depth: **1-1/2 inches** AND AS INDICATED ON DRAWINGS.
- H. Resilient Furring Channels: **1/2-inch-** deep, steel sheet members designed to reduce sound transmission.
 1. Configuration: **Asymmetrical or hat shaped.**
- I. Cold-Rolled Furring Channels: **0.053-inch** uncoated-steel thickness, with minimum **1/2-inch-** wide flanges.
 1. Depth: **3/4 inch.**
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of **0.033 inch.**
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.062-inch-** diameter wire, or double strand of **0.048-inch-** diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of **1-1/4 inches**, wall attachment flange of **3/4 inch**, minimum uncoated-metal thickness of **0.018 inch**, and depth required to fit insulation thickness indicated.

- a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) MARINOWARE Z-FURRING CHANNEL (ZF).
 - 2) APPROVED EQUAL.

2.03 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.062-inch-** diameter wire, or double strand of **0.048-inch-** diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.16 inch** in diameter.
- C. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of **0.053 inch** and minimum **1/2-inch-** wide flanges.
 1. Depth: **2-1/2 inches.**
- D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
 1. Products: Subject to compliance with requirements, **available products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; Drywall Grid System.
 - c. USG Corporation; Drywall Suspension System.

2.04 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide **one of** the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, **1/8 inch** thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently. COORDINATE ALL WALL FURRING WITH EXISTING EXPANSION JOINTS AND NEW EXPANSION JOINT COVERS.
- E. EXTEND ALL VERTICAL CEILING AND SOFFIT SUPPORTING STRUCTURE AND SUSPENSION SYSTEM SUPPORTS TO EXISTING STEEL STRUCTURE ABOVE.

3.03 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: **16 inches** o.c., COORDINATE WITH DRAWINGS.
 - 2. Multilayer Application: **16 inches** o.c., COORDINATE WITH DRAWINGS.
 - 3. Tile backing panels: **16 inches** o.c., COORDINATE WITH DRAWINGS.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb MINIMUM. COORDINATE WITH DOOR MANUFACTURER.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum **1/2-inch** clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

- a. Firestop Track: AT ALL RATED PARTITIONS, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** o.c.

F. Z-Furring Members:

1. Erect insulation specified in Section 072100 "Thermal Insulation" vertically and hold in place with Z-furring members spaced **24 inches** o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced **24 inches** o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than **12 inches** from corner and cut insulation to fit.

- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than **1/8 inch** from the plane formed by faces of adjacent framing.

3.04 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: **48 inches** o.c. COORDINATE WITH DRAWINGS.
 2. Carrying Channels (Main Runners): **48 inches** o.c. COORDINATE WITH DRAWINGS.

- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

- C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within **performance limits established by referenced installation standards.**
- 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- 4. Do not attach hangers to steel roof deck.
- 5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
- 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems **with hangers used for support.**
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within **1/8 inch in 12 feet** measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 092600

GYPSUM BOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.
 - 3. Gypsum plaster.
- B. Related Requirements:
 - 1. Section 092210 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.
 - 2. Division 09 painting Sections for primers applied to gypsum board surfaces.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.05 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. ANY GYPSUM BOARD THAT BECOMES WET DURING CONSTRUCTION SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR AT THEIR EXPENSE.

- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.06 COORDINATION

- A. LIGHT FIXTURES. COORDINATE SIZE OF OPENINGS REQUIRED FOR LIGHT FIXTURES IN GYPSUM BOARD CEILINGS WITH ELECTRICAL CONTRACTOR AND ADJUST CEILING GRIDS TO ACCOMMODATE FIXTURES.
- B. COORDINATE WITH SUSPENSION GRID SYSTEM SPECIFIED IN SECTION 092210: NON-STRUCTURAL METAL FRAMING.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.02 GYPSUM BOARD, GENERAL

- A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent. Provide gypsum panel products with 100% recycled content FOR FACE AND LINER PAPERS
- B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site.
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.03 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - 1. USG Corporation (BASIS OF DESIGN)
 - 2. Lafarge North America Inc.

3. National Gypsum Company.
- B. Gypsum Wallboard (WALLS): ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch COORDINATE WITH DRAWINGS.
 2. Long Edges: **Tapered.**
 3. MANUFACTURER:
 - a. USG "IMPERIAL GYPSUM BASE"
 - b. APPROVED EQUAL
- C. Gypsum Board, Type X (WALLS AND CEILINGS IN RATED ASSEMBLIES): ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch COORDINATE WITH DRAWINGS.
 2. Long Edges: **Tapered.**
 3. MANUFACTURER:
 - a. USG "IMPERIAL GYPSUM BASE, FIRE CODE CORE"
 - b. APPROVED EQUAL
- D. Moisture- and Mold-Resistant Gypsum Board (TOILET ROOM CEILINGS): ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: **5/8 inch, Type X.**
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10.
 4. MANUFACTURER:
 - a. USG "MOLD TOUGH AR"
 - b. APPROVED EQUAL

2.04 TILE BACKING PANELS

- A. Water-Resistant Gypsum Backing Board (WALLS IN TOILET ROOMS): ASTM C 1396/C 1396M, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. USG Corporation "FIBEROCK AQUA TOUGH INTERIOR PANELS.
 - b. APPROVED EQUAL.
 2. Core: **5/8 inch, Type X.**

2.05 FINISH COAT PLASTER MATERIALS

- A. Gypsum Ready-Mixed Finish Plaster: Manufacturer's standard, mill-mixed, gauged, interior finish.
1. Product: Subject to compliance with requirements, provide IMPERIAL Brand Finish Plaster by United States Gypsum Company.
 2. Approved Equal.

2.06 ACCESSORIES

- A. General: Comply with ASTM C 841 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Zinc and Zinc-Coated (Galvanized) Accessories:
 - 1. Cornerite: Fabricated from expanded-metal lath with manufacturer's standard corrosion-resistant zinc coating, unless otherwise indicated.
 - 2. Striplath: Fabricated from expanded-metal lath with manufacturer's standard corrosion-resistant zinc coating, unless otherwise indicated.
 - 3. Corner Beads: Fabricated from zinc or zinc-coated (galvanized) steel.
 - a. Small nose corner bead with expanded flanges; use unless otherwise indicated.
 - b. Bull nose corner bead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.
 - 4. Casing Beads: Fabricated from zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
 - 5. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 - 6. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
 - 7. Two-Piece Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

2.07 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Board: Paper.
 - 2. Plaster base: Pressure sensitive as per manufacturer recommendations.
 - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, **rounded or beveled panel edges**, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use **setting-type taping** compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use **setting-type, sandable topping** compound.
 - 4. Finish Coat: For third coat, use **setting-type, sandable topping** compound.
- D. Joint Compound for Tile Backing Panels:
 - 1. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.08 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- D. Sound Attenuation Blankets: As specified in Division 7 Section "Building Insulation".
- E. Acoustical Sealant: As specified in Division 7 Section "Joint Sealants."
- F. Thermal Insulation: As specified in Division 7 Section "Building Insulation".

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 2. Fit gypsum panels around ducts, pipes, and conduits.
 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.03 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Regular Type plaster base: **Vertical surfaces AND HORIZONTAL SURFACE AS INDICATED ON DRAWINGS.**
 2. Type X plaster base: **As indicated on Drawings FOR Vertical AND HORIZONTAL surfaces where required for fire-resistance-rated assembly.**
 3. MOLD AND ABUSE RESISTANT: **Ceiling surfaces.**
 4. Tile Backing Panels- Walls in toilet rooms.
- B. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels **vertically (parallel to framing)** unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 2. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

3. Fastening Methods: **Fasten base layers and face layers separately to supports with screws.**

3.04 APPLYING TILE BACKING PANELS

- A. Water-Resistant GYPSUM Backing Panel: Comply with manufacturer's written installation instructions and install at **ALL locations indicated to receive tile INCLUDING BUT NOT LIMITED TO TOILET ROOM WALLS**. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.05 PLASTER APPLICATION

- A. General: Comply with ASTM C 842.
 1. Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
 2. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster material, before lathing where necessary. Except where full grouting is indicated or required for fire-resistance rating, grout at least 6 inches at each jamb anchor.
 3. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where casing bead does not terminate plaster at metal frame cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 4. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Bonding Compound: Apply on unit masonry and concrete plaster bases.
- C. Finish Coats:
 1. Provide float finish where indicated.

3.06 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions. Install according to ASTM C 841.
 1. Corner Beads: Install at external corners.
 2. Casing Beads: Install at terminations of plasterwork, except where plaster passes behind and is concealed by other work and where metal screeds, bases, or frames act as casing beads.
 3. Control Joints: Install control joints at locations indicated on drawings.

3.07 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

- B. Pre-fill open joints, **rounded or beveled edges**, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

3.08 FINISH LEVEL SCHEDULE

- A. Level 1: Above finished ceilings concealed from view; including, but not limited to plenums and attics.
- B. Level 2: Areas behind cabinetry or other built in items which conceal the wall.
- C. Level 3: Walls in service or utility rooms, electrical closets, telephone equipment rooms, janitor closets and other non-habitable spaces. Walls scheduled to receive veneer plaster finish.
- D. Level 4: Walls and Ceilings in all finished spaces which are not scheduled for another finish level by the descriptions contained herein. Including, but not limited to walls and ceilings to be painted with flat or eggshell finishes or which are scheduled for wall coverings.
- E. Level 5: Walls and Ceilings scheduled to receive semi-gloss or gloss paint finishes and surfaces to be used for cove lighting applications or where lighting is focused directly onto gypsum surface:
- F. Soffits: Finish as indicated for Ceilings
- G. Fire Rated Assemblies: Provide finish level as indicated in schedule except where finish level requirements for fire rated assemblies are more restrictive, in which case the fire rated finish requirements shall govern.

3.09 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 093000

CERAMIC TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ceramic and ceramic mosaic tile for floor and wall applications.
- B. Thresholds at door openings.
- C. Ceramic accessories.
- D. Waterproof Membrane

1.02 RELATED SECTIONS

- A. Section 079000 - Joint Sealers.
- B. Section 092600 - Gypsum Board Assemblies.

1.03 REFERENCES

- A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 1992.
 - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 1992.
 - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 1992.
 - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar; 1992.
 - 4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive; 1992.
 - 5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1992.
 - 6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1992.
 - 7. ANSI A108.7 - American National Standard Specification for Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar; 1992.
 - 8. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout; 1992.
 - 9. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1992.
 - 10. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1992.
 - 11. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation; 1992.
 - 12. ANSI A118.6 - American National Standard Specifications for Ceramic Tile Grouts; 1992.
 - 13. ANSI A136.1 - American National Standard for Organic Adhesives for Installation of Ceramic Tile; 1992.
 - 14. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 1988.

- B. TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of America, Inc.; 1997.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate thresholds and ceramic accessories.
- C. Product Data: Provide instructions for using grouts and adhesives.
- D. Samples: Mount tile and apply grout on two plywood panels, 8 x 8 inch in size illustrating pattern, color variations, and grout joint size variations.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of TCA Handbook and ANSI A108 Series/A118 Series on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.08 EXTRA MATERIALS

- A. Provide 5 sq ft of each size, color, and surface finish of tile specified.

PART 2 PRODUCTS

2.01 TILE

- A. Manufacturers: All products by the same manufacturer.
 - 1. American Olean Tile Co.
 - 2. Dal-Tile Corp.
 - 3. Summitville Tiles, Inc.
 - 4. Substitutions: See Product Requirements.
- B. Ceramic Mosaic Tile: ANSI A137.1, and as follows:

1. Application: Floors and Base
 2. Moisture Absorption: 0 to 0.5 percent.
 3. Size and Shape: 1 inch square.
 4. Edges: Cushioned.
 5. Surface Finish: Slip resistant.
 6. Colors: To be selected from manufacturer's full range.
 7. Mounted Sheet Size: 12 x 12 inches.
 8. Base: cove type, 5" high, assembled from same size tiles as used on floor and adhered to sheets as per manufacturer's standards.
- C. Glazed Wall Tile: ANSI A137.1, and as follows:
1. Moisture Absorption: 3.0 to 7.0 percent.
 2. Size and Shape: 4-1/4 inch square; 1/4" thick.
 3. Edges: Cushioned.
 4. Surface Finish: manufacturer's range of available finishes for this product line.
 5. Colors: To be selected from manufacturer's full range. Up to four colors will be used for this project.
 6. Pattern: See Drawings.
 7. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile. Provide such shapes and other shapes as required by field conditions to close all gaps in tile field.

2.02 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, **selected from the following**, that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
1. Products: Subject to compliance with requirements, **available products that may be incorporated into the Work include, but are not limited to, the following:**
 - a. Custom Building Products; REDGARD OR 9240 Waterproofing and Anti-Fracture Membrane.
 - b. MAPEI Corporation; **Mapelastic L (PRP M19).**
 - c. APPROVED EQUAL.
- C. Latex-Portland Cement Product: Flexible mortar consisting of cement-based mix and acrylic-latex additive.
1. Available Products:
 - a. MAPEI Corporation; Mapei Kerabond / Keralastic System
 - b. CUSTOM BUILDING PRODUCTS; **Master Blend w Custom Flex ultra strength additive.**
 - c. APPROVED EQUAL.

2.03 ADHESIVE MATERIALS

- A. Manufacturers:
1. W.R. Bonsal Co.
 2. Bostik.
 3. Custom Building Products.
 4. Substitutions: See Section 016000 - Product Requirements.

- B. Organic Adhesive: ANSI A136.1, thinset bond type; use Type I in areas subject to prolonged moisture exposure.

2.03 GROUT MATERIALS

- A. Manufacturers:
 - 1. W.R. Bonsal Co.
 - 2. Bostik.
 - 3. Custom Building Products.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Standard Grout: Latex-Portland cement type as specified in ANSI A118.6.
 - 1. Color: Premixed in dry form
 - 2. Color: As selected.

2.04 ACCESSORY MATERIALS

- A. Thresholds: Marble type, white color, honed finish, 3/4 x 4 inch size by full width of wall or frame opening, beveled both sides radiused edges from bevel to vertical face.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in Section 033000 and are ready to receive tile.
- B. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of setting materials to sub-floor surfaces.
- C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
 - 1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 - 2. Alkalinity: pH range of 5-9.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler.
- D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, manufacturer's instructions, and TCA Handbook recommendations.
- B. Installation Specifications: Comply with the following TCA Installation Specifications as they

apply to the indicated installation type.

- C. Request tile pattern. Do not interrupt tile pattern through openings.
- D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base, and wall joints.
- E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
- F. Form internal angles coved and external angles bullnosed.
- G. Install ceramic accessories rigidly in prepared openings.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep control joints free of adhesive or grout. Apply sealant to joints.
- J. Allow tile to set for a minimum of 48 hours prior to grouting.
- K. Grout tile joints. Use standard grout unless otherwise indicated.
- L. Apply sealant to junction of tile and dissimilar materials, junction of dissimilar planes, at toilet Partitions and at Plumbing fixtures.

3.04 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCA Handbook Method F122, organic adhesive, with standard grout, on waterproof membrane unless otherwise indicated.
- B. Over interior wood substrates, install in accordance with TCA Handbook Method F155, organic adhesive, with standard grout, on waterproof membrane unless otherwise indicated.

3.06 INSTALLATION - WALL TILE

- A. Over cementitious backer units install in accordance with TCA Handbook Method W244C, using membrane at rooms with showers when applicable.

3.07 CLEANING

- A. Clean tile and grout surfaces.

3.08 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 095110

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED SECTIONS

- A. Section 079000 - Joint Sealers: Acoustical sealant.
- B. Division 15 - Mechanical: air outlets, diffusers, grilles
- C. Division 16 - Electrical: lighting fixtures, electrical devices, smoke/fire detectors

1.03 REFERENCES

- A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2000.
- B. ASTM C 636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1996.
- C. ASTM E 580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint; 2000.
- D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 1998.
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components.
- D. Samples: Submit three samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

- A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.

- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust-generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

1.08 EXTRA MATERIALS

- A. See Section for Product Requirements, for additional provisions.
- B. Provide 2 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Equal products from other manufacturers may be submitted for consideration
 - 2. Substitutions: See Product Requirements.
- B. Acoustical Panels Type lay in: ASTM E 1264 Type IV, Plastic faced mineral fiber, conforming to the following:
 - 3. Size: 24 x 24 inches.
 - 4. Thickness: 5/8 inches.
 - 5. Composition: mineral fiber, wet-formed.
 - 6. Weight: 1.40 lb/sq.ft.
 - 7. NRC: 0.10
 - 8. CSTC Minimum: 35.
 - 9. UL Labeled; Class A; Flame Spread 25 or under according to ASTM 1264 requirements.
 - 10. Smoke Development Rating: 50 or less according to ASTM E84 & ASTM 1264.
 - 11. Edge: Square.
 - 12. Surface Color: White. High light reflectance rating of 0.88
 - 13. Surface Pattern: Non-directional fissured Texture: medium.
 - 14. Product: "Fine-Fissured" Ceramaguard, by Armstrong.
 - 15. Suspension System: Exposed grid Type exposed tee.
- C. Acoustical Panels Type ACT-1:
 - 16. Surface Texture: Medium
 - 17. Composition: Mineral Fiber
 - 18. Color: White

19. Size: 12 x 12 inches
20. Thickness: 5/8 inches.
21. Edge Profile: Beveled K4C4.
22. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.55.
23. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 35
24. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton N/A.
25. Flame Spread: ASTM E 1264; Class A (UL)
26. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.85.
27. Dimensional Stability: HumiGuard Plus - temperatures up to 120 degrees F and high humidity excluding only exterior use, use over standing water, and direct contact with moisture .
28. Mold/Mildew Inhibitor: The front and back of the product have been treated with BioBlock, a paint that contains a special biocide that inhibits or retards the growth of mold or mildew, ASTM D 3273.
29. Acceptable Product: Fine Fissured, 746 as manufactured by Armstrong World Industries.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 1. Same as for acoustical units.
 2. Substitutions: See Section 016000 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System Type Exposed Tee: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Profile: Tee; 15/16-inch wide face.
 2. Construction: Double web.
 3. Finish: White painted.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Adhesive: Henry 237 AcoustiGum Acoustical Ceiling Tile Adhesive
- D. Acoustical Insulation: Specified in Section 072120.
 1. Thickness: 2 inch.
 2. Size: To fit acoustical suspension system.
- E. Acoustical Sealant For Perimeter Moldings: Specified in Section 079000.
- F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Coordinate location of hangers and grid pattern with Mechanical or Electrical work.
- C. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Support suspension system only from structural floor slab, beams, girders or joists. Do not support suspension system from ducts, mechanical equipment, electrical equipment, piping, finish materials or framework supporting other finishes
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant at acoustic partitions.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Follow grid pattern indicated on the drawings; coordinate with details at windows and other perimeter conditions.

- D. Fit border trim neatly against abutting surfaces.
- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- H. Where round obstructions occur, provide preformed closures to match perimeter molding.
- I. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions except where otherwise indicated.
- J. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
- K. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 096500

RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring (Vinyl Composition Tile - VCT)
- B. Resilient base.
- C. Installation accessories.

1.02 RELATED SECTIONS

- A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.03 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 1997a.
- B. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2000.
- C. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2000.
- D. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 1995.
- E. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile; 1999.
- F. ASTM F 1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 1999.
- G. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, and Vinyl Composition; Federal Specifications and Standards; Revision B, 1974, and Amendment 1, 1979.

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for fire performance ratings as follows:
 - 1. Classification: Class 1 as per ASTM E-648
 - 2. Critical radiant flux (CRF): Minimum 0.45 watt per square centimeter, per ASTM E 648.
 - 3. Flame spread: Maximum 75, per ASTM E 84.
 - 4. Smoke developed: Maximum 450, per ASTM E 84.
 - 5. Smoke density: Maximum 450, per ASTM E 662.

1.05 SUBMITTALS

- A. See Section on Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plan for resilient sheet flooring.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit three samples, 6 x 6 inch in size illustrating color and pattern for each resilient flooring product specified.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Protect roll materials from damage by storing on end.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.08 EXTRA MATERIALS

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Provide 400 sq ft of flooring, 100 lineal feet of base, and 5 percent of installed stair materials of each type and color specified.

PART 2 PRODUCTS

2.01 MATERIALS - TILE FLOORING (VCT)

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
 - 1. Size: 12 x 12 inch.
 - 2. Thickness: 0.125 inch.
 - 3. Pattern: Marbleized.
 - 4. Manufacturers:
 - a. Armstrong World Industries, Inc: www.ceiling.com.
 - b. Azrock Industries, Inc.
 - c. Tarkett, Inc: www.tarkett.com.
 - d. Kentile Floors Inc.
 - e. Congoleum Corporation

2.02 MATERIALS - BASE

- A. Resilient Base: ASTM F 1861, Type TV, vinyl, thermoplastic; top set Style A, Straight, and as follows:
 - 1. Height: 4 inch.
 - 2. Thickness: 0.080 inch thick.

3. Finish: Satin.
4. Length: Roll (minimum 80 feet long)
5. Color: Color as selected from manufacturer's standards.
6. Manufacturers:
 - a. Same manufacturers as for Tile Flooring or one of the following.
 - b. BurkeMercer Flooring Products, Inc: www.burkemercer.com.
 - c. Johnsonite, Inc: www.johnsonite.com.
 - d. Roppe Corp: www.roppe.com.
 - e. Substitutions: See Section 016000 - Product Requirements.

2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Moldings and Edge Strips: Metal.
- D. Filler for Coved Base: Plastic.
- E. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified in 033000 and are ready to receive resilient flooring.
- B. Verify that sub-floor surfaces are dust-free, and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- C. Verify that concrete sub-floor surfaces are ready for resilient flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:
 1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
 2. Alkalinity: pH range of 5-9.
- D. Verify and/or test for the presence of curing compounds or similar products which may have applied to the concrete substrate and determine if such substances will affect installation and bond.
- E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is cured.
- C. Clean substrate.

3.03 INSTALLATION - TILE FLOORING (VCT)

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Secure metal strips before installation of flooring with stainless steel screws.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Install flooring in recessed floor access covers. Maintain floor pattern.
- J. Install feature strips where indicated. Fit joints tightly.

3.04 INSTALLATION - BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners,'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
- C. Install base on solid backing, bond tightly to wall and floor surfaces.
- D. Scribe and fit to doorframes and other interruptions.

3.05 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal and wax resilient flooring products in accordance with manufacturer's instructions.

3.08 PROTECTION OF FINISHED WORK

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

SECTION 099000

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. See Schedule - Surfaces to be Finished, at end of Section.

1.02 RELATED SECTIONS

- A. Section 081100 - Custom Steel Frames

1.03 REFERENCES

- A. ASTM D 16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products; 1996a.
- B. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 1992 (Reapproved 1997).

1.04 DEFINITIONS

- A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products and referenced preparation and application procedures.
- C. Report by technical representative of the paint/coatings manufacturer regarding substrate conditions of new and existing materials
- D. Samples: Submit three sets of paper chip samples, 3 x 3 inch in size illustrating range of colors available for each surface finishing product scheduled.
 - 1. Report shall include test results of substrates for compatibility of existing coatings and primers with scheduled coatings and moisture content of substrates.
 - 2. Include recommendations for correcting unsuitable substrate conditions.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating requirements for products and finishes.
- B. Use products which comply with New Jersey Volatile Organic Compounds (VOC) Regulations

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and other Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color and type; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Paints, Primers and Preparation Materials:
 - 1. Base Manufacturer: Benjamin Moore & Co. except where otherwise indicated. Equal and matching products of the following manufacturers may be submitted for review.

2. ICI Paints North America. (Glidden)
 3. Sherwin-Williams Co. (Con-Lux)
 4. Pittsburgh Paints (PPG)
 5. Pratt and Lambert Paints.
- B. Transparent Finishes:
1. Base Manufacturer: Benjamin-Moore, Benwood Products.
- C. Stains: Equal to products by:
1. Base Moore-Moore, Benwood Products.
- D. Substitutions: See Section 016000 - Product Requirements. Proposed substitutions shall match the color, finish and performance of the Base Manufacturer's Products.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, except field-catalyzed coatings. Prepare pigments:
1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
 2. For good flow and brushing properties.
 3. Capable of drying or curing free of streaks or sags.
- B. Primers: Tint primers to approximate color of finish coat.
- C. Finish Coats: The number of finish coats for opaque coatings is a minimum. Provide additional coats to produce a uniform, opaque finish.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Wood, Opaque, Alkyd, 3 Coat:
1. One coat of alkyd primer sealer. Backprime surface concealed from view.
 2. Semi-gloss: Two coats of alkyd enamel.
- B. Ferrous Metals, Primed, Alkyd, 2 Coat: Primed Ferrous Metals including Exposed Structural Steel.
1. Touch-up with zinc chromate primer as recommended by manufacturer.
 2. Gloss: Two coats of alkyd enamel; Impervo Enamel 133.
- C. Galvanized Metals, Alkyd, 3 Coat: Steel Doors, Frames, Rails and other Galvanized Ferrous Metals.
1. One coat galvanize primer as recommended by manufacturer.
 2. Gloss: Two coats of alkyd enamel; Impervo Enamel 133.

2.04 PAINT SYSTEMS - INTERIOR

- A. Wood, Opaque, Latex, 3 Coat: Shelving and other wood not indicated for staining, sealing, or fire retardant application.
1. One coat of latex primer sealer as recommended by manufacturer.
 2. Previously Painted Surfaces: One coat of primer or barrier coating as recommended by manufacturer to provide appropriate substrate for scheduled finish coats.
 3. Semi-gloss: Two coats of latex enamel; Regal Aqua-Glo 333.
- B. Wood, Transparent, Varnish, Stain: Wood Doors, Interior wood doors other wood items indicated for staining and sealing.
1. One coat of stain; Benwood Interior Stain.
 2. One coat of sealer; as recommended by manufacturer for substrate.

3. Satin: Two coats of varnish; Benwood Polyurethane.
- C. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
 1. One coat of latex primer.
 2. Semi-gloss: Two coats of latex enamel; Regal Acqua-Glo 333.
- D. Ferrous Metals, Primed, Latex, 2 Coat: Steel Doors and Frames, Railings and other factory primed Ferrous Metals
 1. Touch-up with primer compatible with factory primer as recommended by paint manufacturer.
 2. Previously Painted Surfaces: One coat of primer or barrier coating as recommended by manufacturer to provide appropriate substrate for scheduled finish coats.
 3. Semi-gloss: Two coats of latex enamel; Regal Aqua-Glo 333.
- E. Galvanized Metals, Latex, 3 Coat: Galvanized Steel Doors and Frames; Railings and other galvanized ferrous metals.
 1. Use this system at exterior steel doors and frames which are scheduled for different colors or finish between the exterior side and interior side.
 2. One coat galvanize primer as recommended by manufacturer.
 3. Previously Painted Surfaces: One coat of primer or barrier coating as recommended by manufacturer to provide appropriate substrate for scheduled finish coats.
 4. Semi-gloss: Two coats of latex enamel; Regal, Aqua-Glo.
- F. Gypsum Board/Plaster, Epoxy Enamel, 3 Coat: Toilet Rooms, Utility Rooms
 1. One coat of catalyzed epoxy primer as recommended by manufacturer.
 2. Gloss: Two coats of catalyzed epoxy enamel; Tile-Like Catalyzed Epoxy Coatings 378 two part coating with semi-gloss clear hardener.
- G. Paint I-TR-F - Fire-Retardant Coating, Intumescent: Wood trim, moldings, base and window/door casings.
 1. Stain: Stain to match existing wood trim, moldings, base and casings
 2. Sealer: One coat of fire-retardant primer sealer.
 3. Satin Finish Coats: Two coats of intumescent interior coating, flame/smoke rating of 25 NFPA Classification: "A"; "Flamort, Flame-Gard" manufactured by The Flamort Company.
- H. Fabrics/Insulation Jackets, Alkyd, 3 Coat: Exposed pipes, ducts and similar items.
 1. One coat of alkyd primer sealer as recommended by manufacturer.
 2. Previously Painted Surfaces: One coat of primer or barrier coating as recommended by manufacturer to provide appropriate substrate for scheduled finish coats.
 3. Eggshell: Two coats of alkyd enamel; Satin Impervo 235.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive Work as instructed by the product manufacturer.
- B. Representative of the Paint/coatings Manufacturer shall prepare a report describing new and existing surfaces with recommendations of the appropriate primer and barrier coats.
 - 1. Report shall identify any conditions which shall require preparation procedures other than typical procedures.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
 - 1. Results of testing shall be included in report by paint/coatings representative.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.
 - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

3.02 PREPARATION

- A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- F. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Plaster and Veneer Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- H. Insulated Coverings to be Painted: Remove dirt, grease, and oil from canvas and cotton.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- J. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

- K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- L. Interior Wood Items to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- M. Interior Wood Items to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces, areas where holes were drilled or cut to install hardware or similar items.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Sprayed applications are not permitted.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- F. Sand wood surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Refer to appropriate sections in Divisions 15 and 16 for schedule of color coding of equipment, duct work, piping, and conduit.
- B. Paint shop-primed equipment, where indicated.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.
- B. Owner will provide field inspection.

- C. Inspect and test questionable coated areas in accordance with manufacturer's recommendations.
 - 1. Contractor shall perform paint testing

3.06 CLEANING

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.07 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically noted.
 - 2. Fire rating labels, equipment serial number and capacity labels.
 - 3. Stainless steel items.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
 - 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
 - 2. Paint shop-primed items occurring in finished areas.
 - 3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one, opaque, coat of flat black, non specular paint to visible surfaces.
 - 4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets flat, non-specular black.
- D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

3.08 SCHEDULE - PAINT SYSTEMS

- A. Concrete, Concrete Block, Masonry: Finish all surfaces exposed to view.
 - 1. Interior: semi-gloss or epoxy
- B. Gypsum Board: Finish all surfaces exposed to view.
 - 1. Interior Ceilings: Flat
 - 2. Interior Walls and Soffits: semi-gloss.
- C. Plaster/Veneer Plaster: Finish all surfaces exposed to view.
 - 1. Interior Walls and Ceilings: Eggshell for walls; flat for ceilings
- D. Wood: Finish all surfaces exposed to view.
 - 1. Exterior trim, fascias and soffits: Semi-gloss
 - 2. Interior trim and frames: semi-gloss.
- E. Wood Doors: Stained and Sealed, satin finish
- F. Steel Doors and Frames: Finish all surfaces exposed to view, semi-gloss for interior; gloss for exterior.
- G. Steel Fabrications: Finish all surfaces exposed to view.
 - 1. Exterior: gloss; finish all surfaces, including concealed surfaces, before installation.

- H. Galvanized Steel: Finish all surfaces exposed to view.
 - 1. Exterior: gloss
 - 2. Interior: semi-gloss
- I. Shop-Primed Metal Items: Finish all surfaces exposed to view.
 - 1. Finish the following items:
 - a. Exposed surfaces of lintels.
 - b. Exposed surfaces of steel stairs and railings.
 - c. Exposed structural steel columns and beams.
- J. Plywood for Electrical Panels and Equipment: low luster, finish all surfaces exposed to view with intumescent paint; Black
- K. Pipe and Duct Insulation Jackets: Finish all surfaces exposed to view; semi-gloss.

3.09 SCHEDULE - COLORS

- A. Architect to provide color schedule after submittals for this section are accepted

END OF SECTION

SECTION 101700

PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments.
 - 1. Overhead braced, floor-mounted system as shown on Drawings.

1.02 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry: Concealed wood framing and blocking for compartment support.
- B. Section 108000 - Toilet Accessories.

1.03 REFERENCES

- A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1996b.

1.04 SUBMITTALS

- A. See Section on Submittal Procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit three samples of partition panels, 3 x 3 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 WARRANTY

- A. Manufacturer's 15-year warranty against breakage and corrosion for material replacement.
- B. Contractor's warranty as indicated in the General Conditions and Supplementary Conditions also applies.

1.06 COORDINATION

- A. Coordinate partitions with Plumbing work
- B. Coordinate the work with placement of support framing and anchors in wall.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Plastic Toilet Compartments: This Section includes products as manufactured by Santana Products Co. Inc.
- B. Products which are of equivalent quality, design, color selection, appearance and function by the following manufacturer may be submitted:
 - 1. Ampco Products, Inc
 - 2. Capitol Partitions, Inc
 - 3. Substitutions: See Product Requirements.

2.02 FIRE RESISTANCE REQUIREMENTS

- A. Furnish products which comply with the following minimum requirements
 - 1. Smoke Developed: 15 or less as per ASTM D2843
 - 2. Self-Ignition: 650 deg. F or greater as per ASTM D1929 - 77
 - 3. Rate of Burn: less than 2.0 cm/min. as per ASTM D635-81

2.03 COMPONENTS

- A. Toilet Compartments: Solid molded plastic panels, doors, brackets, shoes and pilasters, floor-mounted headrail-braced.
 - 1. Color: as selected from manufacturer's standards for series listed below.
 - a. Colors for components may be selected from one or more of the following: Designer Series, "Poly-Marble HD" or "Poly-Granite HD".
- B. Door and Panel Dimensions:
 - 1. Thickness: 1 inch.
 - 2. Door Width: 24 inch except where indicated otherwise.
 - 3. Door Width for Handicapped Use: 36 inch, out-swinging.
 - 4. Height: 58 inch.
 - 5. Thickness of Pilasters: 1 inch.
- C. Urinal Screens: Wall mounted with continuous panel brackets; size as shown on drawings.

2.04 ACCESSORIES

- A. Pilaster Shoes: solid plastic; concealing floor fastenings and adjusters.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
 - 2. Provide ceiling attachment using two adjustable hanging studs, attached to above-ceiling framing.
- B. Brackets: For connections between panels, pilasters and walls; solid plastic channels with one or two legs depending upon connection conditions.
- C. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
 - 1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- D. Hardware: Polished chrome plated non-ferrous cast metal:
 - 1. Integral, concealed hinges, gravity type, with nylon cam and stainless steel insert; two per door.
 - 2. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.

- 3. Coat hook with rubber bumper; one per compartment, mounted on door.
- 4. Provide door pull for outswinging doors.
- E. Overhead Brace: Anodized aluminum; grab-resistant design with polished stainless steel brackets.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements and conditions are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify that blocking bracing and anchorage built into partitions complies with manufacturer's requirements and warranty requirements.
- D. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attached panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster centerlines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 ERECTION TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return outswinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 108000

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Accessories for toilet rooms.
- B. Pipe insulation for barrier free lavatories
- C. Grab bars.

1.02 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry: Blocking.
- B. Section 101700 - Plastic Toilet Compartments.

1.03 REFERENCES

- A. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1997a.
- B. ASTM A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 1996.
- C. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 1996b.
- D. ASTM C 1036 - Standard Specification for Flat Glass; 1991 (Reapproved 1997).
- E. FS DD-M-411 - Mirrors, Glass; Federal Specifications and Standards; Revision C, 1990.

1.04 SUBMITTALS

- A. See Section 013400 – Submittal Procedures, for submittal procedures.
- B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.05 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Products listed on the Schedule are made by Bobrick Washroom Equipment Inc.
 - 1. Products which are of equivalent quality, design, appearance and function by the following manufacturer may be submitted:
 - a. American Specialties, Inc.
 - b. Bradley Corp.
- B. Where products are specified without identifying a manufacturer, provide product which complies with the requirements and as indicated on the drawings.
 - 1. Substitutions: Section 016000 - Product Requirements.
 - 2. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Provide four keys for each accessory to Owner; master key all lockable accessories.
- C. Stainless Steel Sheet: ASTM A 666, Type 304.
- D. Stainless Steel Tubing: ASTM A 269.
- E. Stainless Steel Mirror: Type 304.
- F. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type, torx head center pin reject type.
- G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Galvanizing for Items other than Sheet: ASTM A 123/A 123M to 1.3-oz/sq yd. Galvanize ferrous metal and fastening devices.
- C. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- D. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

Refer to Drawings for locations of items included in this Section.

- A. Toilet Paper Dispenser: (4 total)
 - 1. Jumbo-roll toilet paper dispenser, surface mounted, 18-8 S, type 304, 20 gauge cabinet, steel; with tumbler lock. 18 gauge door, 18-8 S, type 304, satin stainless steel; one-piece seamless construction; wide viewing slot revealing toilet tissue supply. Concealed wall mounting.
 - 2. Dispensing System: Dispensing system shall be high-impact ABS and shall accommodate two toilet tissue rolls up to 10" diameter with 3" diameter core; and

- equipped with a sliding access panel that exposes one roll at a time. Spindles shall be convertible in the field to dispense 2-1/4" diameter core rolls.
3. Product: B-2892 manufactured by Bobrick.
- B. Sanitary Napkin Disposal: (2 total)
1. Surface mounted container and cover shall be 18-8 S, type 304, 22 gauge stainless steel. Exposed surfaces shall have satin finish. Cover to be secure to container with a full length stainless steel piano hinge.
 2. Product: Series B-270 manufactured by Bobrick.
- C. Pipe Insulation at Lavatories: Application: At all barrier free lavatories and sinks (4 lavs total)
1. Flexible molded closed cell vinyl insulation components which enclose waste lines, traps and shut off valves. Fasteners: Nylon. Paintable; Burning Characteristics: self-extinguishing as per ASTM D635
 2. Complies with ADA, article 4.19.4 ANSI A117.1 and BOCA article P-1203.4
 3. Product: 'Handi-Lav-Guard' Model: 102G manufactured by Truebro Inc. or equal.
- D. Soap Dispenser: (3 total)
1. Liquid soap dispenser, surface mounted, 20 gauge, one piece, satin stainless steel construction; push type soap valve, unbreakable window gage refill indicator, with lock. Concealed wall mounting.
 2. Minimum Capacity: 40 ounces.
 3. Product: B-4112 "Contura" manufactured by Bobrick.
- E. Mirrors: All locations where indicated (3 total)
1. Stainless steel of type 304 (18-8), 20 gauge stainless steel, polish No.8 Architectural bright finish.
 2. Size: As indicated on drawings.
 3. Secure to wall with tamper-resistant mounting screws.
 4. Backing: 1/4" return to conceal 1/4" tempered Masonite backing bonded to mirror with adhesive.
 5. Model: 748 manufactured by Bradley.
- F. Grab Bars: Type 304 stainless steel, 18 gauge, 1-1/4 inches outside diameter, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar. (2-36" and 6-42" total)
1. For all applications of grab bars in toilets rooms.
 2. Length and configuration: As indicated on drawings.
- G. Trash Receptacles: All locations where indicated (2 total)
1. Waste Receptacle, surface mounted, one piece, satin stainless steel construction; Width = inches, Depth = 6 inches, Height = 18 inches, Shape = Rectangle.
 2. Minimum Capacity: 6.4 gallons
 3. Product: B-279 manufactured by Bobrick.
- H. Hand Dryer: All locations where indicated (2 total)
1. Refer to mechanical specification for information.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

- C. Verify locations of items to be installed by the Owner to coordinate blocking installation.
- D. Install accessories following the dimensional requirements shown on the Drawings.
- E. Verify that field measurements are as indicated on drawings.
- F. See Sections 061000 and the Drawings for installation of blocking, reinforcing plates, and concealed anchors in walls.
 - 1. Verify that preparations, blocking and reinforcing is in place and is correct.

3.02 PREPARATION

- A. Install blocking in stud walls for all wall mounted Toilet Accessories included in this Section and for items to be furnished by the Owner. Advise the Owner of locations of blocking installed for Owner furnished accessories.
- B. Install in CMU walls with masonry anchors for all wall mounted Toilet Accessories included in this Section and for items to be furnished by the Owner.
- C. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights and Locations: as indicated on drawings
 - 1. Install accessories in compliance with CABO/ANSI A117.1 and the Americans with Disabilities Act (ADA).
 - 2. Should the drawings conflict with the requirements of CABO/ANSI A117.1 and ADA, the requirements of CABO/ANSI A117.1 and ADA shall govern.
- D. Install pipe insulation on exposed supply and waste piping at barrier free lavatories.

END OF SECTION

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

1.01 SCOPE AND INTERPRETATION

- A. These Specifications and accompanying Drawings provide for the furnishing, setting and connection of the installation of drainage and water supply systems.
- B. The specifications and Drawings require the Contractor to provide all labor, materials, equipment and appliances to perform of all Work pertaining or incidental thereto, which is needed to complete the Work shown on the Drawings and called for in the Specifications.
- C. The complete systems and the Work shall be so installed as to give proper and continuous service under all conditions, and shall be in accordance with the requirements of all public authorities having jurisdiction and to the complete satisfaction of the Owner. Any Work shown on the Drawings and not particularly described in the specifications, or vice versa or any Work which may be deemed necessary to complete the Contract shall be provided by the Contractor as part of its Contract.
- D. For purposes of clearness and legibility, plumbing Drawings are essentially diagrammatic and size and location of equipment are drawn to scale wherever possible. The Drawings indicate size, connection points and routes of pipe. It is not intended, however, that all offsets, rises and drops are shown. Provide piping as required to fit structure, avoid obstruction, and retain clearances, headroom openings and passageways.
- E. Fixtures shown and described on the Drawings shall be connected with waste, vent and water supply piping in accordance with the requirements of New York State Building Code, despite the omission of indication of such piping on the plans. Any question involving the installation of such piping shall be referred to the Engineer for resolution.
- F. Scope of Work: The plumbing and drainage work of this contract shall include but shall not be limited to the following systems, equipment and services:
 - 2. Equipment furnished under other Sections of this Contract: Including fire protection equipment shall be piped.
 - 3. Piping, Equipment Supports, and seismic restraints: To comprise all restraints, hangers, pipe guides, rods, beam clamps, brackets, pipe anchors, other attachments, floor flanges, masonry anchors, bolts, nuts, washers, and other items as required to fully support all piping and equipment installed under this contract inclusive of spring hangers, seismic restraints, and vibration mounts where recommended by equipment manufacturers, where required to meet noise abatement regulations and as necessary to prevent piping and equipment vibrations being transmitted to structure.
 - 4. Provide unions and stop valves at all equipment connections and where required for service, repairs and draining.
 - 5. Piping - General: Piping, Piping installation or hook-up shall mean a complete installation in all respects including pipe, fittings, valves, unions, traps, strainers,

specialties and other miscellaneous items to make piping systems and equipment operational.

6. Painting and Identification: As specified in their respective sections of this Contract.
7. Miscellaneous Work: Included shall be all items of materials, piping, controls, wiring and other miscellaneous items not specifically shown on Contract Drawings or called for herein but which are normally furnished and required for a complete installation of this type.
8. Sealing of Openings: Openings left in walls, floors, ceilings or partitions shall be sealed. Finish shall match existing adjoining finish in all respects.
9. Coordination Drawings: The plumbing contractor shall cooperate with the Fire Protection Systems, and Electrical contractors in the development of the coordination drawings. The specified order in which the various trade contractors impose their work on the coordination drawings is not intended to grant priority to any one trade contractor in the allocation of space. At the completion of this phase, hold a coordination meeting to eliminate any interference among the trades that the drawings indicate and to avoid any conflicts in installing the Work.

1.02 CODES AND STANDARDS

- A. It shall be unlawful for any person to perform the work referred to under this Plumbing and Drainage Specifications and/or shown on the Plumbing and Drainage Contract Drawings unless such person is a licensed master plumber, partnership, corporation or other business association as permitted by the New York State Building Code and unless such work is performed under the direct and continuing supervision of a licensed master plumber.
- B. Where requirements for products, materials, systems, equipment, methods and other portion of the work specified herein exceed minimum requirements of regulatory agencies having jurisdiction over the construction work, contractor shall comply with such requirements specified herein, unless specifically approved otherwise by the Owner.

1.03 TORCH BURNING OPERATION

- A. The storing and use of oxygen and combustible gases in conjunction with torch burning apparatus is subject to the Rules and Regulations of the New York State Building and Fire Code. Fire watches shall be provided during all operations using torches for burning, cutting or welding.
- B. The cost of permits, certificates, fire watches, apparatus and other items required in the torch burning operation shall be borne by the Contractor at no additional cost to the Owner.

1.04 PROTECTION OF MATERIALS AND WORK

- A. Existing Building
 1. Open ends of piping shall be temporarily closed by a proper fitting, until piping is approved and ready for service.

2. Equipment and other items shall be protected during the progress of the Work. When the building is practically complete and ready for use the fixtures and other items shall be cleaned and all metal work polished and the entire installation put in perfect working order.

1.05 GUARANTEES AND WARRANTIES

- A. The Requirements of Section G01740 and this Article shall apply to Guarantees and Warranties.
- B. Contractor's Guarantees: The Contractor guarantees that all Work of this Contract is free from all defects, and is as specified, and that should any defects, which cannot be proven to have been caused by improper use, develop within the space of one year from the date of substantial completion of the Work, such defects shall be made good by the Contractor, free of cost to the Owner.

1.07 OPENINGS AND CHASES

- A. Openings through exterior foundation walls shall be made watertight by the Contractor after pipes, conduits and other items passing through the wall have been installed. This building is planned and detailed, and is the intent of these specifications to provide a structure that will prevent the penetration by rodents and vermin of any vacant space where they might find a harborage. The Contractor will be held responsible for securing this condition by the closing of all points of access to such spaces, including the passage of piping and conduits, through all walls, partitions, ceilings and furred out spaces, the closing of access to voids in hollow tile or cinder blocks. There shall be a special inspection of the building with regard to this matter before final acceptance.

1.08 INSTRUCTION OF STAFF

- A. After the plumbing, drainage systems have been tested, and fixtures, apparatus and all other items adjusted and operating properly to the satisfaction of the Owner, Contractor shall furnish a competent person to instruct the staff in the operation and maintenance of the systems. Contractor shall video record all the training sessions for various equipment and systems as specified in individual sections of these Specifications. Determination of the date and time of such instruction shall be under the direction of the Owner.

1.10 SUBMITTALS

- A. Formal submission for approval of manufacturer is required as per manufacturer/model number or series listed in the specification. Formal submissions are required for materials and appurtenances (ex. sheet metal, pipes, etc.) as defined in the specification. Submittals are always required to verify capacity. Schedules, installation instructions, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.

1.11 CLEANING AND REPAIR

- A. At the completion of the Work and before the final inspection is made the Contractor shall thoroughly clean all apparatus, appurtenances, piping, and leave these items free from all marks, scratches, stains, and other damage. All equipment shall be cleaned and left in

condition to operate, and the work, as a whole, left in perfect working order. Remove all tools, debris and excess materials from the premises.

- B. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, P&D equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

END OF SECTION

SECTION 22 05 23

VALVES

PART 1 GENERAL

1.01 ABBREVIATIONS

- A. IBBM: Iron body, bronze mounted.
- B. OS&Y: Outside screw and yoke.

1.02 SUBMITTALS

- A. Product Data: Manufacturer's catalog sheets and specifications for each valve type.

1.03 MAINTENANCE

- A. Special Tools:
 - 1. One wrench for each type and size wrench operated plug valve.

PART 2 PRODUCTS

2.01 VALVES - GENERAL

- A. Valve Standardization: Valves from one or more manufacturers may be used, however valves supplied for each specific valve type shall be the product of one manufacturer.
- B. Valves shall be first quality, free from all imperfections and defects, with body markings indicating manufacturer and rating.
- C. Valve parts of same manufacturer, size and type shall be interchangeable.
- D. Manually operated gate, globe and angle valves shall be of rising stem type, unless otherwise specified.
- E. Valves which use packing, shall be capable of being packed when wide open and under full working pressure.
- F. Size valves the same size as the piping in which they are installed, unless specified otherwise.

2.02 GATE VALVES

- A. 125 psig WSP, 200 psig WOG up to 12 inch size, and 150 psig WOG for 14 inch and 16 inch sizes; IBBM OS&Y, bolted bonnet, solid wedge disc, and threaded or flanged ends depending on size. Acceptable Valves: Crane 464-1/2, 465-1/2, Hammond IR1140, Milwaukee F2885, Nibco T6170 & F6170, and Stockham G620 & G623

2.03 GLOBE AND ANGLE VALVES

N/A

2.04 CHECK VALVES

- A. 125 psig WSP, 200 psig WOG, IBBM, horizontal swing, bolted bonnet, regrindable and renewable seat ring and disc, and threaded or flanged ends depending on size. Discs on valves 4 inch size and larger may be cast iron with bronze face. Acceptable Valves: Crane 372, & 373, Hammond IR1124, Jenkins 623CJ & 624CJ, Milwaukee F2974, Nibco F918, and Stockham G927 & G931.

2.05 PLUG VALVES

N/A

2.06 BUTTERFLY VALVES

N/A

2.07 WATER PRESSURE REDUCING VALVES

N/A

2.08 SAFETY AND RELIEF VALVES

N/A

2.09 NEEDLE STOP VALVES

N/A

2.10 GAGE COCKS

N/A

2.11 BALL VALVES

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- A. 150 psig WSP, 600 psig WOG, 2 piece bronze body, solid blow-out proof stem, teflon seats, chrome plated brass ball, teflon seals, corrosion resistant steel lever handles with vinyl grips, balancing stop, and threaded or solder ends.
Acceptable Manufacturers: Conbraco, Hammond, Milwaukee, Nibco, and Watts.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Install valves at locations noted on the drawings or specified.

END OF SECTION

SECTION 22 05 29

PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Companion high density filler pieces for installation over the top 180 degree surface of pipe or tubing, at points of support where a combination clevis hanger, insulation shield and high density insulating saddle are installed.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. N/A

1.03 SUBMITTALS

- A. Shop Drawings:
 - 1. Details of trapeze hangers and upper hanger attachments for piping 4 inches in diameter and over. Include the number and size of pipe lines to be supported on each type of trapeze hanger.
 - 2. Details of pipe anchors.
 - 3. Details and method of installing sway braces for cast iron soil pipe.
- B. Product Data: Catalog sheets, specifications and installation instructions for each item specified except fasteners.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with the applicable requirements of the ASME B31 Piping Codes.
 - 2. Unless otherwise shown or specified, comply with the requirements of the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS) Standards SP-58, and SP-69.
 - 3. Materials for use in Sprinkler Systems and Standpipe and Hose Systems shall comply with the requirements of NFPA 13 and NFPA 14 as applicable.

PART 2 PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

- A. Combination clevis hanger, pipe insulation shield and vapor barrier jacketed high density insulating saddle with companion high density filler piece.
 - 1. Insulating saddles and filler pieces shall be of the same thickness and materials as the adjoining pipe insulation. Saddles shall cover the lower 180 degrees of the pipe or tubing, and companion filler pieces shall cover the upper 180 degrees of the pipe or tubing. Physical sizes, gages, etc. of

the components of insulated hangers shall be in accordance with the following schedule:

PIPE OR TUBING SIZE (Inches)	SHIELD LENGTH (Inches)	SHIELD GAGE	SADDLE LENGTH (Inches)	VAPOR BARRIER JACKET LENGTH (Inches)
Up to 2-1/2	4	16	6	10

- B. Pipe Insulation Shields: Fabricated of steel, with a minimum arc of 180 degrees, unless otherwise indicated. Shields for use with hangers and supports, with the exception of combination clevis type hangers, shall be in accordance with the following schedule:

PIPE OR TUBING SIZE (Inches)	SHIELD LENGTH (Inches)	SHIELD GAGE
Up to 2-1/2	8	18

- C. Pipe Covering Protection Saddles: 3/16 inch thick steel, of sufficient depth for the insulation thickness specified, notched so that saddle contact with the pipe is approximately 50 percent of the total axial cross section. Saddles for pipe 12 inches in size and larger shall have a center support.
- D. Pipe Hangers: Height adjustable standard duty clevis type, with cross bolt and nut.
1. Pipe spreaders or spacers shall be used on cross bolts of clevis hangers, when supporting piping 10 inches in size and larger.
 2. Swivel ring type hangers will be allowed for sprinkler piping up to a maximum of 2 inches in size.
- E. Adjustable Floor Rests and Base Flanges: Steel.
- F. Hanger Rods: Mild, low carbon steel, fully threaded or threaded at each end, with two nuts at each end for positioning rod and hanger, and locking each in place.
- G. Riser Clamps: Malleable iron or steel.

2.02 ANCHORS AND ATTACHMENTS

- A. Sleeve Anchors (Group II, Type 3, Class 3): Molly's Div./USM Corp. Parasleeve Series, Ramset's Dynabolt Series, or Red Head/Phillips AN, HN, or FS Series.
- B. Wedge Anchors (Zinc Plated, Group II, Type 4, Class 1): Hilti's Kwik Bolt Series, Molly's Div./USM Corp. Parabolt PB Series, Ramset's Trubolt T Series, or Red Head/Phillips WS Series.
- C. Self-Drilling Anchors (Group III, Type 1): Ramset's RD Series, or Red Head/Phillips S Series.

- D. Non-Drilling Anchors (Group VIII, Type 1): Ramset's Dynaset DS Series, Hilti's HDI Series, or Red Head/Phillips J Series.
- E. Stud Anchors (Group VIII, Type 2): Red Head/Phillips JS Series.
- F. Beam Clamps: Forged steel beam clamp, with weldless eye nut (right hand thread), steel tie rod, nuts, and washers, Grinnell's Fig No. 292 (size for load, beam flange width, and rod size required).
- G. Metal Deck Ceiling Bolts: B-Line Systems' Fig. B3019.
- H. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 800 lbs/ft: Kindorf's D-986.
 - 2. Load Rating 1500 lbs/ft: Kindorf's D-980.
 - 3. Load Rating 3000 lbs/ft: Hohmann & Barnard's Inc. Type CS-H.
 - 4. Load Rating 4500 lbs/ft: Hohmann & Barnard's Inc. Type CS-HD.
- I. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded to receive 3/4 inch diameter machine bolts.
- J. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept 3/4 inch diameter bolts having special wedge shaped heads.

2.03 FASTENERS

- A. Bolts, Nuts, Washers, Lags, and Screws: Medium carbon steel; size and type to suit application; galvanized for high humidity locations, and treated wood; plain finish for other interior locations. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work.

2.04 SHOP PAINTING AND PLATING

- A. Hangers, supports, rods, inserts and accessories used for pipe supports, unless chromium plated, cadmium plated or galvanized shall be shop coated with metal primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper pipe or copper tubing.
- B. Hanger supports for chromium plated pipe shall be chromium plated brass.

PART 3 EXECUTION

3.01 PREPARATORY WORK

- A. Place inserts into construction form work expeditiously, so as not to delay the Work.

3.02 INSTALLATION

- A. Do not hang or support one pipe from another or from ductwork.
 - 1. Do not bend threaded rod.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- B. Support all insulated horizontal piping conveying fluids below ambient temperature, by means of hangers or supports with insulation shields installed outside of the insulation.
- C. Space hangers or supports for horizontal piping on maximum center distances as listed in the following hanger schedules, except as otherwise specified, or noted on the Drawings.
1. For Steel, and Threaded Brass Pipe:

PIPE SIZE (Inches)	MAXIMUM SPACING (Feet)
1 and under	8
1-1/4 and 1-1/2	9
2	10
2-1/2 and up	12

2. For Copper Pipe and Copper Tubing:

PIPE OR TUBING SIZE (Inches)	MAXIMUM SPACING (Feet)
1-1/2 and under	6
2 and over	10

3. For Directional Changes: Install a hanger or support close to the point of change of direction of all pipe runs in either a horizontal or vertical plane.
4. For Concentrated Loads: Install additional hangers or supports, spaced as required and directed, at locations where concentrated loads such as in-line pumps, valves, fittings or accessories occur, to support the concentrated loads.
5. For Branch Piping Runs and Runouts Over 5 feet In Length: Install a minimum of one hanger, and additional hangers if required by the hanger spacing schedules.
6. Parallel Piping Runs: Where several pipe lines run parallel in the same plane and in close proximity to each other, trapeze hangers may be submitted for approval. Base hanger spacing for trapeze type hangers on the smallest size of pipe being supported. Design the entire hanger assembly based on a safety factor of five, for the ultimate strength of the material being used.
9. Support floor drain traps from the overhead construction, with hangers of type and design as required and approved. Overhead supports are not required for floor drain traps installed directly below earth supported concrete floors.
- D. Size hanger rods in accordance with the following:

PIPE OR TUBING SIZE (Inches)	SINGLE ROD HANGER SIZE (Inches)		DOUBLE ROD HANGER SIZE (Inches)	
	PIPE	TUBING	PIPE	TUBING
1/2 to 2	3/8	1/4	3/8	1/4
2-1/2 and 3	1/2	3/8	3/8	1/4

1. Size hanger rods, for piping over 12 inches in size and multiple line supports, based on a safety factor of five for the ultimate strength of the materials being used.
 2. Secure hanger rods as follows: Install one nut under clevis, angle or steel member; one nut on top of clevis, angle or steel member; one nut inside insert or on top of upper hanger attachment and one nut and washer against insert or on lower side of upper hanger attachment. A total of four nuts are required for each rod, two at upper hanger attachment and two at hanger.
- E. Vertical Piping:
1. Support vertical risers of piping systems, by means of heavy duty hangers installed close to base of pipe risers, and by riser clamps with extension arms at intermediate floors, with the distance between clamps not to exceed 25 feet, unless otherwise specified. Support pipe risers in vertical shafts equivalent to the aforementioned. Install riser clamps above floor slabs, with the extension arms resting on floor slabs. Provide adequate clearances for risers that are subject to appreciable expansion and contraction, caused by operating temperature ranges.
 2. Support extension arms of riser clamps, secured to risers to be insulated for cold service, 4 inches above floor slabs, to allow room for insulating and vapor sealing around riser clamps.
 3. Install intermediate supports between riser clamps on maximum 6 foot centers, for copper tubing risers 1-1/4" in size and smaller, installed in finished rooms or spaces other than mechanical equipment machine or steam service rooms, or penthouse mechanical equipment rooms.
 4. Support cast iron risers, by means of heavy duty hangers installed close to the base of the pipe risers, and 1/4 inch thick malleable iron or steel riser clamps with extension arms at each floor level, with the distance between clamps not to exceed 25 feet. Support cast iron risers in vertical shafts equivalent to the aforementioned.
 5. Support hubless cast iron risers, by means of heavy duty hangers installed close to the base of the pipe risers, and by malleable iron or steel riser clamps with the extension arms at each floor level, with the distance between clamps or intermediate supports not to exceed 12 feet. Support risers in vertical shafts equivalent to the aforementioned.
- F. Floor Supports: Install adjustable yoke rests with base flanges, for the support of piping, unless otherwise indicated on the Drawings. Install supports in a manner, which will not be detrimental to the building structure.

- G. Underground Cast Iron Pipe Supports: Firmly bed pipe laid underground, on solid ground along bottom of pipe. Install masonry piers for pipe laid in disturbed or excavated soil or where suitable bearing cannot be obtained. Support pipe, laid proximate to building walls in disturbed or excavated soil, or where suitable bearing cannot be obtained, by means of wall brackets or hold-fasts secured to walls in an approved manner.

3.03 UPPER HANGER ATTACHMENTS

- A. General:
 - 1. Secure upper hanger attachments to overhead structural steel, steel bar joists, or other suitable structural members.
 - 2. Do not attach hangers to steel decks that are not to receive concrete fill.
 - 3. Do not attach hangers to precast concrete plank decks less than 2-3/4 inches thick.
 - 4. Do not use flat bars or bent rods as upper hanger attachments.
- B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by pipe support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of five.
 - 1. Do not use drive-on beam clamps.
 - 2. Do not support piping over 4 inches in size from steel bar joists. Secure upper hanger attachments to steel bar joists at panel points of joists.
 - 3. Do not drill holes in main structural steel members.
 - 4. Beam clamps, with tie rods as specified, may be used as upper hanger attachments for the support of piping, subject to clamp manufacturer's recommended limits.
- C. Attachment to Existing Cast-In-Place Concrete:
 - 1. For piping up to a maximum of 4 inches in size, secure hangers to overhead construction with self-drilling type expansion shields and machine bolts.
 - 2. Secure hangers to wall or floor construction with single unit expansion shields or self-drilling type expansion shields and machine bolts.

3.04 ANCHORS, RESTRAINTS, RIGID SUPPORTS, STAYS AND SWAY BRACES

- A. Install pipe anchors, restraints and sway braces, at locations noted on the Drawings. Design anchors so as to permit piping to expand and contract freely in opposite directions, away from anchor points. Install anchors independent of all hangers and supports, and in a manner that will not affect the structural integrity of the building.
- B. Cast Iron Soil Piping Systems:
 - 1. Where piping is suspended on centers in excess of 18 inches by means of non-rigid hangers, provide sway braces, of design, number and location in accordance with the Cast Iron Soil Pipe Institute's Cast Iron Soil Pipe and Fittings Handbook to prevent horizontal pipe movement.
 - 2. Additionally, brace piping 5 inches and larger to prevent horizontal movement and/or joint separation. Provide braces, blocks, rodding or

other suitable method at each branch opening, or change of direction in accordance with the Cast Iron Soil Pipe Institute's Cast Iron Soil Pipe and Fittings Handbook to prevent horizontal pipe movement.

3.05 PIPING IN TUNNELS

- A. Support piping in tunnels on adjustable stanchions, fabricated in accordance with the details on the Drawings, unless otherwise indicated. Install, secure and be responsible for the proper locations of all cast-in-place inserts and stanchion supports, in ample time so as not to delay construction Work. Secure tops of stanchions to overhead construction, as required and approved.

3.06 COMBINATION CLEVIS HANGER, PIPE INSULATION SHIELD AND VAPOR BARRIER JACKETED HIGH DENSITY INSULATING SADDLES

- A. Install a combination clevis hanger, pipe insulation shield and vapor barrier jacketed high density insulating saddles, at all points of support for piping or tubing to be insulated for cold service. Furnish companion high density vapor barrier jacketed saddle pieces, of the same material, thickness and length, for installation over the top 180 degree surface of pipe or tubing, at each point of support where an insulated clevis hanger is utilized.

3.07 PIPE INSULATION SHIELDS

- A. Unless otherwise specified, install a pipe insulation shield, at all points of support. Center shields on all hangers and supports outside of high density insulation insert, and install in such a manner so as not to cut, or puncture jacket.

3.08 PIPE COVERING PROTECTION SADDLES

- A. Install pipe covering protection saddles at all points of support, for steel piping 6 inches in size and larger, insulated with hot service insulation. Weld saddles to piping to insure movement with pipe.

END OF SECTION

SECTION 22 05 53

PIPE AND VALVE IDENTIFICATION

PART 1 GENERAL

1.01 REFERENCES

- A. ANSI A13.1 - Scheme for Identification of Piping Systems.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions for each item specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. W.H. Brady Co., Milwaukee, WI.
- B. Emed Co., Buffalo, NY.
- C. Panduit Corp., Tinley Park, IL.
- D. Seton Nameplate Corp., New Haven, CT.

2.02 PIPE MARKERS AND ACCESSORIES

- A. Snap-on Marker: One piece wrap around type constructed of precoiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, 3/4 inch adhesive strip on inside edge, and 360 degree visibility.
- B. Strap-On Marker: Strip type constructed of precoiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, factory applied grommets, and pair of stainless steel spring fasteners.
- C. Stick-On Marker: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, and integral flow arrows for applications where flow arrow banding tape is not being used.
- D. Pipe Marker Legend and Color Field Sizes:

OUTSIDE DIAMETER OF PIPE OR INSULATION (Inches)	LETTER SIZE (Inches)	LENGTH OF COLOR FIELD (Inches)
3/4 to 1-1/4	1/2	8
1-1/2 to 2	3/4	8
2-1/2 to 6	1-1/4	12

- E. Banding Tapes: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating.
 - 1. Plain Tape: Unprinted type; color to match pipe marker background.
 - 2. Flow Arrow Tape: Printed type with integral flow arrows; color to match pipe marker background.
- F. Pipe Size Labels: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, vertical reading pipe size in inches, and legend size matching adjacent pipe marker.

2.03 PIPE SERVICE IDENTIFICATION TAGS

- A. Type: No. 19 B & S gage brass, with 1/4 inch high pipe service abbreviated legend on one line, over 1/2 inch high pipe size legend in inches, both deep stamped and black filled; and 3/16 inch top hole for fastener.
- B. Size: 2 inch square tag.
- C. Fasteners: Brass "S" hook or brass jack chain of size as required for pipe to which tag is attached.

2.04 VALVE SERVICE IDENTIFICATION TAGS

- A. Type: No. 19 B & S gage brass, with 1/4 inch high valve service abbreviated lettering on one line over 1/2 inch high valve service chart number, both deep stamped and black filled; and with 3/16 inch top hole for fastener.
- B. Sizes:
 - 1. Plumbing Use: 1-1/2 inch hexagon.
- C. Fasteners: Brass "S" hook or brass jack chain of size as required for valve stem or handle to which tag is attached.

2.05 VALVE SERVICE IDENTIFICATION CHART FRAMES

- A. Type: Satin finished extruded aluminum frame with rigid clear plastic glazing, size to fit 8-1/2 x 11 inches valve chart.

PART 3 EXECUTION

3.01 PREPARATION

- A. Complete testing, insulation and finish painting work prior to completing the Work of this Section.
- B. Clean pipe surfaces with cleaning solvents prior to installing piping identification.
- C. Remove dust from insulation surfaces with clean cloths prior to installing piping identification.

3.02 INSTALLATION

- A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Stick-On Pipe Markers:
 - 1. Install minimum of 2 markers at each specified location, 90 degrees apart on visible side of pipe.
 - 2. Encircle ends of pipe markers around pipe or insulation with banding tape with one inch lap. Use plain banding tape on markers with integral flow arrows, and flow arrow banding tape on markers without integral flow arrows.
- C. Pipe Size Labels: Install labels adjacent to each pipe marker and upstream from flow arrow. Install a minimum of 2 pipe size labels at each specified location, 90 degrees apart on visible side of pipe.
- D. Pipe Service Identification Tags: Attach tags to piping being identified with "S" hooks or jack chains.

3.03 PIPING IDENTIFICATION SCHEDULE

- A. Piping Identification Types:
 - 1. Piping or Insulation under 3/4 inch od: Pipe identification tags.
 - 2. Piping or Insulation 3/4 inch to 5-7/8 inch od: Snap-on marker or stick-on marker.
 - 3. Piping or Insulation 6 inch od and Larger: Strap-on marker or stick-on marker.
- B. Identify exposed piping, bare or insulated, as to content, size of pipe and direction of flow, with the following exceptions:
 - 1. Piping in non-walk-in tunnels or underground conduits between manholes.
 - 2. Piping in furred spaces or suspended ceilings, except at valve access panels where valves and piping shall be identified as specified for exposed piping systems.
 - 3. Piping in finished spaces such as offices, class rooms, wards, toilet rooms, shower rooms and spaces as specified.

- C. Locate piping identification to be visible from exposed points of observation.
 - 1. Locate piping identification at valve locations; at points where piping enters and leaves a partition, wall, floor or ceiling, and at intervals of 20 feet on straight runs.
 - 2. Where 2 or more pipes run in parallel, place printed legend and other markers in same relative location.

3.04 VALVE IDENTIFICATION SCHEDULE

- A. Valve Service Identification Tags:
 - 1. Tag control valves, except valves at equipment, with a brass tag fastened to the valve handle or stem, marked to indicate service and numbered in sequence for the following applications:
 - a. Domestic water valves controlling mains, risers and branch runouts.
 - b. Gas valves controlling mains, risers, and branch runouts.
 - c. Valves in sprinkler and fire standpipe systems, except hose valves.
- B. Valve Service Identification Charts:
 - 1. Provide 2 framed valve charts for each piping system specified to be provided with valve identification tags. Type charts on 8-1/2 x 11 inches heavy white bond paper, indicating valve number, service and location.
 - 2. Hang framed charts at locations as directed.

END OF SECTION

SECTION 22 05 76

DRAINAGE ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

- A. Comply with the applicable requirements of ASME A112.36.2M - Cleanouts, and ASME A112.1.2 - Drainage Funnels and Air Gaps.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications, and installation instructions for each item specified except fasteners.

1.03 MAINTENANCE

- A. Special Tools: Deliver the following to the Director's Representative:
 - 1. Tools for Vandal Resistant Fasteners: One for each type and size.
 - 2. T-Handle Wrench for Cleanout Plugs: One for each type and size.

PART 2 PRODUCTS

2.01 CLEANOUT PLUG

- A. Cast brass or bronze, with threaded end, and raised or countersunk head.
 - 1. Tapped head for attachment of cleanout wall or deck plate covers where required.
- B. Anti-Seize Lubricant: Never-Seez by Bostik Chemical Group, Broadview, IL; Molycote 1000 by Dow Corning Corp, Midland, MI; Anti-Seize Lubricant by Loctite Corp, Newington, CT.

2.02 CLEANOUT

- A. Threaded pipe fitting or cast iron ferrule with gas tight cleanout plug.

2.03 CLEANOUT WALL PLATE

- A. Round, stainless steel or polished chrome plated bronze cover plate with stainless steel vandal resistant fastener to secure to cleanout plug.

2.04 CLEANOUT DECK PLATE

- A. Standard duty floor cleanout fitting with coated cast iron body; round, polished nickel bronze scoriated top secured to cleanout plug with stainless steel vandal resistant fastener; threaded height adjustment, cast iron head, gas tight cleanout plug, and connection to match piping option selected.
- B. Membrane flange and clamping collar, secured with corrosion resistant fasteners.

2.05 CONDUCTOR EXPANSION JOINT

- A. Coated cast iron body with brass telescoping sleeve, adjustable packing gland with graphite, neoprene or mineral fiber gasket, and connection to match piping option selected.

2.06 AIR GAP FITTING

- A. Coated cast iron body with air gaps, set screw or threaded inlet, and outlet connection to match piping option selected.

2.07 INDIRECT WASTE FUNNEL

- A. Combination Funnel Drain and P Trap: Polished chrome plated cast brass construction.
 - 1. Funnel: 4 inch top dia., 4 inches deep, with threaded outlet.
 - 2. P Trap: Bottom cleanout, threaded inlet, and outlet connection to match piping option selected.

2.08 FASTENERS

- A. Corrosion Resistant Fasteners: Brass, bronze, or Type 302 or 304 stainless steel bolts.
- B. Vandal Resistant Fasteners: Torx head with center pin.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Cleanout Plug: Lubricate threads with anti-seize lubricant before final installation.
- C. Secure external components in place with vandal resistant fasteners or devices which cannot be removed without special tools.

END OF SECTION

SECTION 22 05 77

FLOOR AND AREA DRAINS

PART 1 GENERAL

1.01 REFERENCES

- A. Unless otherwise specified, the Work of this section shall meet the applicable requirements of FS WW-P-541 - Plumbing Fixtures, and ASME A112.21.1M - Floor Drains.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions for each type drain specified.

1.03 MAINTENANCE

- A. Special Tools: Deliver to the Director's Representative.
 - 1. Tools for Vandal Resistant Fasteners: One for each type and size.

PART 2 PRODUCTS

2.01 TYPE A FLOOR DRAIN

- A. Drain Body: Coated cast iron, two-piece body with reversible flashing clamp, minimum 9 inch dia drainage flange, corrosion resistant bolts, weep holes, bottom outlet, and connection to match piping option selected.
- B. Strainer Head: Round, minimum 7 inch dia, nickel bronze with threaded shank for height adjustment.
- C. Strainer Grate: Polished nickel bronze, heel proof; secured with stainless steel vandal resistant fasteners.
- D. Acceptable Drain Series: Josam 30000A, Smith 2010A, Wade W1100, and Zurn Z415.

2.02 TYPE B FLOOR DRAIN

- A. Drain Body: Coated cast iron, two-piece body with reversible flashing clamp, minimum 9 inch dia drainage flange, corrosion resistant bolts, weep holes, bottom outlet, and connection to match piping option selected.
- B. Strainer Head: Round, minimum 8 inch dia, nickel bronze with threaded shank for height adjustment.

- C. Strainer Grate: Polished nickel bronze, heel proof, fitted with a 4 inch high, 6 inch dia nickel bronze funnel, and secured with stainless steel vandal resistant fasteners.
 - 1. Funnel either cast integral with, threaded or bolted into top of strainer grate.
- D. Acceptable Drain Series: Josam 30000E2, Smith 2010A, Wade W1100, and Zurn Z415.

2.03 FASTENERS

- A. Corrosion Resistant Fasteners: Brass, bronze, or Type 302 or 304 or stainless steel bolts.
- B. Vandal Resistant Fasteners: Torx head with center pin.

2.04 FREE AREA OF GRATE

- A. Minimum strainer grate free area listed below for each connecting pipe size:

CONNECTING PIPE SIZE (Inches Nominal)	INTERIOR DRAINS FREE AREA (Square Inches)	EXTERIOR DRAINS FREE AREA (Square Inches)
1-1/2	3.06	4.08
2	4.71	6.28
3	10.59	14.12
4	18.90	25.20
5	29.40	39.20
6	42.45	56.60
8	75.38	100.50

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Protect weep holes from plugging during installation. Rod out weep holes after installation to remove obstructions.
- C. Adjust strainer head to height indicated. If height not indicated, set at 1/2 inch below finished floor elevation.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- D. Secure external components in place with vandal resistant fasteners or devices which cannot be removed without special tools.

END OF SECTION

SECTION 22 07 00

PIPING INSULATION

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Through Penetration Firestops: Section 078400.
- B. Painting: Section 099103.
- C. Pipe Hangers and Supports: Section 220529.

1.02 ABBREVIATIONS

- A. FS: Federal Specification.
- B. K: Thermal Conductivity, i.e., maximum Btu per inch thickness per hour per square foot.
- C. pcf: Pounds per cubic foot.
- D. PVC: Polyvinylchloride.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's catalog sheets, specifications and installation instructions for the following:
 - 1. Insulation Materials.
 - 2. Jacket Materials.
- B. Quality Control Submittals:
 - 1. Installers Qualification Data:
 - a. Name of each person who will be performing the Work, and their employer's name, business address and telephone number.
 - b. Furnish names and addresses of the required number of similar projects that each person has worked on which meet the qualifications.

1.04 QUALITY ASSURANCE

- A. Qualifications: The persons installing the Work of this Section and their Supervisor shall be personally experienced in mechanical insulation work and shall have been regularly employed by a company installing mechanical insulation for a minimum of 5 years.
- B. Regulatory Requirements:

1. Insulation installed inside buildings, including laminated jackets, mastics, sealants and adhesives shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.

PART 2 PRODUCTS

2.01 PIPING INSULATION

- A. Fibrous Glass (Mineral Fiber) Insulation: Composed principally of fibers manufactured from rock, slag, or glass, with or without binders, and asbestos free.
 1. Preformed Pipe Insulation: Minimum density 3 pcf; ASTM C 547:
 - a. Class 1 (Suitable for Temperatures Up to 450 degrees F): K of 0.26 at 75 degrees F.
 2. Premolded Fitting Insulation: Minimum density 4.0 pcf, K of 0.26 at 75 degrees F; ASTM C 547, Class 1.
 3. Insulation Inserts for PVC Fitting Jackets: Minimum density 1.5 pcf, K of 0.28 at 75 degrees F; ASTM C 553, Type III.
 - a. Suitable for temperatures up to 450 degrees F.
- B. Flexible Elastomeric Foam Insulation:
 1. FM tested and approved, meeting the following:
 - a. Maximum Water Vapor Transmission: 0.10 perm - inch based on ASTM E 96, Procedure A.
 - b. K of 0.27 at 75 degrees F based on ASTM C 518 or C 177.
 - c. Fire Spread/Smoke Developed Rating: 25/50 or less based on ASTM E 84.
 2. Pipe Insulation: ASTM C 534, Type I.
 3. Polyethylene and polyolefin insulation is not acceptable.
- C. High Density Jacketed Insulation Inserts for Hangers and Supports:
 1. For Use with Fibrous Glass Insulation:
 - a. Cold Service Piping:
 - 1) Polyurethane Foam: Minimum density 4 pcf, K of 0.13 at 75 degrees F, minimum compressive strength of 125 psi.
 - b. Hot Service Piping:
 - 1) Calcium Silicate: Minimum density 15 pcf, K of 0.50 at 300 degrees F; ASTM C 533.
 - 2) Perlite: Minimum density 12 pcf, K of 0.60 at 300 degrees F; ASTM C 610.
 2. For Use with Flexible Elastomeric Foam Insulation: Hardwood dowels and blocks, length or thickness equal to insulation thickness, other dimensions as specified or required.
- D. Cements:
 1. Fibrous Glass Thermal Insulating Cement: Asbestos free; ASTM C 195.

2. Fibrous Glass Hydraulic Setting Thermal Insulating and Finishing Cement: ASTM C 449/C 449M.

2.02 INSULATION JACKETS

- A. Laminated Vapor Barrier Jackets for Piping: Factory applied by insulation manufacturer, conforming to ASTM C 1136, Type I.
 1. Type I: Reinforced white kraft and aluminum foil laminate with kraft facing out.
 - a. Pipe Jackets: Furnished with integral 1-1/2 inch self sealing longitudinal lap, and separate 3 inch wide adhesive backed butt strips.
 2. Laminated vapor barrier jackets are not required for flexible elastomeric foam insulation.
- B. Canvas Jackets: Cotton duck, fire retardant, complying with NFPA 701, 4 oz or 6 oz per sq yd as specified.
- C. Premolded PVC Fitting Jackets:
 1. Constructed of high impact, UV resistant PVC.
 - a. ASTM D 1784, Class 14253-C.
 - b. Working Temperature: 0-150 degrees F.
- D. Metal Jacketing:
 1. Aluminum: ASTM B 209, Alloys 1100, 30003, 3105 or 5005, Temper H14, 0.016 inch thick.
 - a. Factory Pre-formed Sectional Pipe Jacketing:
 - 1) Smooth outer finish with integral bonded laminated polyethylene film - kraft paper moisture barrier underside.
 - 2) Pittsburgh or modified Pittsburgh longitudinal lock seams.
 - 3) 2 inch overlapping circumferential joints with integral locking clips, or butt joints sealed with 2 inch wide mastic backed aluminum snap bands.
 - b. Fastening Devices:
 - 1) Strapping: Type 18-8 stainless steel, 0.020 inch thick, 1/2 and 3/4 inch wide as specified.
 - 2) Wing Seals: Type 18-8 stainless steel, 0.032 inch thick.
 - 3) Sheet Metal Screws: Panhead, Type A, hardened aluminum, and stainless steel.

2.03 ADHESIVES, MASTICS, AND SEALERS

- A. Lagging Adhesive (Canvas Jackets): Childers' CP-50AMV1, Epolux's Cadalag 336, Foster's 30-36.

- B. Vapor Lap Seal Adhesive (Fibrous Glass Insulation): Childers' CP-82, Epolux's Cadoprene 400, Foster's 85-60 or 85-20.
- C. Vapor Barrier Mastic(Fibrous Glass Insulation): Permeance shall be .03 perms or less at 45 mils dry per ASTM E 96. Childers' CP-34, Epolux's Cadalar 670, Foster's 30-65.
- D. Adhesive (Flexible Elastomeric Foam): Armstrong's 520, Childers' CP-82, Epolux's Cadoprene 488, Foster's 85-75. 5 gallon cans only
- E. Adhesive (Fiberglass Duct Liner): Childers' Chil Quick CP-127, Foster Vapor Fas 85-60. Must comply with ASTM C 916, Type II
- F. Weather Barrier Breather Mastic (Reinforcing Membrane): Childers' VI-CRYL CP-10/11, Foster's Weatherite 46-50.
- G. Sealant (Metal Pipe Jacket): Non hardening elastomeric sealants. Foster Elastolar 95-44, Childers Chil Byl CP-76, Pittsburgh Corning 727
- H. Reinforcing Membrane: Childers' Chil Glas #10, Foster Mast a Fab, Pittsburgh Corning PC 79

2.04 MISCELLANEOUS MATERIALS

- A. Pressure Sensitive Tape for Sealing Laminated Jackets:
 - 1. Acceptable Manufacturers: Alpha Associates, Ideal Tape, Morgan Adhesive.
 - 2. Type: Same construction as jacket.
- B. Wire, Bands, and Wire Mesh:
 - 1. Binding and Lacing Wire: Nickel copper alloy or copper clad steel, gage as specified.
 - 2. Bands: Galvanized steel, 1/2 inch wide x 0.015 inch thick, with 0.032 inch thick galvanized wing seals.
 - 3. Wire Mesh: Woven 20 gage steel wire with 1 inch hexagonal openings, galvanized after weaving.
- C. Reinforcing Membrane: Glass or Polyester, 10 x 10 mesh. Alpha Associates Style 59, Childer's Chil-Glas, Foster's MAST-A-FAB.

PART 3 EXECUTION

3.01 PREPARATION

- A. Perform the following before starting insulation Work:
 - 1. Install hangers, supports and appurtenances in their permanent locations.
 - 2. Complete testing of piping.
 - 3. Clean and dry surfaces to be insulated.

3.02 INSTALLATION, GENERAL

- A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions unless otherwise specified.
- B. Provide continuous piping insulation and jacketing when passing thru interior wall, floor, and ceiling construction.
 - 1. At Through Penetration Firestops: Coordinate insulation densities with the requirements of approved firestop system being installed. See Section 078400.
 - a. Insulation densities required by approved firestop system may vary with the densities specified in this Section. When this occurs use the higher density insulation.
- C. Do not intermix different insulation materials on individual runs of piping.

3.03 INSTALLATION AT HANGERS AND SUPPORTS

- A. Reset and realign hangers and supports if they are displaced while installing insulation.
- B. Install high density jacketed insulation inserts at hangers and supports for insulated piping.
- C. Insulation Inserts For Use with Fibrous Glass Insulation:
 - 1. Where clevis hangers are used, install insulation shields and high density jacketed insulation inserts between shield and pipe.
 - a. Where insulation is subject to compression at points over 180 degrees apart, e.g. riser clamps, U-bolts, trapezes, etc.; fully encircle pipe with 2 protection shields and 2 high density jacketed fibrous glass insulation inserts within supporting members.
 - 1) Exception: Locations where pipe covering protection saddles are specified for hot service piping, 6 inch and larger.
- D. Insulation Inserts For Use with Flexible Elastomeric Foam Insulation:
 - 1. Where clevis hangers are used, install insulation shields with hardwood filler pieces, same thickness as adjoining insulation, inserted in undersized die cut or slotted holes in insulation at support points.
 - 2. Contour hardwood blocks to match the curvature of pipe, and shield.
 - 3. Coat dowels and blocks with insulation adhesive, and insert while still wet.
 - 4. Vapor seal outer surfaces of dowels and blocks with adhesive after insertion.
 - 5. Install filler pieces as follows:

PIPE/TUBING SIZE	FILLER PIECES	POSITION
Thru 1-1/2"	2 dowel plugs	6 o'clock; in tandem
2" thru 4"	1 block, 2 dowel plugs	6 o'clock, and 4 & 8 o'clock respectively

3.04 INSTALLATION OF FIBROUS GLASS COLD SERVICE INSULATION

- A. Install insulation materials with a field or factory applied ASTM C 1136 Type I laminated vapor barrier jacket, unless otherwise specified.
- B. Piping:
 1. Butt insulation joints together, continuously seal minimum 1-1/2 inch wide self-sealing longitudinal jacket laps and 3-inch wide butt adhesive backed strips.
 - a. Substitution: 3 inch wide pressure sensitive sealing tape, of same material as jacket, may be used in lieu of butt strips.
 2. Bed insulation in a 2-inch wide band of vapor barrier mastic, and vapor seal exposed ends of insulation with vapor barrier mastic at each butt joint between pipe insulation and equipment, fittings or flanges at the following intervals:
 - a. Horizontal Pipe Runs: 21 ft.
 - b. Vertical Pipe Runs: 9 ft.
- C. Fittings, Valves, Flanges and Irregular Surfaces:
 1. Insulate with mitre cut or premolded fitting insulation of same material and thickness as pipe insulation.
 2. Secure insulation in place with 16-gage wire, with ends twisted and turned down into insulation.
 3. Butt insulation against pipe insulation and bond with joint sealer.
 4. Insulate valves up to and including bonnets, without interfering with packing nuts.
 5. Apply leveling coat of insulating cement to smooth out insulation and cover wiring.
 6. When insulating cement has dried, seal fitting, valve and flange insulation, by imbedding a layer of reinforcing membrane or 4 oz. canvas jacket between 2 flood coats of vapor barrier mastic, each 1/8 inch thick wet.
 7. Lap reinforcing membrane or canvas on itself and adjoining pipe insulation at least 2 inches.
 8. Trowel, brush or rubber glove outside coat over entire insulated surface.
 9. Exceptions:
 - a. Type C and D Piping Systems: Valves, fittings and flanges may be insulated with premolded PVC fitting jackets, with fibrous glass insulation inserts.
 - 1) Additional insulation inserts are required for services with operating temperatures under 45 degrees F or where insulation thickness exceeds 1-1/2 inches. The surface temperature of PVC fitting jacket must not go below 45 degrees F.

3.05 INSTALLATION OF FIBROUS GLASS HOT SERVICE INSULATION

- A. Install insulation materials with field or factory applied ASTM C 1136 Type I laminated vapor barrier jacket unless otherwise specified.
- B. Canvas Jackets on Piping, Fittings, Valves, Flanges, Unions, and Irregular Surfaces:
 - 1. For Piping 2 inch Size and Smaller: 4 oz per sq yd unless otherwise specified.
 - 2. For Piping Over 2 inch Size: 6 oz per sq yd unless otherwise specified.
- C. Piping:
 - 1. Butt insulation joints together, continuously seal minimum 1-1/2 inch wide self-sealing longitudinal jacket laps and 3-inch wide adhesive backed butt strips.
 - a. Substitution: 3 inch wide pressure sensitive sealing tape, of same material as the jacket, may be used in lieu of butt strips.
 - 2. Fill voids in insulation at hanger with insulating cement.
 - 3. Exceptions:
 - a. Piping in Accessible Shafts, Attic Spaces, Crawl Spaces, Unfinished Spaces and Concealed Piping: Butt insulation joints together and secure minimum 1-1/2 inch wide longitudinal jacket laps and 3 inch wide butt strips of same material as jacket, with outward clinching staples on maximum 4 inch centers. Fill voids in insulation at hangers with insulating cement.
- D. Fittings, Valves, Flanges and Irregular Surfaces:
 - 1. Insulate with mitre cut or premolded fitting insulation of same material and thickness as insulation.
 - 2. Secure in place with 16-gage wire, with ends twisted and turned down into insulation.
 - 3. Butt fitting, valve and flange insulation against pipe insulation, and fill voids with insulating cement.
 - 4. Insulate valves up to and including bonnets, without interfering with packing nuts.
 - 5. Apply leveling coat of insulating cement to smooth out insulation and cover wiring.
 - 6. After insulating cement has dried, coat insulated surface with lagging adhesive, and apply 4 oz or 6 oz canvas jacket as required by pipe size.
 - a. Lap canvas jacket on itself and adjoining pipe insulation at least 2 inches.
 - b. Size entire canvas jacket with lagging adhesive.
 - 7. Exceptions:
 - a. In Types E, and F Service Piping Systems: Valves, fittings and flanges may be insulated with premolded PVC fitting jackets, with fibrous glass insulation inserts.
 - 1) Additional insulation inserts are required for services with operating temperatures over 250 degrees F or

where insulation thickness exceeds 1-1/2 inches. The surface temperature of PVC fitting jacket must not exceed 150 degrees F.

- b. In Types E, and F Service Piping Systems: Insulate fittings, valves, and irregular surfaces 3 inch size and smaller with insulating cement covered with 4 oz or 6 oz canvas jacket as required by pipe size.
 - 1) Terminate pipe insulation adjacent to flanges and unions with insulating cement, trowelled down to pipe on a bevel.
- c. Fittings, Valves, Flanges, and Irregular Surfaces In Concealed Piping, Piping in Accessible Shafts, Attic Spaces, Crawl Spaces, Unfinished Rooms, Unfinished Spaces, and Tunnels: Sizing of canvas surface is not required.

3.06 INSTALLATION OF FLEXIBLE ELASTOMERIC FOAM INSULATION

- A. Where possible, slip insulation over the pipe, and seal butt joints with adhesive.
 - 1. Where the slip-on technique is not possible, slit the insulation and install.
 - 2. Re-seal with adhesive, making sure the mating surfaces are completely joined.
- B. Insulate fittings and valves with miter cut sections. Use templates provided by the manufacturer, and assemble the cut sections in accordance with the manufacturer's printed instructions.
 - 1. Insulate threaded fittings and valves with sleeved fitting covers. Over lap and seal the covers to the adjoining pipe insulation with adhesive.
- C. Carefully mate and seal with adhesive all contact surfaces to maintain the integrity of the vapor barrier of the system.
- D. Piping Exposed Exterior to a Building, Totally Exposed to the Elements:
 - 1. Apply flexible elastomeric foam insulation to piping with adhesive.
 - 2. Apply reinforcing membrane around piping insulation with adhesive or mastic.
 - 3. Adhesive Applied System: Apply 2 coats of finish. See Section 099103.
 - 4. Mastic Applied System: Apply another coat of mastic over reinforcing membrane.

3.07 INSTALLATION OF SHEET METAL JACKETING ON PIPING

- A. Secure jacketing to insulated piping with preformed aluminum snap straps and stainless steel strapping installed with special banding wrench.
- B. Jacket exposed insulated fittings, valves and flanges with mitred sections of aluminum jacketing.
 - 1. Seal joints with sealant and secure with preformed aluminum bands.

3. Substitution: Factory fabricated, preformed, sectional aluminum fitting covers or premolded polyvinylchloride fitting covers may be used in lieu of mitred sections of aluminum jacketing for covering fittings, valves and flanges.

3.08 FIELD QUALITY CONTROL

- A. Field Samples: The Director's Representative, may at his discretion, take field samples of installed insulation for the purpose of checking materials and application. Reinsulate sample cut areas.

3.09 PIPING INSULATION SCHEDULE

- A. Insulate all cold service and hot service piping, and appurtenances except where otherwise specified.
- B. Schedule of Items Not to be Insulated:
 1. Chrome plated piping, unless otherwise specified.
 2. Exposed piping in finished spaces, serving one fixture, or piece of equipment, and which connection from the main, branch, or riser, is 24 inches or less in length.
 3. Water heater blow-off piping.
 4. Air vents, pressure reducing valves, pilot lines, safety valves, relief valves.
 5. Water meters.
 6. Piping buried in the ground, unless otherwise specified herein.
 7. Items installed by others, unless otherwise specified herein.
 8. Sanitary drainage piping, unless otherwise specified herein.
 9. Mechanical equipment with factory applied steel jacket.
 10. Hot service piping 81 degrees F to 104 degrees F.
 11. Flanges and unions in Type E, F, and G service piping systems.
 12. Sprinkler and standpipe piping, unless otherwise specified.

3.10 COLD SERVICE INSULATION MATERIAL SCHEDULE

TYPE	SERVICE AND TEMPERATURES	INSULATION MATERIAL	PIPE SIZES (INCHES)	MINIMUM (NOMINAL) INSULATION THICKNESS (INCHES)
C	Fluids (except domestic cold water) 40 F to 80 F.	Flex. Elastomeric Foam or Fibrous Glass	1-1/2 & less	1
			Over 1-1/2	1-1/2
D	Domestic cold water, and as specified. 33 F to 80 F.	Flex. Elastomeric Foam or Fibrous Glass	All Sizes	1/2

A. **NOTES:**

1. Sprinkler and Standpipe Piping (First 10 feet connected to domestic water main within building): Insulate with same materials and thicknesses specified for domestic cold water.
3. Piping Serving Handicapped Accessible Lavatories:
 - a. Insulate exposed hot water supply and waste piping with flexible elastomeric foam pipe insulation.
 - b. Insulate exposed hot and cold water supply, and waste piping with under lav piping protection cover. Install fasteners thru each pair of holes in insulated safety wrap.

3.11 HOT SERVICE INSULATION MATERIAL SCHEDULE

	SERVICE AND TEMPERATURES	INSULATION MATERIAL	PIPE SIZES (INCHES)	MINIMUM (NOMINAL) INSULATION THICKNESS (INCHES)
E	Water and other fluids 105 F to 140 F.	Flex. Elastomeric Foam or Fibrous Glass	1-1/2 & Less	1
			Over 1-1/2	2

3.12 SCHEDULE OF METAL JACKETING FOR INSULATED PIPE

C. **General:**

1. Jacket exposed insulated piping with preformed sectional aluminum metal pipe jacketing.

END OF SECTION

SECTION 22 08 00

CLEANING AND TESTING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Testing Sprinkler System: NFPA-13.

1.02 SUBMITTALS

- A. Quality Control Submittals
 - 1. Test Reports (Field Tests): Submit data for each system tested, and/or disinfected; include date performed, description, and test results for each system.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Perform factory testing of factory fabricated equipment in complete accordance with the agencies having jurisdiction.
 - 2. Perform field testing of piping systems in complete accordance with the local utilities and other agencies having jurisdiction and as specified.

1.04 PROJECT CONDITIONS

- A. Protection: During test Work, protect controls, gages and accessories which are not designed to withstand test pressures. Do not utilize permanently installed gages for field testing of systems.

1.05 SEQUENCING AND SCHEDULING

- A. Transmit written notification of proposed date and time of operational tests to the Director's Representative at least 5 days in advance of such tests.
- B. Perform cleaning and testing Work in the presence of the Director's Representative.
- C. Pressure test piping systems inside buildings, at the roughing-in stage of installation, before piping is enclosed by construction Work, and at other times as directed. Perform test operations in sections as required and directed, to progress the Work in a satisfactory manner and not delay the general construction of the building. Valve or cap-off sections of piping to be tested, utilizing valves required to be installed in the permanent piping systems, or temporary valves or caps as required to perform the Work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Test Equipment and Instruments: Type and kind as required for the particular system under test.
- B. Test Media (air, vacuum, water): As specified for the particular piping or system under test.
- C. Cleaning Agent (water): As specified for the particular piping, apparatus or system being cleaned.

PART 3 EXECUTION

3.01 PRELIMINARY WORK

- A. Thoroughly clean pipe and tubing prior to installation. During installation, prevent foreign matter from entering systems. Prevent if possible and remove stoppages or obstructions from piping and systems.

3.02 PRESSURE TESTS - PIPING

- A. Piping shall be tight under test and shall not show loss in pressure or visible leaks, during test operations or after the minimum duration of time as specified. Remove piping which is not tight under test; remake joints and repeat test until no leaks occur.
- B. Water Systems:
 - 1. Domestic water (potable cold, domestic hot and recirculation) inside buildings:
 - a. Before fixtures, faucets, trim and accessories are connected, perform hydrostatic test at 125 psig minimum for 4 hours.
 - b. After fixtures, faucets, trim and accessories are connected, perform hydrostatic retest at 75 psig for 4 hours.
- C. Gas Piping: Before backfilling or concealment perform air test of duration and pressure as required by the local gas company. However, for gas piping designed for pressures of from 4 inches to 6 inches water column, air test at 15 inches Hg for one hour, without drop in pressure. Test gas piping with air only. Check joints for leaks with soap suds.
- D. Air Piping:
 - 1. Compressed Air: Test with air at 150 psig for one hour.
 - 2. Check joints for leaks with soap suds.

- E. Drainage, Vent, Conductor and Roof Drain Piping (Inside Buildings): Perform tests before fixtures are installed. Test by filling the entire system with water, and allowing to stand for 3 hours, with no noticeable loss of water. Test joints under a minimum head of 10 feet of water, except the uppermost section. Test the uppermost section to overflowing.

3.03 TESTING OF EQUIPMENT, APPARATUS AND APPURTENANCES

- A. Relief Valves: Increase pressure in equipment or apparatus to relief valve setting, to test opening of valves at required relief pressures.

3.04 DISINFECTION OF POTABLE WATER SYSTEMS

- A. Disinfect potable water pipe and equipment installed in the Work of this Contract.
 - 1. Completely fill the piping, including water storage equipment if installed, with a water solution containing 50 mg/L available chlorine, and allow stand for 24 hours. Operate all valves during this period to assure their proper disinfection.
 - 2. After the retention period, discharge the solution to an approved waste and flush the system thoroughly with water until substantially all traces of chlorine are removed. Drain and flush water storage equipment if installed.
- B. Connect plumbing fixtures and equipment and place the system into service. Prevent recontamination of the piping during this phase of the Work.

END OF SECTION

SECTION 221100

DOMESTIC WATER PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Domestic water piping, within 5 feet of building.
 - 2. Domestic water piping, above grade.
 - 3. Unions and flanges.
 - 4. Valves.
 - 5. Flow control valves.
 - 6. Water pressure reducing valves.
 - 7. Relief valves.
 - 8. Strainers.
 - 9. Hose bibs.
 - 10. Hydrants.
 - 11. Recessed valve box.
 - 12. Backflow preventers.
 - 13. Water hammer arrestors.
 - 14. Thermostatic mixing valves.
 - 15. Pressure balanced mixing valves.
 - 16. In-line circulator pumps.

1.2 REFERENCES

- A. American National Standards Institute ANSI.
- B. American Society of Mechanical Engineers (ASME).
- C. American Society of Sanitary Engineering (ASSE).
- D. ASTM International:
- E. American Welding Society (AWS).
- F. American Water Works Association: (WWA).
- G. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS).
- H. National Electrical Manufacturers Association (NEMA).
- I. Plumbing and Drainage Institute (PDI).

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data:
 - 1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
 - 2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
 - 3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
 - 4. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
 - 5. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves and accessories.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of valves and equipment.
- C. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NYS and Local standards.
- B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.

- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install underground piping when bedding is wet or frozen.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.11 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for domestic water piping.

1.12 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish two packing kits for each size valve and two pump seals for each pump model.

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Ductile Iron Pipe: AWWA C151.
 - 1. Fittings: AWWA C110, ductile iron, standard thickness.
 - 2. Joints: AWWA C111, rubber gasket with rods.
 - 3. Jackets: AWWA C105 polyethylene jacket.
- B. Copper Tubing: ASTM B88, Type K, annealed.

1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
 2. Joints: Compression connection or Brazed, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.
- C. PVC Pipe: ASTM D1785, Schedule 80 ASTM D2241, , polyvinyl chloride (PVC) material.
1. Fittings: ASTM D2467, Schedule 80, PVC.
 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.
- D. Polyethylene/Aluminum Composition Tubing: ASTM F1281 or ASTM F1282.
1. Fittings and Joints: Brass compression type.
- E. High Density Polyethylene (HDPE) Piping
- a. Smooth interior annular exterior corrugated polyethylene pipe as per ASTM D3350 minimum cell classification 335420C; AASHTO M294, Type S or AASHTO MP7-97, Type S. The closed cell structural core shall have a compressive strength no less than 20 lbs/square inch, which provides high stress resistance to cracks.
 - b. The bell-and-spigot HDPE piping network shall be joined using watertight connections in accordance with the requirements of ASTM D3212. Elastomeric seals (gaskets) made of polyisoprene and meeting the requirements of ASTM F477 shall show no visible leaks when tested under a 10 ft hydrostatic water test.
 - c. To preclude crumbling and provide better joint performance of the HDPE pipe, the bell and spigot ends shall be reinforced, including a bell tolerance device. The bell tolerance device must be installed by the pipe manufacturer.
 - d. Approved Manufacturers:

Hancor Inc.

2.2 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tubing: ASTM B88 (ASTM B88M), Type L, hard drawn.
1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F. Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.
- B. Steel Pipe: ASTM A53/A53M Schedule 40, galvanized, grooved ends.
1. Fittings: ASTM A395/A395M and ASTM A536 ductile iron, grooved ends.
 2. Joints: Grooved mechanical couplings meeting ASTM F1476.

- a. Housing Clamps: ASTM A395 and ASTM A536 ductile iron, hot dipped galvanized, compatible with steel piping sizes, rigid type.
 - b. Gasket: Elastomer composition for operating temperature range from -30 degrees F to 230 degrees F.
 - c. Accessories: Steel bolts, nuts, and washers.
- C. CPVC Pipe: ASTM D2846/D2846M, ASTM F441/F441M, or ASTM F442/F442M, chlorinated polyvinyl chloride (CPVC) material.
 - 1. Fittings: ASTM D2846/D2846M, ASTM F437, ASTM F438, ASTM F439, or ASTM F441/F441M, CPVC.
 - 2. Joints: ASTM D2846/D2846M, solvent weld with ASTM F493 solvent cement.
- D. PVC Pipe: ASTM D1785 Schedule 40, or ASTM D2241 SDR-26 for not less than 150 psi pressure rating, polyvinyl chloride (PVC) material.
 - 1. Fittings: ASTM D2466, Schedule 40, PVC ASTM D2467, Schedule 80, PVC.
 - 2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.3 UNIONS AND FLANGES

- A. Unions for Pipe 2 inches and Smaller:
 - 1. Ferrous Piping: Class 150, malleable iron, threaded.
 - 2. Copper Piping: Class 150, bronze unions with soldered.
 - 3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
 - 4. PVC Piping: PVC.
 - 5. CPVC Piping: CPVC.
- B. Flanges for Pipe 2-1/2 inches and Larger:
 - 1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
 - 2. Copper Piping: Class 150, slip-on bronze flanges.
 - 3. PVC Piping: PVC flanges.
 - 4. CPVC Piping: CPVC flanges.
 - 5. Gaskets: 1/16 inch thick preformed neoprene gaskets.
- C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.4 STRAINERS

- A. Strainers in water service piping installed upstream of water meters shall be cast bronze body with stainless steel elements. Strainers shall be rated at 150 p.s.i. working pressure. Strainers shall be of the same manufacturer as the compound water meters.
- B. Strainers in water service piping installed upstream of Double Detector Check Valves shall be flanged basket type, cast iron body with bronze basket and bronze handle and 1/16" perforations, good for the same working pressure as specified for fittings. Strainers shall be Sarco Type 528-B, Mueller Steam Specialty No. 165, or J.R. Smith No. 8795.

C. Y-Strainers

1. Except as otherwise noted strainers shall be full size Y-pattern provided with removable cylindrical or conical screens of monel or stainless steel and suitable flanges or tapping to connect with the piping they serve.
2. Strainers shall be cast iron on iron and steel piping and bronze on brass or copper piping except as otherwise noted in other sections of the specifications.
3. Screen perforations for water shall be 1/16" (0.57 diameter) for pipe sizes up to 3" and 1/8" for 4" and above.

D. Provide valves dirt blow-off connection for each Y-strainer. The blow-off connection shall terminate with a gate valve and nipple.

E. Bronze Y-Strainers shall be Sarco Type BT or Mueller Steam Specialty No. 352.

F. Cast iron Y-Strainers shall be Sarco Type IT or Mueller Steam Specialty No.11.

2.5 HOSE BIBBS

A. Manufacturers:

1. Mifab Model MHY-20.
2. Substitutions: Section 01600 - Product Requirements.

B. Furnish materials in accordance with NYS standards.

C. Interior: Bronze or brass with integral mounting flange, replaceable hexagonal disc, hose thread spout, chrome plated where exposed with hand wheel, [integral vacuum breaker in conformance with ASSE 1011.

D. Interior Mixing: Bronze or brass, wall mounted, double service faucet with hose thread spout, integral stops, chrome plated where exposed with hand wheels, and vacuum breaker in conformance with ASSE 1011.

2.6 HYDRANTS

A. Wall Hydrant:

1. Wall hydrants shall be nickel bronze with nickel bronze casing, polished nickel bronze face, brass operating parts throughout, adjustable wall clamp, renewable nylon seat, 3/4" HPT standard hose outlet with integral vacuum breaker, 3/4" IPS male thread ground joint union elbow adapter, nickel bronze access box and nickel bronze hinged cover with locking device. Furnish and deliver four (4) operating keys to the Custodian. Wall hydrants shall be Josam 71000, Jay R. Smith 5509-E, Wade W-8625, Zurn Z-1300.

B. Post Hydrant:

1. Provide post hydrants where indicated on the Drawings. Post Hydrant shall be cast iron non-freeze with aluminum housing, brass casing, brass valve housing,

brass removable operating parts and neoprene washers, removable handle with 3/4" hose connection, 3/4" IPS inlet, approved equal to Josam 71700, Smith 5910, Zurn 1385, or Wade W-8610. For number, location, depth, etc., see Drawings.

2.7 BACKFLOW PREVENTERS

- A. Manufacturers:
 - 1. Wilkins Series 575
 - 2. Watts 909
 - 3. Febco 825Y
 - 4. Conbraco 40-200 series
 - 5. Substitutions: Section 01600 - Product Requirements.
- B. Furnish materials in accordance with NYS standards.
- C. Reduced Pressure Backflow Preventers:
 - 1. Comply with ASSE 1013.
 - 2. Bronze body, with bronze internal parts and stainless steel springs.
 - 3. Two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve opening under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.
- D. Double Check Valve Assemblies: Comply with ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.8 WATER HAMMER ARRESTORS

- A. Manufacturers:
 - 1. Josam Series 75000.
 - 2. Zurn Series Z-1700.
 - 3. Smith NYBE Series 5000.
 - 4. Substitutions: Section 01600 - Product Requirements.
- B. Furnish materials in accordance with NYS standards.
- C. ASSE 1010; stainless steel construction, bellows type sized in accordance with PDI WH-201.
- D. Pre-charged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - SERVICE CONNECTIONS

- A. Provide new water service complete with approved [[reduced pressure] [double check] back-flow preventer and] water meter with by-pass valves [pressure reducing valve,] [and strainer].
- B. Provide sleeve in wall for service main and support at wall with reinforced-concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
- C. Provide 18 gage galvanized sheet metal sleeve around service main to 6 inch above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Test domestic water piping system in accordance with local authority having jurisdiction.

3.5 CLEANING

- A. Section 01700 - Execution Requirements: Requirements for cleaning.
- B. Disinfect water distribution system in accordance with Section 02516.
- C. Prior to starting work, verify system is complete, flushed and clean.
- D. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- E. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.

- F. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.
- G. Maintain disinfectant in system for 24 hours.
- H. When final disinfectant residual tests less than 25 mg/L, repeat treatment.
- I. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.
- J. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION

SECTION 221119

WATER SUPPLY ACCESSORIES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications, dimensional data, and installation instructions for each item specified, excluding fasteners.

1.02 MAINTENANCE

- A. Special Tools: Deliver to the Director's Representative.
 - 1. Wall Hydrant T-Handle Locking Key: One for each wall hydrant.
 - 2. Tools For Vandal Resistant Fasteners: One for each type and size.

PART 2 PRODUCTS

2.01 WATER HAMMER ARRESTORS

- A. Hydropneumatically controlled with permanently sealed expansion chamber pre-charged with non-combustible gas, threaded connection, and conforming to ASME A112.26.1M - Water Hammer Arrestors, and ASSE 1010 - Water Hammer Arrestors.
 - 1. Bellows Type: Stainless steel construction with elastomer or stainless steel bellows.
 - 2. Piston Type: Hard drawn copper body with brass piston, cap and adapter; and elastomer seals.

2.02 HOSE BIBBS

- A. Compression type with polished chrome plated bronze body, renewable units, vacuum breaker with breakaway screw or vandal resistant fastener (ASSE 1011), removable T-handle, and integral threaded wall flange.
 - 1. Connections: 3/4 inch female threaded inlet, and 3/4 inch hose bibb outlet.

2.03 DRAIN VALVE

- A. Cast brass body with renewable units, hose bibb vacuum breaker (ASSE 1011) with drainage feature, and removable cast iron handwheel with vandal resistant fastener.
 - 1. Valve must be completely assembled to make hose connection.
 - 2. Connections: 3/4 inch threaded or solder end inlet, and 3/4 inch hose bibb outlet.

2.04 FASTENERS

- A. Vandal Resistant Fasteners: Torx head with center pin.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.
- B. Secure external components in place with vandal resistant fasteners or devices which cannot be removed without special tools.

END OF SECTION

SECTION 22 13 00

SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.1 SUMMARY

1. Section Includes:
 2. ASTM B302 - Standard Specification for Threadless Copper Pipe.
 3. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
 4. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- B. Manufacturers Standardization Society of the Valve and Fittings Industry:
 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.2 SUBMITTALS

- A. Product Data:
 1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
 2. Hangers and Supports: Submit manufacturers catalog information including load capacity.
 3. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
- B. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A74, service weight.
 - 1. Fittings: Cast iron, ASTM A74.
 - 2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.
- B. Cast Iron Pipe: CISPI 301, hub-less, service weight.
 - 1. Fittings: Cast iron, CISPI 301.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.2 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Carpenter & Paterson Inc.
 - 2. Creative Systems Inc.
 - 3. Flex-Weld, Inc.
 - 4. Glope Pipe Hanger Products Inc.
 - 5. Michigan Hanger Co.
 - 6. Superior Valve Co.
- B. Drain, Waste, and Vent: Conform to ASME B31.9
- C. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
- D. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
- E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- F. Wall Support for Pipe Sizes 3 inches (80 mm) and Smaller: Cast iron hooks.
- G. Wall Support for Pipe Sizes 3 inches (100 mm) and Larger: Welded steel bracket and wrought steel clamp.
- H. Vertical Support: Steel riser clamp.
- I. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- J. Copper Pipe Support: Carbon-steel, copper-plated adjustable ring.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove scale and dirt, on inside and outside, before assembly.
- B. Prepare piping connections to equipment with flanges or unions.
- C. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION - HANGERS AND SUPPORTS

- A. Inserts:
 - 1. Provide inserts for placement in concrete forms.
 - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches (100 mm) and larger.
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- B. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9
 - 2. Support horizontal piping as scheduled.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 6. Support vertical piping at every [other] floor. Support riser piping independently of connected horizontal piping.
 - 7. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

3.3 INSTALLATION - ABOVE GROUND PIPING

- A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.

- E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- G. Install piping to maintain headroom. Do not spread piping, conserve space.
- H. Group piping whenever practical at common elevations.
- I. Support cast iron drainage piping at every joint.

END OF SECTION

SECTION 224200

PLUMBING FIXTURES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications, roughing dimensions, and installation instructions for each item specified except fasteners.
 - 1. Deliver cut out data for countertop fixtures to the Owner.
- B. Samples:
 - 1. Water Closet Seat: One seat if other than product specified. Sample will be returned and if approved, may be installed on the Project.

1.02 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with applicable requirements of FS WW-P-541, and the following standards:
 - a. ANSI/ASME A112.6.1M - Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use.
 - b. ANSI/ASME A112.18.1M - Plumbing Fixture Fittings.
 - c. ANSI/ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures.
 - d. ANSI/ASME A112.19.2M - Vitreous China Plumbing Fixtures.
 - e. ANSI/ASME A112.19.6 - Hydraulic Requirements for Water Closets and Urinals.
 - 2. Materials and installations designated as handicapped accessible shall conform with the following:
 - a. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
 - b. The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG), (Appendix A to 28 CFR Part 36).
 - c. The Uniform Federal Accessibility Standards (UFAS), (Appendix A to 41 CFR Part 101-19.6).
 - 3. Each fixture carrier support shall be listed by model number in the fixture support manufacturer's Fixture Support Selection Guide as being recommended for support of the appropriate fixture.
- B. Plainly and permanently mark each fixture and fitting with the manufacturer's name or trade mark.

1.03 MAINTENANCE

- A. Special Tools: Deliver to the Owner.

1. Furnish the following tools labeled with names and locations where used.
 - a. Keys for stops (furnished with stops).
 - b. Tools for Vandal Resistant Fasteners: Two for each type and size.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

- A. Vitreous China: First quality, smooth, uniform color and texture, with fused on glaze covering surfaces exposed to view.
 1. Surfaces shall be free of chips, craze, warpage, cracks and discolorations. Surfaces in contact with walls or floors shall be flat, with warpage not to exceed 1/16 inch per foot.
 2. Color: White.
- B. Porcelain Enameled Cast Iron: Smooth, uniform color and texture, having fused on glaze covering surfaces exposed to view.
 1. Material shall show no cracks, chips, craze or discolorations.
 2. Enameled surfaces shall be acid resistant unless otherwise specified.
 3. Color: White.
- C. Fixture Trim: Brass, bronze, or stainless steel construction; consisting of supply and waste fittings, faucets, traps, stop valves, escutcheons, sink strainers, nipples, supplies, and metal trim.
 1. Brass piping: Ips standard weight, with standard weight, 125 lb cast brass fittings.
 2. Brass tubing: 18 B & S gage.
 3. Stainless steel: 18-8 Type 302 or 304 unless otherwise specified.
- D. Fixture Trim Finishes:
 1. Brass or Bronze: Polished or satin finished chrome plating, 0.02 mil chromium over 0.2 mil nickel plating.
 2. Stainless Steel: Invisible welds and seams, and unless otherwise specified, polished to No. 4 commercial finish.
- E. Fixture Hold-down Bolts: Steel, plated for corrosion resistance.
 1. Cap nuts: Metal, polished and chrome plated.
- F. Combination Faucets: Faucets shall turn counter to each other for the on and off positions.
- G. Vandal Resistant Fasteners: Torx head with center pin.

2.02 MOP SERVICE SINK, P-4

- A. Receptor:

1. Terrazzo: Precast of marble chips and portland cement, ground and polished, with no visible air holes or pits.
 - a. Exterior Basin Height: 12 inches.
- B. Drain Fitting: Cast iron or cast brass body integral or attached to the receptor, ready for connection. Strainer grate shall be polished brass or stainless steel, removable for cleaning.
- C. Service Fitting: Combination faucet with 3/4 inch hose end spout, and with the following features.
 1. 1/2 inch eccentric inlets on 8 inch centers and integral stops.
 2. Integral wall flanges.
 3. Renewable units.
 4. Metal, four arm or lever, indexed handles.
 5. Integral vacuum breaker.
 6. 10 inches from finished wall to center of spout outlet.
 7. Five foot rubber hose with threaded connector to fit the hose bibb.
 - a. Hose wall hook.
- D. Rim Guard: Anodized aluminum, stainless steel, or pre-molded vinyl plastic, as recommended by the receptor manufacturer.

2.03 TYPE P-2 LAVATORY

- A. Fixture: Vitreous china, unitized construction, straight front and sides, flat top graded to bowl, cast-in soap dish, anti-splash rim and front overflow; designed for concealed arm supports.
 1. Dimensions: 20 inches long, 18 inches front to back, 3-1/2 inches front and side apron.
 2. 4 inch high integral back.
- B. Supply Fitting: Individual deck mounted, electronic automatic metering faucet:
 1. Maximum Flow: 0.5 gpm at 80 psi.
 - a. Exception: Metering faucets shall have a maximum flow of 0.25 gallons per cycle.
 2. Over rim spout with aerator.
 3. Renewable operating units.
 4. Vandal resistant assembly.
 5. 1/2 inch inlet lock nut and coupling nut.
- C. Waste Fitting: Pop-up type, actuated by a lift knob on the back ledge.
 1. Metal drain plug.
 2. Solid metal lift knob and cast escutcheon.
 3. 1-1/4 inch tailpiece.
 4. Vandal resistant assembly.
- D. Trap: Cast brass, non-adjustable P trap, 1-1/4 inch tubing inlet, 1-1/2 inch ips outlet.
 1. Bottom cleanout plug.

2. Ips brass nipple with solid cast brass escutcheon.
- E. Supplies: 3/8 inch ips brass with key operated stops and solid cast brass escutcheons.
 1. Wall Supplies: Angle stops with keys.
 2. Floor Supplies: Straight stops with keys.
- F. Faucet Hole Cover: Cast brass, rounded top, and threaded shank, with backing plate, lock washer and nut.

2.04 TYPE P-2A LAVATORY, HC

- A. Fixture: Vitreous china, unitized construction, straight front and sides, flat top graded to bowl, cast-in soap dish, anti-splash rim and front overflow; designed for concealed arm supports.
 1. Dimensions: 20 inches long, 18 inches front to back, 3-1/2 inch front and side apron.
 2. 4 inch high integral back.
- B. Supply Fitting: Individual deck mounted, electronic automatic metering faucet:
 1. Maximum Flow: 0.5 gpm at 80 psi.
 - a. Exception: Metering faucets shall have a maximum flow of 0.25 gallons per cycle.
 2. Over rim spout with aerator.
 3. Renewable operating units.
 4. Vandal resistant assembly.
 5. 1/2 inch inlet lock nut and coupling nut.
- C. Waste Fitting: 1-1/4 inch tailpiece with cast brass flat perforated strainer grate.
- D. Trap: Cast brass, non-adjustable P trap, 1-1/4 inch tubing inlet, 1-1/2 inch ips outlet.
 1. Bottom cleanout plug.
 2. Ips brass nipple with solid cast brass escutcheon.
- E. Supplies: 3/8 inch ips brass with key operated stops and solid cast brass escutcheons.
 1. Wall Supplies: Angle stops with keys.
 2. Floor Supplies: Straight stops with keys.
- F. Faucet Hole Cover: Cast brass, rounded top, and threaded shank, with backing plate, lock washer and nut.

2.05 TYPE P-2B LAVATORY, HC

- A. Fixture: Vitreous china, unitized construction, flat top graded to bowl, cast-in soap dish, front overflow, and self-rimming.
 1. Size (approximate):
 - a. Oval: 20 inches x 17 inches.

- b. Rectangular: 21 inches x 19 inches.
 - c. Round: 19 inches.
- B. Supply Fitting: Individual deck mounted, electronic automatic metering faucet:
 - 1. Maximum Flow: 0.5 gpm at 80 psi.
 - a. Exception: Metering faucets shall have a maximum flow of 0.25 gallons per cycle.
 - 2. Over rim spout with aerator.
 - 3. Renewable operating units.
 - 4. Vandal resistant assembly.
 - 5. 1/2 inch inlet lock nut and coupling nut.
- C. Trap: Cast brass, non-adjustable P trap, 1-1/4 inch tubing inlet, 1-1/2 inch ips outlet.
 - 1. Bottom cleanout plug.
 - 2. Ips brass nipple with solid cast brass escutcheon.
- D. Supplies: 3/8 inch ips brass with key operated stops with solid cast brass escutcheon.
 - 1. Wall Supplies: Angle stops with keys.
 - 2. Floor Supplies: Straight stops with keys.

2.06 FIXTURE SUPPORTS AND SUPPORTING DEVICES FOR LAVATORIES, SINKS, AND EQUIPMENT

- A. General: Ferrous metal members of carriers and supporting devices with the exception of chrome plated or porcelain enameled cast iron, shall be factory painted for corrosion resistance.
- B. Wall Mounted Carrier Supports: Plate type system, with steel plates on both sides of the wall and through-bolted. On walls having an integral finish, a single plate wall carrier designed for such installations may be used. Each carrier shall be provided with the appropriate fixture supporting devices specified, or recommended by the Carrier manufacturer's Fixture Support Selection Guide.
 - 1. Concealed Arms: Steel, with fixture locking lugs, leveling screws and a means of attaching, positioning and securing the fixture to the carrier.
 - a. Trim: Polished, Chrome plated metal escutcheon to space fixture two inches from the wall.
- C. Wood Stud Filler Piece: 2 inch x 8 inch wood planking cut to fit between wood studding. Fasten with four 3/8 inch x 2-1/2 inch lag bolts with washers.

2.07 COUNTERTOP SINK, P4A

- A. Material: 18 gage, seamlessly drawn, Type 302 (18-8) stainless steel.
 - 1. Features: Self-rimming, extended back ledge, with faucet punchings spaced on 4 inch centers. Cove corners 1-3/4 inch minimum radius; fully coat underside with sound deadening and condensation barrier.
 - 2. Finish: Satin finish exposed surfaces.

- B. Supply Fitting: Top mounted deck type mixing faucet, cast brass base and spout; indexed lever handles.
 - 1. Maximum Flow: 2.5 gpm at 80 psi.
 - 2. 8 inch swing spout.
 - 3. 1/2 inch inlets on 8 inch centers.
 - 4. Renewable units.
 - 6. Supplies: 1/2 inch ips brass, with key operated angle stops, keys and cast brass escutcheons.
- C. Drain Assembly:
 - 1. Stainless steel removable strainer basket with neoprene stopper and 1-1/2 inch tubing tailpiece.
 - 2. 1-1/2 inch cast brass non-adjustable P trap, with bottom cleanout plug.
 - 3. 1-1/2 inch ips brass trap nipple with cast brass escutcheon.
- D. Fastening Devices: Stainless steel spring clip assemblies or clamping devices for securing sink to the countertop.

2.08 VITREOUS CHINA WATER CLOSETS

- A. Fixtures: Vitreous china, full size, elongated bowl with integral flushing rim and jet; trapway at the rear and the outlet centered between a pair of hold down bolt holes.
 - 1. Trapway size: Pass minimum ball of 2 inches.
 - 2. Trap seal: 2 inches minimum.
 - 3. Water surface area: 12 inches x 10 inches minimum.
 - 4. Provisions for flushing:
 - a. 1-1/2 inch top spud for flush valve operation.
 - 5. Floor Supported Fixture Heights:
 - a. Standard Fixture: 14 to 15 inches from finished floor to rim.
 - b. Handicapped Accessible Fixture: 17 to 19 inches from finished floor to top of seat (15-13/16 to 17-13/16 inches from finished floor to top of rim based on 1-3/16 inch seat height).
- B. Operation: Fixture shall flush satisfactorily without extraordinary rise of water level in the bowl.
 - 1. Maximum gallons of water per flush: 1.6 gallons.
- C. Water Closet Floor Flange:
 - 1. For Use with DWV Copper Tubing: Cast brass, 48 ounce minimum weight.
 - 2. For Use with Cast Iron Soil Pipe: Cast iron, 90 ounce minimum weight.
- D. Closet Seat: Extra heavy duty, commercial design; Model 1655-C by Bemis Mfg. Co., Model No. 527-CH by Beneke Corp., or Model No. 9500C by Church Seat Co.
 - 1. Material and Construction: Solid plastic, open front, less cover, molded in one piece with no joints, seams or crevices.

2. The manufacturer's name shall be molded into the seat.
3. Metal check hinges shall be integrally molded into the seat. Hinges, inserts, bearings and posts shall be of brass or stainless steel. Cover upper post and metal exposed above fixture rim with plastic to match seat.
4. Surface shall be hard, polished, impervious to moisture, and not affected by the action of uric acid.
5. Color: White.

E. Water Closet Types:

1. Type 1 & 1A Water Closet: Floor supported, floor outlet, top spud inlet, siphon jet action, activated by an exposed flush valve.

2.09 VITREOUS CHINA URINALS

- A. Floor Supported Fixture: Vitreous china, stall type.
1. Dimensions (approx.): 38 inches high, 18 inches wide.
- B. Wall Supported Fixture: Vitreous china, with elongated rim, integral trap and extended side shields.
1. Dimensions (approx.): 28 inches high, 18 inches wide, 12 inches front to back.
 2. Method of Support: Wall hangers and lugs for bearing plate bolting.
- C. Operation: Fixture shall be designed for use without flushing water.
- D. Fixture Types:
1. Type 3 & P3A Urinal: Wall supported, back outlet and water-free operation.

2.10 URINAL CARRIER

- A. Floor Mounted Carrier Support (For Wall Hung Urinals): 1-1/4 inch ips steel pipe upright supports with block feet arranged with provisions for bolting to the floor slab, and with the following:
1. Hanger Plate: Steel, height adjustable with provisions for mounting and positioning the fixture hanger.
 2. Bearing Plate: Steel, adjustable, with bearing studs, nuts and washers.
 3. Studs, Nuts and Washers: Steel, treated for corrosion resistance.
 4. Fixture Washers: Plastic.
 5. Stud thread protectors.
 6. Factory Painted.
 7. Trim: Polished chrome plated metal cap nuts and washers.
- B. Ferrous metal members of carriers and supporting devices with the exception of chrome plated or porcelain enameled cast iron, shall be factory painted for corrosion resistance.

2.11 FLUSH VALVES

- A. Control Mechanism: Diaphragm or piston operated; do not intermix types.
- B. Maximum Flow Per Flush:
 - 1. Water Closet: 1.1/1.6 gallons dual flush.
- C. Flush Valve Assemblies: Flush valve, stop-check, tailpiece, vacuum breaker, and fixture spud coupling, including wall and spud flanges.
- D. Valve Materials:
 - 1. Valve Body: Brass or bronze.
 - 2. Valve Internal Parts: Corrosion resistant materials that will not be affected by the action of or contact with water.
- E. Operating Features:
 - 1. Valve operators shall employ the non hold-open feature.
 - 2. Piston type valves shall be field adjustable.
- F. Valve Operators:
 - 1. Automatic, electronic with dual flush mode selection. Sloan ECOS or approved equal.
- G. Assembly Components:
 - 1. Flush Pipe: Seamless brass tubing with integral vacuum breaker, No. 18 B & S gage.
 - 2. Fitting: Cast brass.
 - 3. Stop-Check: Brass or bronze body, non rising stem stop valve with a built-in automatic check.
 - a. Exposed Stop-Check: Screwdriver operated with protective cap.
 - b. Concealed Stop-Check: Wheel handle operated.
 - 4. Spud Coupling and Wall Flanges: Cast brass.

PART 3 EXECUTION

3.01 FIXTURE SUPPORT AND SUPPORTING DEVICE INSTALLATION

- A. Install heavy duty floor mounted carrier supports with specified fixture supporting devices for wall type plumbing fixtures.
 - 1. Secure to building construction with lag bolts and metal expansion shields, or other appropriate means as required by the construction encountered.
- B. Fixture Supporting Devices: Attach fixtures by means of the following fixture supporting devices attached to carrier supports.

FIXTURE	SUPPORTING DEVICE
Lavatory, P2 & P2A	Concealed arms.
Lavatory, P2B	Through bolt.
Water Closet	Bolt to comb. carrier and drainage fitting.
Urinal	Fixture hanger and bearing plate.

3.02 FIXTURE INSTALLATION

- A. Install the Work of this section in accordance with the manufacturer's printed installation instructions.
- B. Install fixtures level and at proper height, tighten connections, and install hold-down bolts, cap nuts and cover plates, where required.
- C. Mop Service Sinks:
 - 1. Set receptor leveled in bed of mortar laid on clean roughened surface. Remove excess mortar and strike a neat joint.
 - 2. Make connection from drainage pipe to receptor drain.
 - 3. Caulk joints between receptor and wall or floor with Type 1D sealant; strike a neat joint.
 - 4. Install service fittings.
 - d. Caulk perimeter of fixture; strike a neat joint.
- D. Lavatories:
 - 1. Mount lavatories 31 inches from finished floor to rim unless otherwise specified.
 - 2. Mount handicapped accessible fixtures 34 inches from finished floor to rim. Refer to Standard Drawing No. 93/S3013 bound herein, for special clearances required for handicapped accessible fixtures.
 - d. Caulk perimeter of fixture; strike a neat joint.
- E. Countertop Fixtures:
 - 1. Install fixture with securing devices supplied.
 - 2. Set fixture on bedding of sealant, tighten securing devices and remove excess sealant.
 - d. Caulk perimeter of fixture; strike a neat joint.
- F. Water Closets:
 - 1. Floor Supported Fixtures:
 - a. Set fixture in bed of setting compound; remove excess.
 - 2. After connections are tightened, install cap nuts and washers.
 - 3. Install water closet seats when directed.
 - d. Caulk perimeter of fixture; strike a neat joint.
- G. Urinals:
 - 1. Wall Hung Fixtures:

- a. Standard Fixtures: Install wall hung fixtures 24 inches from finished floor to rim.
 - b. Handicapped Accessible Fixtures: Install wall hung handicapped accessible fixtures 14 inches (minimum) to 17 inches (maximum) from finished floor to rim.
 - c. Set bearing nuts on floor mounted carrier supports to position wall hung fixtures 1/16 inch clear of finished wall.
 - d. Caulk perimeter of fixture; strike a neat joint.
2. After connections are tightened, install cap nuts and washers.

H. Flush Valves:

1. Standard Fixtures: Install flush valves on fixture centerline, and at following heights above fixture rim or back to centerline of water inlet to flush valve.
 - a. Water Closet: 11-1/2 inches.
2. Handicapped Accessible Fixtures: Install flush valves on fixture centerline, and at following height above finished floor to centerline of flush valve operator. Distance between centerline of flush valve operator and centerline of water inlet is 1-1/2 inches.
 - a. Water Closet: Approximately 31-1/2 inches, and mounted on wide side of stall.
 - 1) Coordinate mounting height with Construction Work Contractor to avoid interference with grab bar, and to facilitate flush valve servicing.
3. Slip joints in flush pipe connections allowed only at fixture spud and vacuum breaker ends; others shall be screwed connections.
4. Score tubing ends before assembling to assure tight slip joint connections. No score marks shall be visible after assembly.
5. In utility corridors, solder screwed flush pipe connections.

3.03 CLEANING, FLUSHING AND ADJUSTMENT

- A. Clean fixture and trim. Remove grease and dirt; polish surfaces but leave stickers and warning labels intact.
- B. Flush supply piping and traps; clean strainers.
- C. Adjust stops for proper delivery.
- D. Adjust metering faucets for proper timing.

END OF SECTION

SECTION 23000
BASIC HEATING, VENTILATING AND AIR CONDITIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Provide labor, materials, tools, machinery, equipment, and services necessary to complete the HVAC Work under this Contract. All systems and equipment shall be complete in every aspect and all items of material, equipment and labor shall be provided for a fully operational system and ready for use. Coordinate the work with the work of the other trades in order to resolve all conflicts without impeding the job progress.
- B. Examine the Architectural, Structural, Plumbing and Electrical Drawings and other Divisions, and Sections of the Specifications in order to determine the extent of the Work required to be completed under this Division. Failure to examine all the Contract Documents for this Project will not relieve the Contractor of his/her responsibilities to perform the Work required for a complete fully operational and satisfactory installation.
- C. All systems, equipment and services specified herein shall be provided complete and ready for use.

1.02 SUBMITTALS

- A. General: Unless indicated otherwise in the specific technical section, if a particular product specified in the technical section is being provided, manufacturer's qualifications and samples (except as listed below), are not required to be submitted. Manufacturer's product data, installation instructions, samples requiring color or texture approval, samples showing thickness and type of material, shop drawings, and calculations are to be submitted. Schedules, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.
- B. The following Submittals are required for all Sections of Division 23-Heating, Ventilating, and Air Conditioning. Specific "Supplemental Submittals" or additional information to that listed below that are required to be submitted are defined in each individual technical section.
 - 1. Product Data: Submit manufacturer's product data for equipment including catalog sheets or cuts, specifications, capacity, performance charts, test data, materials, dimensions, weights, furnished specialties and accessories; and installation instructions. Submit start-up instructions where applicable.
 - 2. Shop Drawings: Submit manufacturer's shop drawings detailing equipment assemblies and indicating dimensions, weight, loadings, required clearances, method of field assembly, components, location and size of each field connection.

- C. Where indicated in the Supplemental Submittals of the technical sections, the following submittals are defined as follows:
 - 1. Maintenance Data: Submit maintenance data and parts list. Include this data and the product data in the maintenance manual in accordance with the requirements of Division 1.
 - 2. Test Report: Submit factory certified test results prior to shipping.
- D. Piping, Ductwork, and Wiring Diagrams: Submit a complete wiring diagram, ductwork layout, and piping layout of all equipment. All parts of the installation shall be indicated exactly as installed and shall be properly identified. Valve identification numbers shall agree with valve tags of Section 230553: Identification and all piping shall be clearly shown and labeled.
- E. Coordination Drawings: Provide complete coordination Drawings showing interface of all mechanical trades with the Architecture of the Building. All copies are to be signed. The Contractor is to keep a copy of the signed coordination drawing on the site.

1.04 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: If a particular product specified in the technical section is not being provided, provide manufacturer's qualifications.

Provide manufacturer's qualifications that indicate that the firms are regularly engaged in manufacture of equipment, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five years.

- B. Codes and Standards: All equipment furnished and installed shall meet or exceed the referenced Standards and Codes in all respects – installation, performance, etc.

References and industry standards listed herein and in other HVAC Sections are applicable to the Work specified in the Section. Unless more restrictive criteria is explicitly called-out for in other HVAC Specifications or mandated by the Building Code, the requirements described in the referenced standards below shall be deemed applicable to the Work. This includes language in the documents in the form of a recommendation or suggestion, which shall be deemed as mandatory.

- 1. NFPA
- 2. 2020 NYS BUILDING CODE
- 3. ASHRAE (SPECIFICALLY 90.1)
- 4. SMACNA
- 5. ELECTRICAL IEEE STANDARDS
- 6. STATE DEC REGULATIONS
- 7. ASME
- 8. ANSI
- 9. ABMA
- 10. UL
- 11. LOCAL LAWS

12. NCPWB
13. FCI
14. EJMA
15. MSS
16. ABMA
17. IRI
18. MEA
19. AABC
20. NEBB
21. ARI
22. AMCA
23. ADC
24. NEMA
25. NEC
26. ASTM
27. YONKERS BUILDING CODE

1.05 ACCESSIBILITY

- A. Install access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- B. For access doors to valves, dampers and all other HVAC type of items, accessories and equipment, concealed in walls, ceiling, furring's and hung ceilings; Door shall permit full access to the equipment.

1.06 ROUGHING-IN

- A. Verify final locations for roughing work with field measurements and with the requirements of the actual equipment being connected. Coordinate with General Construction drawings.

1.07 MECHANICAL INSTALLATIONS

- A. Coordinate HVAC equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for HVAC installations.
- D. Sequence, coordinate, and integrate installations of HVAC materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning and entrance prior to the close of the building.
- E. Coordinate the cutting and patching of building components to accommodate the installation of HVAC equipment and materials.

- F. Where mounting heights are not detailed or dimensioned, install HVAC services and overhead equipment to provide the maximum headroom possible.
- G. Install HVAC equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting and minimum of interference with other installations.
- H. Coordinate the installation of HVAC materials and equipment above ceilings with suspension system, light fixtures, and all other installations and accessories.
- I. Provide all rigging, disassembly and reassembly of equipment including the furnishing and installation of dunnage and all other required and necessary accessories.

1.08 COORDINATION DRAWINGS

- A. Provide coordination drawings. Coordination drawings shall be completed so as not to delay the progress of the Project.
- B. The coordination drawings shall be prepared in the following manner: HVAC Subcontractor shall prepare a set of mylars drawn to the scale of 3/8"=1'-0", indicating thereon ductwork, steam and return piping, All beam and slab penetrations shall be indicated and sizes shall be coordinated. HVAC Contractor shall provide shop drawings for all roof openings required for installation of HVAC systems. At the completion of this phase, hold a coordination meeting to eliminate any interference among the trades that the drawings indicate and to avoid any conflicts in installing the Work. Should any problems of coordination require architectural or structural change of design, this change shall be submitted to the Owner for approval.
- C. If any trade installs any Work before coordinating with the Work of other trades, that Trade shall make necessary changes to correct the condition without extra cost to the OWNER OW. This requirement for "Coordination Drawings" shall not be construed as authorization to make any unauthorized changes to the Drawings. All Design Drawings space allocations shall be maintained, such as ceiling height, chase walls, equipment room size, and all other items and accessories, unless prior written authorization is received from the OWNER OW to change them.

1.09 CUTTING AND PATCHING

- A. Do not endanger or damage installed Work through procedures and processes of cutting and patching.
- B. Arrange for repairs required to restore the work, because of damage caused as a result of HVAC installations.
- C. No additional compensation will be authorized for cutting and patching Work that is necessitated by defective or non-conforming installations.

- D. Perform cutting, fitting, and patching of HVAC equipment and materials required to:
 - 1. Remove and replace defective work.
 - 2. Remove and replace work not conforming to requirements of the Contract Documents.
 - 3. Remove samples of installed work as specified for testing.
 - 4. Install equipment and materials in existing structures.
 - 5. Cut, remove and legally dispose of selected HVAC equipment, components, and materials as indicated, including, but not limited to removal of HVAC piping, heating units and trim and other HVAC items made obsolete by the new work.
 - 6. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

1.10 EQUIPMENT NOISE AND VIBRATION

- A. Provide equipment and systems that, as defined herein, shall be quiet and free of apparent vibration in operation.
- B. The vibration shall not be apparent in occupied areas of the building. Both the balancing of rotating machinery and the installation of vibration isolation at various locations are required.
- C. Obtain equipment that is quiet in operation as compared to other available equipment of its size, capacity, and type; install equipment so that a minimum amount of noise and/or vibration is transmitted to the building; and fabricate the duct system so that air noises generated in the system are held to an absolute minimum.
- D. Adjust all the equipment RPM, noise production and vibration in order to avoid any production of resonance in any system.

1.11 ELECTRICAL CHANGES TO MECHANICAL EQUIPMENT

- A. If any changes made in equipment submitted are approved especially as to the sizes of the motors, notify Electrical.

1.12 DELIVERY, STORAGE, AND HANDLING

- A. Handle equipment carefully to prevent damage, breaking, denting, and scoring. Do not install damaged units or components; replace with new.
- B. Store equipment in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

- C. Comply with manufacturer's rigging and installation instructions for unloading equipment, and moving them to final location.

1.13 GUARANTEES, WARRANTIES, BONDS, AND MAINTENANCE CONTROL

- A. Refer to General Sections for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
 - 1. Compile and assemble the warranties specified for HVAC work into a separated set of documents, tabulated and indexed for easy reference.
 - 2. Provide complete warranty information for each item to include product or equipment including duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.
 - 3. Unless otherwise noted in the specific sections, warranties for the equipment, workmanship and materials shall be provided for the period of one year.
 - 4. Manufacturers', not Contractors' warranties, shall be provided for all HVAC equipment and accessories.
 - 5. All warranties are to start from the date of Substantial Completion.

1.15 OPERATIONS, TRAINING, AND MANUAL

- A. Refer to General Sections for procedures and requirements for preparation and submittal of operation and maintenance manuals of each HVAC equipment. Refer to individual equipment specifications for maintenance manual additional requirements. In addition, include the following information:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassemble; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.
- B. Bind all the other Sections maintenance manuals in a single final Operating and Maintenance Manual.

1.16 PAINTING

A. Painting Schedule

1. No on-site painting is required on the following items unless specifically indicated otherwise:
 - a. Concealed metal and piping.
 - b. Piping or ductwork to be insulated.
 - c. Insulation on piping or ductwork in unfinished spaces or concealed.
2. Paint the following:
 - a. Hangers, Supports, Restraints and Accessories:
 - 1) All black steel or iron pipe hangers, rods, inserts, brackets, restraints, and accessories for supporting piping systems and duct systems: 1 coat of primer and 2 coats of latex semi-gloss enamel. Paint black steel hanger rods, threaded on the job site, with a primer immediately after installation.

F. Color Coding:

1. Apply finish paints of colors indicated opposite the various items listed below where such items are installed in Mechanical Equipment Rooms:

Piping, Exposed - Bare and Insulated on Unfinished Spaces and Rooms:

Water - Dual temperature	Yellow
--------------------------	--------
2. Piping Not Listed Above: Color code by classification as follows:

Dangerous Materials	Yellow or Orange
Safe Materials	Green
Valuable Materials	Purple
3. Ductwork: Grey.
4. Equipment - Bare and Insulated (Except Factory Painted): Grey.

1.17 ADJUSTING AND CLEANING

- B. Alignment: Check alignment, and where necessary, realign equipment within recommended tolerances by the manufacturer and in presence of manufacturer's service representative and the owner.

1.18 TORCH BURNING OPERATION

- A. The storing and use of oxygen and combustible gases in conjunction with torch burning apparatus is subject to the Rules and Regulations of the Division of Fire Prevention of the Fire Department, latest Fire Prevention (F.P.) Directive. Fire watches shall be provided during all operations using torches for burning, cutting or welding.
- B. Contractor shall apply for and obtain permits for the use and storage of such equipment on premises. The operator of such equipment shall have a certificate of fitness issued by the Fire Department.
- C. The cost of permits, certificates, fire watches, apparatus and other items required in the torch burning operation shall be borne by the Contractor at no additional cost to the OWNER OW.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas and conditions under which equipment is to be installed. Do not proceed with work until conditions are suitable.

3.02 INSTALLATION

- A. Install equipment in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.
- B. Support: Install equipment on 4" high concrete pad when installed on floor, with vibration isolators and restraints as required.
- C. Accessories: Install equipment accessories not installed at factory and shown on the Drawings.
- D. Connections: Connect all equipment and accessories as recommended by manufacturer for a complete installation.
- E. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, mechanical equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

3.03 START-UP AND DEMONSTRATION/TRAINING/SERVICE

- A. Start-Up and Demonstration/Training: The Contractor shall start-up and demonstrate, in the presence of the Owner, the proper operation of all equipment provided in this Contract.
- B. Service: Provide the services of a competent field service representative to furnish service to the facility during construction and during the warranty period. Service must be performed within 48 hours from the time of notification (24 hours for emergencies).

3.04 ADJUSTING AND CLEANING

- A. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

3.06 TESTING

- A. The Contractor shall furnish energy, fuel, oil, water, air, light and electrical instruments as required for all testing. Reference Section 230593, Cleaning and Testing.

END OF SECTION

SECTION 230594

BALANCING OF SYSTEMS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Quality Control Submittals:
 - 1. Testing, Adjustment and Balancing Reports:
 - a. Submit final testing and balancing results on applicable report forms, as approved or furnished by the environmental systems balancing council or bureau, which is certifying the independent member agency performing the Work, required by this Section. Each final systems report form shall bear the signature of the person performing the Work and recording the data and the signature of the certified supervisor for the performing agency. Submit simultaneously with the final reports, a list of the instruments used with the last date of calibration for each instrument.

1.02 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Provide the services of a certified independent agency for the testing, adjustment and balancing of all air distribution and hydronic distribution systems complete with all connected apparatus and equipment. The agency shall be certified by the Associated Air Balance Council Bureau - AABC, Los Angeles, Cal. 90026 or by National Environmental Balancing Bureau - NEBB, Arlington, Va. 22209.
 - 2. The Work shall be performed by skilled mechanical technicians under the direct supervision of certified personnel in the employ of the independent agency. The supervisor shall be personally certified by the national council or bureau, as approved by the Owner.

1.03 SEQUENCING AND SCHEDULING

- A. Scheduling:
 - 1. Perform environmental systems testing and balancing after cleaning, miscellaneous testing, adjustment and operational testing Work has been completed.
 - 2. Test and balance system during a period of time when outside temperature conditions will impose a significant load on the system; i.e., summer months for air conditioning system, winter months for heating system. Balance and adjust systems accordingly.
 - 3. Send written notification to the Owner a minimum of five days prior to the performance of testing and balancing Work. Perform testing and balancing Work in the presence of the Owner.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. General Information: Test instruments are included in this specification for information only. Balancing of air and hydronic systems shall be performed by qualified personnel utilizing company owned test instruments, which will remain the property of the company. Use test instruments which are in first class operating condition, with individual calibration histories to guarantee their accuracy. Test instruments shall be of type and kind as required by the type of system installed. Trade names and manufacturer's names are mentioned in this section for descriptive purposes only; instruments of equivalent range and capabilities may be utilized.
- B. Air Balancing Instruments:
 - 1. Manometers: Inclined with ranges of 0 to 1/4 inch and 0 to 1 inch; Combination inclined and vertical with a range of 0 to 5 inches and U tube type, 18 inches.
 - 2. Portable "Magnehelic" Draft Gages: Ranges 0 to 1/2 inch, 0 to 1 inch and 0 to 5 inches.
 - 3. Anemometers: Deflecting vane type with a range of 100 to 3000 fpm, similar to Alnor Velometer Model 6000 BP and 4 inches diameter rotating vane type.
 - 4. Pitot Tubes: ASHRAE standard type, stainless steel, 5/16 inch diameter, lengths as required.
 - 5. Sling Psychrometer.
 - 6. Smoke Candles and Smoke Generator.

PART 3 EXECUTION

3.01 PRELIMINARY WORK

- A. Circulating Water Systems: Prior to balancing the system, bleed all air vents so as to completely flood the system; check pumps for proper rotation; clean strainers and set balancing and system stop valves in the full-open position.
- B. Ventilating and Air Conditioning Systems: Prior to balancing the system, check fans for proper rotation; check filters for cleanliness and proper installation and set dampers in the normal operating position.

3.02 BALANCING OF VENTILATING AND AIR CONDITIONING SYSTEMS

- A. Equipment Schedules and Report Sheets:
 - 1. Prepare itemized air balance schedules for each system listing all air handling units and air outlets for each system. Schedule multi-zone systems by individual zones. Start each schedule from the inlet or the air

- handling unit and terminate with the last air inlet or outlet device in the system or zone.
 - 2. Prepare individual air handling unit report sheets, noting manufacturer's published performance data.
 - 3. Record all test readings, calculations and results.
- B. Balancing:
- 1. Inspect All Equipment: Establish a definite operational test condition for test and air balance purposes. In accordance with test condition selected, such as minimum fresh air dampers open, turn on all air handling systems in the building, including all exhaust systems.
 - 2. Balance a system starting with the air handling unit. Check fan speed, using a tachometer with a self-timing device and the power reading of the fan motor using a volt-amp meter. Calculate the actual brake horse power from the tachometer and volt-amp meter readings. Compare the actual fan speed reading and the motor power reading, with the air handling unit manufacturer's published performance data, and if they check within reasonable limits, make duct velocity readings on the main ducts. Drill holes in the main ducts and using a velocity measuring instrument take velocity readings. Take velocity readings in each zone duct of a multi-zone system and in addition, in the main branch ducts of a reheat type system. Close and seal test holes with metal snap hole plugs and duct tape. Calculate the cfm's of the ducts. Establish the total air for the fan or system under test. Compare the design data with the test results, and if the total air is high or low, adjust the fan speed accordingly. Repeat the described test procedure for all air handling units, including all supply air, return air and exhaust air apparatus. With the total air for the system established, use the same duct velocity check system for adjusting the main splitter dampers or other volume control devices for the various branches of the system. Test and adjust the individual air inlet or outlet devices, after the main ducts, zone ducts and branch ducts have been set at design conditions. Adjust individual air inlet and outlet devices, such as registers and diffusers, for air pattern and volume, in the manner recommended by the manufacturer of the devices. The total cfm of all inlets or outlets shall equal the total cfm of all branches, which in turn shall equal the total air volume of the air handling units. The system is balanced, when the results of the specified test procedures check with the design data, that is, fan speed and horsepower; total air by velocity readings and total air by inlet or outlet volume.

3.03 FIELD QUALITY CONTROL

- A. Inspection: Prior to the environmental testing and balancing of hydronic and air distribution systems, the certified supervisor in the employ of the testing and balancing agency shall inspect the installations and notify the Owner of any Work which must be performed or modified prior to initiating testing and balancing procedures.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- B. Performance: Test and balance environmental hydronic and air distribution systems, including all connected equipment and apparatus, so as to conform to the design conditions. Perform the Work of this section in accordance with the published standards of the balancing council or bureau, which is certifying the member firm. Record all test readings, calculations and results.

END OF SECTION

SECTION 230719

INSULATION

PART 1 GENERAL

1.01 ABBREVIATIONS

- A. FS: Federal Specification.
- B. K: Thermal Conductivity, i.e., maximum Btu per inch thickness per hour per square foot.
- C. pcf: Pounds per cubic foot.
- D. PVC: Polyvinylchloride.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's catalog sheets, specifications and installation instructions for insulation materials and jacket materials.
 - 2. Materials Schedule: Itemize insulation materials and thicknesses for each specified application in Insulation Material Schedules in Part 3 of this Section. Where optional materials are specified, indicate option selected.
- B. Quality Control Submittals:
 - 1. Installers Qualification Data:
 - a. Name of each person who will be performing the Work, and their employer's name, business address and telephone number.
 - b. Furnish names and addresses of the required number of similar projects that each person has worked on which meet the qualifications.

1.03 QUALITY ASSURANCE

- A. Qualifications: The persons installing the Work of this Section and their Supervisor shall be personally experienced in mechanical insulation work and shall have been regularly employed by a company installing mechanical insulation for a minimum of 5 years.
- B. Regulatory Requirements:
 - 1. Insulation installed inside buildings, including duct lining materials, laminated jackets, mastics, sealants and adhesives shall have a Fire Spread/Smoke Developed Rating of 25/50 or less based on ASTM E 84.

PART 2 PRODUCTS

2.01 INSULATION

- A. Fibrous Glass (Mineral Fiber) Insulation: Composed principally of fibers manufactured from rock, slag, or glass, with or without binders, and asbestos free.
 - 1. Block or Board Insulation: Minimum density 3.0 pcf and 6.0 pcf as specified; ASTM C 612:
 - a. Type IA or IB (Suitable for Temperatures Up to 450 degrees F): K of 0.26 at 75 degrees F.
 - b. Type II (Suitable for Temperatures 451 to 850 degrees F): K of 0.44 at 300 degrees F.
 - c. Type III (Suitable for Temperatures 851 to 1000 degrees F): K of 0.44 at 300 degrees F.
 - d. Type IV (Suitable for Temperatures 1001 to 1200 degrees F): K of 0.37 at 300 degrees F.
 - e. Type V (Suitable for Temperatures 1201 to 1800 degrees F): K of 0.42 at 300 degrees F.
 - 2. Thermal and Acoustic Board Insulation: Minimum density 3.0 pcf, K of 0.27 at 75 degrees F; ASTM C 1071, Type II.
 - a. Air Stream Side: Erosion, temperature, and fire resistant type; NFPA 90-A and 90-B.
 - 3. Blanket Insulation:
 - a. For Ductwork (Suitable for Temperatures Up to 450 Degrees F): Minimum density 1.0 pcf, K of 0.31 at 75 degrees F; ASTM C 553, Type II.
 - b. For Breeching (Suitable for Temperatures up to 1200 degrees F): Minimum density 8 pcf, K of 0.55 at 400 degrees F, metal mesh faced one side; ASTM C 553, Type VII.
- B. Flexible Elastomeric Foam Insulation:
 - 1. FM tested and approved, meeting the following:
 - a. Maximum Water Vapor Transmission: 0.10 perm - inch based on ASTM E 96, Procedure A.
 - b. K of 0.27 at 75 degrees F based on ASTM C 518 or C 177.
 - c. Fire Spread/Smoke Developed Rating: 25/50 or less based on ASTM E 84.
 - 2. Sheet Insulation for Ductwork and Equipment: ASTM C 534, Type II, smooth skin one side.
 - 3. Polyethylene and polyolefin insulation is not acceptable.
- C. High Density Jacketed Insulation Inserts for Hangers and Supports:
 - 1. For Use with Flexible Elastomeric Foam Insulation:
 - a. Ductwork: Hardwood dowels and blocks, length or thickness equal to insulation thickness, other dimensions as specified or required.
- D. Cements:
 - 1. Fibrous Glass Thermal Insulating Cement: Asbestos free; ASTM C 195.
 - 2. Fibrous Glass Hydraulic Setting Thermal Insulating and Finishing Cement: ASTM C 449/C 449M.

2.02 JACKETS

- A. Laminated Vapor Barrier Jackets for Ductwork: Factory applied by insulation manufacturer, conforming to ASTM C 1136, Types I and II.
 - 1. Type I: Reinforced white kraft and aluminum foil laminate with kraft facing out.
 - a. Pipe Jackets: Furnished with integral 1-1/2 inch self sealing longitudinal lap, and separate 3 inch wide adhesive backed butt strips.
 - 2. Type II: Reinforced aluminum foil and kraft laminate with foil facing out.
 - 3. Laminated vapor barrier jackets are not required for flexible elastomeric foam insulation.
- B. Canvas Jackets: Cotton duck, fire retardant, complying with NFPA 701, 4 oz or 6 oz per sq yd as specified.

2.03 ADHESIVES, MASTICS, AND SEALERS

- A. Lagging Adhesive (Canvas Jackets): Childers' CP-50AMV1, Epolux's Cadalag 336, Foster's 30-36.
- B. Vapor Lap Seal Adhesive (Fibrous Glass Insulation): Childers' CP-82, Epolux's Cadoprene 400, Foster's 85-60 or 85-20.
- C. Vapor Barrier Mastic (Fibrous Glass Insulation): Permeance shall be .03 perms or less at 45 mils dry per ASTM E 96. Childers' CP-34, Epolux's Cadalar 670, Foster's 30-65 .
- D. Adhesive (Flexible Elastomeric Foam): Armstrong's 520, Childers' CP-82, Epolux's Cadoprene 488, Foster's 85-75. 5 gallon cans only.
- E. Adhesive (Fiberglass duct liner): Childers' Chil Quik CP-127, Foster Vapor Fas 85-60. Must comply with ASTM C 916, Type II
- F. Weather Barrier Breather Mastic (Reinforcing Membrane): Childers' VI-CRYL CP-10/11, Foster's Weatherite 46-50.
- G. Sealant (Metal Pipe Jacket): Non hardening elastomeric sealants. Foster Elastolar 95-44, Childers Chil Byl CP-76, Pittsburgh Corning 727.
- H. Reinforcing Membrane: Childers' Chil Glas #10, Foster Mast a Fab, Pittsburgh Corning PC 79

2.04 MISCELLANEOUS MATERIALS

- A. Insulation Fasteners for Ductwork and Equipment:
 - 1. Acceptable Manufacturers: Duro-Dyne Corp.; Erico Fastening Systems, Inc.
 - 2. Type: Weld pins, complete with self-locking insulation retaining washers.

- B. Pressure Sensitive Tape for Sealing Laminated Jackets:
 - 1. Acceptable Manufacturers: Alpha Associates, Ideal Tape, Morgan Adhesive.
 - 2. Type: Same construction as jacket.
- C. Wire, Bands, and Wire Mesh:
 - 1. Binding and Lacing Wire: Nickel copper alloy or copper clad steel, gage as specified.
 - 2. Bands: Galvanized steel, 1/2 inch wide x 0.015 inch thick, with 0.032 inch thick galvanized wing seals.
 - 3. Wire Mesh: Woven 20 gage steel wire with 1 inch hexagonal openings, galvanized after weaving.
- D. Metal Corner Angles: Galvanized steel, 2 x 2 inch 28 gage.
- E. Reinforcing Membrane: Glass or Polyester, 10 x 10 mesh. Alpha Associates Style 59, Childer's Chil-Glas, Foster's MAST-A-FAB.

PART 3 EXECUTION

3.01 PREPARATION

- A. Perform the following before starting insulation Work:
 - 1. Install hangers, supports and appurtenances in their permanent locations.
 - 2. Complete testing of ductwork and equipment.
 - 3. Clean and dry surfaces to be insulated.

3.02 INSTALLATION, GENERAL

- A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions unless otherwise specified.
- B. Do not intermix different insulation materials on individual runs.

3.03 INSTALLATION AT HANGERS AND SUPPORTS

- A. Reset and realign hangers and supports if they are displaced while installing insulation.
- B. Install high density jacketed insulation inserts at hangers and supports for insulated ductwork, piping, and equipment.
- C. Insulation Inserts For Use with Fibrous Glass Insulation:
 - 1. Ductwork: Install 6 pcf density jacketed fibrous glass board, same thickness as adjoining insulation, sized for full bearing on supporting trapeze member, and as required to enable abutting to adjoining insulation and overlapping of jacketing.
- D. Insulation Inserts For Use with Flexible Elastomeric Foam Insulation:

1. Ductwork: Install hardwood block, same thickness as adjoining insulation, sized for full bearing on supporting trapeze member and as required to abutt and seal vapor tight with adjoining insulation.

3.04 INSTALLATION OF DUCTWORK INSULATION

A. Fibrous Glass Board Insulation Application:

1. Secure insulation to ductwork, with duct insulation fasteners spaced 3 inch in from all corners of ducts, with intermediate fasteners on maximum 16 inch centers in all directions.
2. Butt edges of insulation and fill voids with similar insulation.
3. Seal minimum 1-1/2 inch wide longitudinal jacket laps continuously with vapor seal adhesive.
4. Lap circumferential joints with 4 inch wide jacket material and seal laps continuously with vapor barrier lap adhesive, or seal continuously with minimum 3 inch wide pressure sensitive sealing tape, of same material as jacket.
5. Install metal corner angles over the jacketed insulated corners. Seal exposed ends of insulation with vapor barrier mastic.
6. Vapor seal breaks in vapor barrier jacketing, exposed surfaces of duct insulation fasteners and metal corner angles, with pressure sensitive sealing tape of same material as jacket or coat with vapor barrier mastic.
7. Field apply 6 oz canvas jacket over the vapor barrier jacketed insulation where indicated on Ductwork Service Insulation Material Schedule in Part 3 of this Section.
 - a. Apply canvas jacket with lagging adhesive, with a 2 inch lap on circumferential and longitudinal seams.
 - b. Outward clinching staples may be utilized for additional securement of canvas to bottom of ducts in excess of 48 inch in width.
 - c. Apply heavy coat of lagging adhesive to entire canvas surface.
8. Place trapeze hangers, fabricated of steel rods and structural steel channels or angles, outside of jacketed insulated ducts.
 - a. Install high density insulation inserts, of thickness equal to insulation, minimum of 4 inch in width by the bottom dimension of the duct, at points of support.
 - b. Continuously jacket insulated ducts and filler pieces through supports.

B. Fibrous Glass Blanket Insulation Application:

1. Cut insulation to stretch-out dimensions as recommended by insulation manufacturer.
2. Remove 2 inch wide strip of insulation material from the jacketing on the longitudinal and circumferential joint edges to form an overlapping staple/tape flap.
3. Install insulation with jacketing outside so staple/tape flap overlaps insulation and jacketing on other end.
4. Butt ends of insulation tightly together.
 - a. Rectangular and Square Ductwork: Do not compress insulation at duct corners.

5. Staple longitudinal and circumferential joints with outward clinching staples minimum 6 inches on center, and seal with pressure sensitive sealing tape.
6. Cut off pretruding ends of fasteners flush with insulation surface and seal with pressure sensitive sealing tape.
7. Install duct insulation fasteners on bottom side of horizontal duct runs, when bottom dimension of the duct is in excess of 24 inches in width.
8. Install duct insulation fasteners on sides of duct risers having a dimension over 24 inches in size.
9. Seal tears, punctures, and penetrations of insulation jacketing with sealing tape and coat with vapor barrier mastic.
10. Secure insulation to ductwork with fasteners spaced in accordance with the following schedule:

DUCT DIMENSION	SPACING OF FASTENERS (MINIMUM)
Up to 24 inches	None required.
24 inches to 48 inches	Horizontal Runs: 2 rows - 16 inches on center. Risers: 16 inches on center, all directions.
49 inches to 60 inches	Horizontal Runs: 3 rows - 16 inches on center. Risers: 16 inches on center, all directions.
61 inches and over	Horizontal Runs: 16 inches on center, all directions. Risers: 16 inches on center, all directions.

- C. Bench Insulated Ductwork:
 1. Insulate ducts prior to erection in place when ducts are required to be installed proximate to walls, ceilings, equipment or other ductwork, which will not permit adequate space for installation of insulation after ducts are installed.
- D. Flexible Elastomeric Foam Insulation on Ductwork Exposed to the Elements, Exterior to a Building:
 1. Apply 2 inch thick flexible elastomeric foam sheet insulation to ductwork with adhesive.
 - a. Insulate sheet metal duct seams, angle bracing, and reinforcing with same insulation thickness specified for ductwork.
 2. Apply reinforcing membrane around ductwork insulation with adhesive or mastic.
 3. Adhesive Applied System: Apply 2 coats of finish.
 4. Mastic Applied System: Apply another coat of mastic over reinforcing membrane.

3.05 FIELD QUALITY CONTROL

- A. Field Samples: The Owner, may at his discretion, take field samples of installed insulation for the purpose of checking materials and application. Reinsulate sample cut areas.

3.06 DUCTWORK SERVICE INSULATION SCHEDULE

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- A. Insulate all ductwork service except where otherwise specified.
- B. Do not insulate the following ductwork service items:
1. Exhaust ductwork, unless otherwise shown.
 2. Return fans.
 3. Exhaust fans.
 4. Interior lined ductwork.
 5. Flexible ductwork connections.
 6. Interior lined air terminal units.
 7. Sound absorbers.
 8. Ductwork located within equipment.
 9. Ductwork where design temperature difference between interior and exterior of duct or plenum does not exceed 15 degrees F.

3.07 DUCTWORK SERVICE INSULATION MATERIAL SCHEDULE

LOCATION	SERVICE	INSUL. MATERIAL	MINIMUM INSUL. THICKNESS	JACKET TYPE	MINIMUM REQUIRED R VALUE
Concealed, inside building insul. envelope in unconditioned spaces (in shafts, ceilings, walls, and floors)	Air Conditioning Supply and Returns Under 65 F, 100% Outside Air, Heating Supply Over 85 F.	Fibrous Glass Blanket	2	I or II	R-6
	Returns with Temp. Diff. With Ambient Greater than 15 degrees F	Fibrous Glass Board	1-1/2	I or II	
Exposed, inside building insul. envelope.	Air Conditioning Supply Under 65 F, 100% Outside Air, Heating Supply Over 85 F.	Fibrous Glass Board	1-1/2	I with Canvas Outer Jacket	R-6
Inside building but exposed to outside air temp., e.g., ventilated attic.	Air Conditioning Supply, Heating Supply, All Returns including returns mixed with outside air.	Fibrous Glass Blanket	2-1/2	I or II	R-12
		Fibrous Glass Board	2	I or II	
Exposed exterior to building.	Air Conditioning Supply, Heating Supply, All Returns including returns mixed with outside air.	Elastomeric Foam Sheet	2-1/2	None Required	R-12

A. **NOTES:**

1. Equipment: Insulate air handling equipment, not furnished with factory applied insulated jacket or internal insulation, with minimum 1-1/2 inch thick fibrous glass board with an ASTM C 1136 Type I jacket, installed and finished as specified for exposed ductwork in finished spaces.

END OF SECTION

SECTION 233113

METAL DUCTWORK

PART 1 GENERAL

1.01 REFERENCES

- A. American Conference of Governmental Industrial Hygienists (ACGIH).
- B. National Fire Protection Association (NFPA).
- C. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Layouts for areas in which it may be necessary to deviate substantially from layout shown on the Drawings. Show major relocation of ductwork and major changes in size of ducts. Minor transitions in ductwork, if required due to job conditions, need not be submitted as long as the duct area is maintained.
 - 2. Layout and fabrication details for cooking equipment exhaust ductwork.
 - 3. Layouts of mechanical equipment rooms and penthouses.
 - 4. Details of intermediate structural steel members required to span main structural steel for the support of ductwork.
 - 5. Method of attachment of duct hangers to building construction.
 - 6. Coordinate shop drawings with related contracts prior to submission.
- B. Product Data: Material, gage, type of joints, sealing materials, and reinforcing for each duct size range, including sketches or SMACNA plate numbers for joints, method of fabrication and reinforcing. Include ACGIH figure numbers for hoods if applicable.

1.03 QUALITY ASSURANCE

- A. SMACNA: Gages of materials, fabrication, reinforcement, sealing requirements, installation, and method of supporting ductwork shall be in accordance with the following SMACNA manuals, unless otherwise shown or specified:
 - 1. HVAC Duct Construction Standards.
- C. Conform to the applicable requirements of NFPA 90A, 90B, 91, 96, and 101.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Sheet Metal:

1. Galvanized Steel: ASTM A653, Class LFQ (lock forming quality), coating designation G-90.
- B. Duct Hangers:
 1. Strap Hangers: Same material as ducts, except that hangers for stainless steel ducts in unfinished spaces may be galvanized steel.
 2. Rod Type Hangers: Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with 2 removable nuts each end for positioning and locking rod in place. Unless stainless steel, galvanized or cadmium plated; shop coat with metal primer.
- C. Miscellaneous Fasteners and Upper Hanger Attachments:
 1. Sheet Metal Screws, Machine Bolts and Nuts: Same material as duct, unless otherwise specified.
 2. C Clamps: Fee & Mason Co.'s 255L with locking nut, and 255S with retaining strap.
 3. Metal Deck Ceiling Bolts: B-Line Systems, Inc.'s Fig. B3019.
 4. Welding Studs: Erico Fastening Systems, capacitor discharge, low carbon steel, copper flashed.
 5. Structural (carbon) Steel Shapes and Steel Plates: ASTM A36, shop primed.
 6. Stainless Steel Shapes and Plates: ASTM A276 and ASTM A666.
 7. Machine Bolt Expansion Anchors:
 - a. Non-caulking single unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 1.
 - b. Non-caulking double unit type: FS FF-S-325, Group II, Type 2, Class 2, Style 2.
 - c. Self-drilling type: FS FF-S-325, Group III, Types 1 and 2.

2.02 FABRICATION - GENERAL

- A. Fabricate ductwork from galvanized sheet metal.
- B. Dissimilar Metals: Separate dissimilar metals used for ductwork with 12 oz vinyl coated woven fiberglass duct connector fabric, such as Duro Dyne's Glassteel. No separation is required between screws or rivets and the materials in which they are inserted.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Install ductwork to allow maximum headroom. Properly seam, brace, stiffen, support and render ducts mechanically airtight. Adjust ducts to suit job conditions. Dimensions may be changed as approved, if cross sectional area is maintained.
- B. Provide necessary transformation pieces, and flexible fabric connections for ductwork connected to air handling equipment or air inlet and outlet devices.

3.02 SEALING SEAMS, JOINTS, AND PENETRATIONS

- A. Seal ductwork in accordance with the SMACNA Manual except for the following:
 - 1. Ductwork Specified to be Insulated: Conform with Seal Class A for all pressure classes.
- B. Duct Sealants: Water based, non-fibrated: Foster 32-19, Childers CP-146, Duro Dyne SAS.

3.03 HANGERS FOR DUCTS, UNDER 2 INCHES W.G.

- A. Install hangers for ducts as specified in the SMACNA Manual, with the following exceptions:
 - 1. Rectangular ducts up to 42 inches wide, not having welded or soldered seams, and supported from overhead construction; extend strap hangers down over each side of the duct and turn under bottom of duct a minimum of 2 inches. Secure hanger to duct with 3 full thread sheet metal screws, one in the bottom and 2 in the side of the duct.
 - 2. Rectangular ducts 43 inches wide and over, and all sizes of duct with welded or soldered seams, and supported from overhead construction; use trapeze hangers.
 - 3. Prime coat plain steel rods threaded at the site immediately after installation with metal primer.

3.04 UPPER HANGER ATTACHMENTS

- A. General:
 - 1. Secure upper hanger attachments to structural steel or steel bar joists wherever possible.
 - 2. Do not use drive-on beam clamps, flat bars or bent rods, as upper hanger attachments.
 - 3. Do not attach hangers to steel decks which are not to receive concrete fill.
 - 4. Do not attach hangers to precast concrete planks less than 2-3/4 inches thick.
 - 5. Avoid damage to reinforcing members in concrete construction.
 - 6. Metallic fasteners installed with electrically operated or powder driven tools may be used as upper hanger attachments, in accordance with the SMACNA Manual, with the following exceptions:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.
 - d. Do not use powder driven fasteners in precast concrete.
- B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by ductwork support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Secure upper hanger attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
- C. Attachment to Concrete Filled Steel Decks:
1. Existing Construction: Install welding studs (except at roof decks).
 2. Do not attach hangers to decks less than 2-1/2 inches thick.
- D. Attachment to Existing Cast-In Place Concrete:
1. Secure hangers to overhead construction with self drilling type expansion anchors and machine bolts.
 2. Secure hanger attachments required to be supported from wall or floor construction with single unit expansion anchors or self drilling type expansion anchors and machine bolts.

END OF SECTION

SECTION 233300

DUCTWORK ACCESSORIES

PART 1 GENERAL

1.01 REFERENCES

- A. ACGIH: American Conference of Governmental Industrial Hygienists.
- B. AMCA: Air Movement and Control Association.
- C. NFPA: National Fire Protection Association.
- D. SMACNA: Sheet Metal and Air Conditioning Contractors National Association, Inc.
- E. UL: Underwriters Laboratories, Inc.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, diagrams, standard schematic drawings, and installation instructions for each manufactured product. Submit SMACNA Figure Numbers for each shop fabricated item.
- B. Samples: When directed, submit one complete unit for each type of proposed air inlet and outlet device. Approved samples will be delivered to the job site for installation.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Unless otherwise shown or specified, comply with the applicable requirements of the following:
 - a. SMACNA: Gages of materials, fabrication, sealing, and installation shall be in accordance with the SMACNA Manuals.
 - 1) HVAC Duct Construction Standards.
 - b. ACGIH: Follow the Hood Design Data, and Construction Guidelines for Local Exhaust Systems from the Industrial Ventilation Manual.
 - c. AMCA: Certify damper and/or louver ratings in accordance with AMCA 511.
 - d. NFPA: Standards Nos. 90A, 90B, 91, 96, and 101.
 - e. UL: Standards No. UL181, UL555, and UL555S.

1.04 MAINTENANCE

- A. Special Tools:

1. One bar deflection key for every five supply grilles and/or every five return grilles.
2. One operator key for every five supply registers and/or every 5 return or exhaust registers.
3. Two keys or socket wrenches for each type of damper adjustment screw or device on manual damper regulators.

PART 2 PRODUCTS

2.01 GRILLES AND REGISTERS

- A. Unless otherwise specified, fabricate grille and register faces, and frames of steel with factory applied white baked-on enamel.
- B. Exhaust or Return Grilles: Fixed, single deflection type.
 1. Grille Face: 20 gage construction of same material as bars/vanes.
 2. Face Bars/Vanes: Installed in grille face.
 - a. Deflection Angle: 20 to 55 degrees.
 - b. Nominal Bar/Vane Spacing: 0.66 inch or 0.75 inch on center.
 - c. Sidewall grilles shall have horizontal face bars/vanes.

2.02 AIR DIFFUSERS

- A. Unless otherwise specified, fabricate diffusers of steel with factory-applied finish as follows:
 1. Prime coat for installation in walls and gypsum board, hard plaster or acoustic plaster ceilings specified to be painted.
 2. Baked-on white enamel for installation in splined acoustic ceilings, metal pan ceilings and suspended lay-in tile ceilings.
- B. General:
 1. Roll or round and reinforce all exposed edges of diffusers.
 2. Internal diffuser parts shall be readily removable to permit cleaning and access to ducts.
 3. Design removable parts and assemblies so that they cannot be reassembled in a manner that would produce an incorrect air distribution pattern.
 4. Secure internal assemblies with fasteners that allow removal without use of special tools.
 5. Do not use neck or duct connection sizes indicated to size diffusers.
- D. Circular, Square and Rectangular Diffusers:
 1. Complete with volume control damper and adjustable equalizing grid, fabricated of same material and with same finish as diffuser.
 2. Damper shall be adjustable by means of operator handle and rod device, which is designed to be locked in any position , and is operable from diffuser face.

3. Diffusers installed in plaster ceilings shall have plaster grounds of same material and finish as diffuser.

2.03 DAMPERS

A. Control Dampers (Galvanized Steel):

1. Types:
 - a. Low Leakage Damper: 3.7 cfm/sq ft maximum leakage rate at 1500 fpm and 1 inch wg for 48 inch wide damper (based on AMCA 500).
2. Frame: 16 gage galvanized steel hat channel with corner braces, and welded joints.
 - a. Frame Size:
 - 1) Dampers 13 inches high and under: 3-1/2 inch x 3/8 inch top and bottom frames.
 - 2) Dampers over 13 inches high: 5 inch x 1 inch.
3. Blades:
 - a. Low Leakage Damper: Single skin, 16 gage galvanized steel with longitudinal reinforcing grooves, and PVC coated polyester blade edge seals mechanically locked into blade edge.
 - c. Blade Action:
 - 1) Fully Open/Fully Closed Dampers: Parallel blade.
 - d. Single blade dampers are acceptable for ducts up to 14 inches high.
4. Axles: 1/2 inch plated steel hex positively locked to blade, and connected to frame through extruded hole with molded synthetic sleeve bearings.
5. Extended Shaft Assembly: Consisting of outboard support bracket, extended shaft rod, extended shaft.
 - a. Suitable for 2 inches of insulation.
6. Jamb Seals: Flexible metal compression type.
7. Damper Operation:
 - a. Low Leakage Dampers: Electric motor operated. Weld actuator mounting bracket to frame.
8. Linkage:
 - a. Single Section Dampers: In-frame fixed type with removable 1/2 inch dia control shaft extending 6 inches from damper frame, and outboard support bearing.
 - b. Multiple Section Dampers: On-blade fixed type with factory installed jackshaft.
9. Finish: Mill galvanized.

2.04 DAMPER ACTUATORS

- A. Acceptable Manufacturers: Honeywell Inc., Johnson Controls, Inc., Belimo, and Seimens.
- B. Electric/Electronic Type:

1. Positive positioning, spring return, and sized in accordance with actuator manufacturer's printed recommendations for each damper size.
2. Actuators for outdoor dampers shall fail closed upon loss of electric power.
3. Actuator Response: Linear in response to sensed load.
4. Voltage: 120 VAC or 24 VAC.
5. Actuator Timing:
 - a. Open Damper: 90 seconds.
 - b. Spring Return: 30 seconds.
 - c. Spring Close: 30 seconds.

2.05 TURNING VANE ASSEMBLIES

- A. Fabricate vane assemblies of same material as ductwork in which installed.
 1. Vanes: Individual hollow airfoil type, rigidly connected to vane rails.
 2. Weld, screw, or rivet rails to ductwork.

2.06 FLEXIBLE CONNECTIONS - FABRIC

- A. Static Pressures under 6 inches WG: Woven Fiberglass fabric with Hypalon coating; similar to Duro Dyne Corp.'s Durolon.
- B. Static Pressures 6 inches and Above: Single ply neoprene reinforced with 14 oz duck fabric; Style 3210 by Uni Rubber Inc., 11 Park Place, New York, NY 10007, (212) 962-0980.
 1. Attach fabric to minimum one inch wide 11 gage stiffener, and seal with duct sealant.
- C. Direct Fired Heating Equipment with Temperatures up to 500 Degrees F: Woven fiberglass fabric with silicone rubber coating; similar to Duro Dyne Corp.'s Thermofab.
- D. Factory prefabricated and pre-assembled connectors of fabric materials specified above are acceptable with minimum 24 gage galvanized steel edges similar to Duro Dyne Corp.'s Metal-Fab or Super Metal-Fab as required by free fabric length.

2.07 GASKET MATERIAL

- A. Registers, Grilles, and Diffusers Installed in Exposed, Uninsulated Ductwork: 1/4 inch thick felt or sponge rubber material, of width as required by flange.
- B. Flanged Joints in Ducts: 1/8 inch thick reinforced inert plastic of the self-conforming type, of same width as flange.
 1. Exception: Where flanged connections in cooking equipment exhaust ductwork is allowed by NFPA 96, make up joints with Fibrefrax Grade 110 Paper by Carborundum Co.

2.08 SEALANTS

- A. Acceptable Manufacturers: Duro Dyne Corp.; Foster Products Div., H.B. Fuller Co.; Hardcast Inc.; United Sheet Metal Div., United McGill Corp.
- B. U.L. Listed adhesives (liquid or mastic), scrim, tapes, or combinations thereof, as required for pressure class; suitable for system operating temperatures; compatible with media conveyed within, insulation (if any), and ambient conditions.

2.09 FLEXIBLE DUCT

- A. Conform to NFPA 90A, and UL181 Class I:
 - 1. Uninsulated Type: Factory assembled duct consisting of continuous, seamless, metalized polyester tear resistant duct with encapsulated steel helix.
 - 2. Pre-insulated Type: Factory assembled.
 - a. Internal Core: Continuous material suitable for service, with encapsulated steel helix that completely shields fiberglass insulation from air stream.
 - b. Outer Vapor Barrier Jacket: Seamless, tear resistant metalized polyester.
 - 3. Metal Clamps: Stainless steel with cadmium plated hex bolt.

2.10 DUCT ACCESS DOORS

- A. Prefabricated or Fabricated at Site: Minimum 12 x 12 inch size, of same material and finish as duct unless otherwise shown or specified.
 - 1. For uninsulated duct designed for under two inches wg: Fabricate single panel door of same gage as duct, with all edges folded, size door to overlap opening perimeter by one inch.
 - 2. For insulated duct and duct designed for two inches wg and over: Fabricate hollow metal doors in accordance with the SMACNA Manual. Fill void in doors for insulated duct with thermally equivalent insulation.
 - 3. Gasketing: A 3/4 inch wide, 1/8 inch thick urethane gasket, around all four sides of duct opening.
 - a. Exception: Where access doors are required by NFPA 96 in cooking equipment exhaust ductwork, gasket with Fibrefrax Grade 110 paper by Carborundum Co.
- B. Access Door Hardware:
 - 1. Piano Hinges: Galvanized steel with brass pins, continuous type, full height of door.
 - 2. Butt Hinges: Galvanized steel with brass pins, approximately 2 inches x 1-9/16 inches wide for doors under 24 inches high and 3 inches x 2 inches wide for doors over 24 inches and higher.
 - 3. Sash Locks: Galvanized, cadmium plated, or aluminized steel or cast aluminum.
 - 4. Door Latches: Ventfabrics, Inc. Ventlock No. 260 or Duro Dyne Corp. Code No. SP-20 Series.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Unless otherwise shown or specified, install the Work of this Section in accordance with the manufacturer's printed installation instructions and the SMACNA Manual.

3.02 FLEXIBLE FABRIC CONNECTORS (INSTALLATION)

- A. Make ductwork connections to air handling equipment with flexible fabric connectors. Install connectors with sufficient slack to prevent vibration transmission.
- B. Free Fabric Length: Install fabric connectors a minimum of three inches in length for ducts having a maximum diameter of 18 inches, or maximum side dimension of 30 inches, and a minimum of five inches in length for duct diameters over 18 inches or side dimensions over 30 inches.
- C. Secure fabric connectors to fans, casings and ducts as follows:
 - 1. Round Connectors: Secure with No. 12 USS gage x 1 inch wide galvanized steel draw bands. Secure bands with bolts and nuts.
 - 2. Rectangular Connectors: Secure with 1 inch x 1/8 inch thick flat galvanized steel bars, with screws or bolts on maximum 8 inch centers, or with approved sheet metal slip joints. Tightly crimp fabric into sheet metal joint and secure complete joint with sheet metal screws on maximum 6 inch centers.
- D. Fabric connectors may be factory pre-fabricated pre-assembled units, with minimum No. 24 USS gage metal edges, secured to fabric with double lock seams.
- E. Do not paint fabric connectors.

3.03 ACCESS DOORS

- A. Install gasketed access doors in ductwork at each of the following:
 - 1. Major changes of direction in horizontal ducts connected to cooking equipment hoods.
 - 2. Motor operated dampers.
 - 3. Manually operated volume control devices.
 - 4. Fire dampers.
 - 5. Combination fire/smoke dampers.
 - 6. All locations where operating parts of any kind are installed and elsewhere as indicated.
 - 7. In-line damper actuators installed in air stream.

- B. Access doors are not required, where a manually operated damper has an exposed damper regulator, with an indicating quadrant.

3.04 CONCEALED DAMPER REGULATORS

- A. Imbed box in, and secure to back-up construction in ceiling or wall, so cover plate is flush with final surface.

END OF SECTION

SECTION 233416

CENTRIFUGAL FANS

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, include rated capacities of each unit, dimensional data, operating weights, accessories, material finishes and installation instructions.
- B. Quality Control Submittals:
 - 1. Certified fan performance curves.
 - 2. Certified fan sound power ratings at operating conditions.
- C. Contract Closeout Submittals:
 - 1. Operation and Maintenance Data: Deliver 2 copies covering the installed products, to the Owner.

1.02 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Each fan shall bear AMCA Seal indicating that fans comply with AMCA 211, Certified Ratings Program - Air Performance, and AMCA 311, Certified Sound Ratings Program For Air Moving Devices.
 - 2. Operating Limits: Classify according to AMCA 99-2408.
 - 3. Sound power level ratings shall comply with AMCA Standard 301, Method for Calculating Fan Sound Ratings from Laboratory Test Data.

1.03 REFERENCES

- A. ABMA: American Bearing Manufacturer's Association (formerly AFBMA).
- B. AMCA: Air Movement and Control Association.
- C. ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled units to the extent allowable by shipping limitations, with protective crating and coverings.
- B. Disassemble and reassemble units as required for movement to the final locations in accordance with manufacturer's printed instructions.

- C. Lift and support units at the manufacturer's designated lifting or supporting points.

1.05 PROJECT CONDITIONS

- A. Do not operate fans until ductwork is clean, filters, if any, are in place and bearings are lubricated.
- B. Field Measurements: Verify dimensions and clearances by field measurements.

PART 2 PRODUCTS

2.01 FANS

- A. Centrifugal fans, factory fabricated, assembled, finished and tested; consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structures.

2.02 HOUSINGS

- A. Materials and Fabrication: Formed and reinforced steel curved scroll housing panels, spun metal inlet bell, and the doors or panels for access to internal parts and components.

2.03 WHEELS

- A. Backward Inclined Wheel: Steel or aluminum construction with curved inlet flange, back plate, backwardly inclined blades welded or riveted to flange and back plate; cast iron or cast steel hub riveted to back plate and fastened to shaft with set screws.
- B. Airfoil Wheel: Steel construction with smooth curved inlet flange; heavy back plate; hollow die formed airfoil shaped blades continuously welded at the tip flange and back plate; cast iron or cast steel hub riveted to back plate and fastened to shaft with set screws.
- C. Forward Curved Wheel: Baked enameled or galvanized steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in the direction of airflow, mechanically secured to flange and back plate; cast steel hub swaged to back plate and fastened to shaft with set screws.

2.04 SHAFTS

- A. Turned, ground, and polished hot-rolled steel with keyway and drive end counter sunk for tachometer readings. Ship with protective coating of lubricating oil. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower.

1. Size shaft so that first critical speed is at least 25 percent over maximum operating speed.

2.05 BEARINGS

- A. Ball, roller, or taper roller type. Select bearings in accordance with ABMA Standards for Ball and Roller Bearings.

2.06 ACCESSORIES

- A. Equip fan with the following accessory items:
 1. Inlet Screen: Minimum 0.094 inch diameter galvanized steel wire on 1/2 inch center to center spacing welded on galvanized steel frame.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of fans. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install fans in accordance with manufacturer's printed installation instructions.
- B. Install units with clearances for service and maintenance.
 1. Provide clearance for complete wheel, and shaft removal.

3.03 FIELD QUALITY CONTROL

- A. Inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.
- B. Pre-start Up:
 1. Remove shipping blocking, and bracing.
 2. Verify lubrication for grease bearings and other moving parts.
 3. Set dampers in connected ductwork in proper position.
- C. Start Up:
 1. Energize motor, verify proper operation of drive system, and fan wheel.

END OF SECTION

SECTION 260010

GENERAL PROVISIONS FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide labor, materials, tools, machinery, equipment, and services necessary to complete the Electrical Work under this Contract. All systems and equipment shall be complete in every aspect and all items of material, equipment and labor shall be provided for a fully operational system and ready for use. Coordinate the work with the work of the other trades in order to resolve all conflicts without impeding the job progress.
- B. When an item of equipment is indicated on a floor plan and not shown on associated riser diagram or vice-versa, the Contractor shall provide said item and all required conduit and wiring connections for a complete system as part of the Contract.

1.2 EXAMINATION OF SITE

- A. The Contractor shall be held to have examined the site and to have compared it with the Drawings and Specifications, and deemed to have been satisfied as to the conditions existing at the site, as relating to the actual conditions of the site at the time estimating the Work, the storage and handling of materials, and all other matters as may be incidental to the Work under the Contract, before bidding, and no allowance will subsequently be made to the Contractor by reason of any error due to the Contractor's neglect to comply with the requirements of this clause.

1.3 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract.
- B. Division 1 - General and Supplementary Requirements.

1.4 ELECTRICAL EQUIPMENT

- A. All electrical equipment shall be the latest of the current year in design, material and workmanship, and shall be the type or model called for in these Specifications.
- B. If the type or model specified has been superseded by a later type or model, the latest shall be submitted for approval and shall be provided as part of the Contract.

1.5 SUBMITTALS

Provide as outlined in each individual section of these Specifications, including but not limited to:

A. Product Data

Submit manufacturer's product data for equipment including capacity, performance charts, test data, materials, dimensions, weights, and installation instructions.

B. Shop Drawings

Submit manufacture's shop drawings indicating dimensions, weight loading, required clearances, location, and method of assembly of components.

Submittals are mandatory as noted in the respective specifications. Schedules, installation instructions, startup manuals, operation and maintenance manuals, and shop drawings are always required to be submitted.

C. Samples.

D. Special Warranty.

E. Quality Assurance Submittals.

F. Operation and Maintenance Manuals.

G. Test Results and Certificates.

H. Manuals and Video Tape of the Personnel Training.

1.6 COORDINATION DRAWINGS

- A. Provide coordination drawings. Coordination drawings shall be completed so as not to delay the progress of the Project.

1.7 OPERATIONS, TRAINING, AND MAINTENANCE MANUALS

A. General

1. Provide SYSTEMS OPERATION AND MAINTENANCE MANUAL for procedures and requirements for preparation and submittal of operation and maintenance manuals of each equipment. Refer to individual equipment specifications for maintenance manual additional requirements. In addition, include the following information:
2. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.

3. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 4. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassemble; aligning and adjusting instructions.
 5. Servicing instructions and lubrication charts and schedules.
- B. Bind all the other Sections maintenance manuals in a single final Operating and Maintenance Manual.
 - C. Provide FACILITY START-UP, DEMONSTRATION AND TRAINING procedures and requirements for training on each equipment. Refer to individual equipment specifications for the additional training requirements.
 - D. Contractor shall videotape all the training sessions for various equipment and systems as specified in individual sections of these Specifications. If a manufacturer's particular equipment item is furnished with a training video, the manufacturer's video shall be provided in addition to the requirements of this Section, not in lieu thereof and at no additional cost to the Owner. Contractor shall be responsible for providing informative videotapes covering all the materials and content outlined in each individual section of these Specifications.

1.8 CLEANING AND REPAIR

- A. On completion of installation, inspect interior and exterior of installed equipment. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.
- B. Contractor shall not leave sharp exposed metal edges (bottom of threaded rods, electrical equipment supports, etc.) that could otherwise present safety hazards to the building's occupants/work staff.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260519

WIRING, GENERAL - 600 VOLTS AND UNDER

PART 1 GENERAL

1.01 SUBMITTALS

- A. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 01330 does not apply to Shop Drawings.
- B. Shop Drawings:
 - 1. For Electrical Circuit Protective Systems: Show proposed routes and installation details (include UL classification data, listing, and system number).
- C. Product Data: Catalog sheets, specifications and installation instructions.

1.02 PRODUCT DELIVERY

- A. Mark and tag insulated conductors and cables for delivery to the site. Include:
 - 1. Contractor’s name.
 - 2. Project title and number.
 - 3. Date of manufacture (month & year).
 - 4. Manufacturer’s name.
 - 5. Data which explains the meaning of coded identification (UL assigned electrical reference numbers, UL assigned combination of color marker threads, etc.).
 - 6. Environmental suitability information (listed or marked “sunlight resistant” where exposed to direct rays of sun; wet locations listed/marked for use in wet locations; other applications listed/marked suitable for the applications).

PART 2 PRODUCTS

2.01 INSULATED CONDUCTORS AND CABLES

- A. Date of Manufacture: No insulated conductor more than one year old when delivered to the site will be acceptable.
- B. Acceptable Companies: American Insulated Wire Corp., General Cable Industries Inc., Cerro Wire & Cable Co. Inc., Pirelli Cable Corp., Rockbesto and the Okonite company.
- C. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor. Conductor sizes No. 8 and larger shall be stranded.
- D. Types:

1. Electric Light and Power Wiring:
 - a. General: Rated 600V copper, NFPA 70 Type XPLE or XPLO. Polyvinylchloride insulation cables or PVC sheath is NOT ACCEPTABLE. All wiring, power or control shall be insulated with low smoke, zero halogen, thermosetting or thermoplastic jacket. All cables shall meet ICEA and FM requirements and pass the IEEE 383 vertical flame test.
 - b. Color code for control and instrument shall be K-2. Control cables shall be #14 AWG minimum. Shielded instrumentation cables shall be provided with drain wire in contact with shield, 600V with nylon jacket conforming to UL requirements.
 - c. USE, USE-2: Dual rated heat and moisture resistant insulation rated 600 V with jacket or dual purpose insulation/protective covering conforming to UL requirements for type USE service entrance cables.
 - d. Cables specified for direct burial shall have an aluminum sheath with a durable jacket designed for burial in harsh environments. Conductors shall be cross-linked-polyethylene.
 - e. Tray cables shall be rated for intended use with sunlight proof outer jacket.
2. Class 1 Wiring:
 - a. No. 18 and No. 16 AWG: Insulated copper conductors suitable for 600 volts, NFPA 70 types KF-2, KFF-2, PAFF, PF, PFF, PGF, PGFF, PTF, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF.
 - b. Larger than No. 16 AWG: Insulated copper conductors suitable for 600 volts, in compliance with NFPA 70 Article 310.
 - c. Conductor with other types and thickness of insulation may be used if listed for Class 1 circuit use.
3. Class 2 Wiring:
 - a. Multiconductor Cables: NFPA 70 Article 725, Types CL2P, CL2R, CL2.
 - b. Other types of cables may be used in accordance with NFPA 70 Table 725-61 "Cable Uses and Permitted Substitutions", as approved.
4. Class 3 Wiring:
 - a. Single Conductors No. 18 and No. 16 AWG: Same as Class 1 No. 18 and No. 16 AWG conductors except that:
 - 1) Conductors are also listed as CL3.
 - 2) Voltage rating not marked on cable except where cable has multiple listings and voltage marking is required for one or more of the listings.
 - b. Multiconductor Cables: NFPA 70 Article 725, Types CL3P, CL3R, CL3.
 - c. Other types of cables may be used in accordance with NFPA 70, Table 725-61 "Cable Uses and Permitted Substitutions", as approved.

2.02 ELECTRICAL CIRCUIT PROTECTIVE SYSTEM

- A. Minimum 1-Hour Fire Rating: A system listed in UL Building Materials Directory, product category Electrical Circuit Protective Systems (FHIT).

2.03 CONNECTORS

- A. General:
1. Connectors specified are part of a system. Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system.
 2. Connectors shall be UL 486 A listed, or UL 486 B listed for combination dual rated copper/aluminum connectors (marked AL7CU for 75 degrees C rated circuits and AL9CU for 90 degrees C rated circuits).
- B. Splices:
1. Spring Type:
 - a. Rated 105° C, 600V; Buchanan/Ideal Industries Inc.'s B-Cap, Electrical Products Div./3M's Scotchlok Type Y, R, G, B, O/B+, R/Y+, or B/G+, or Ideal Industries Inc.'s Wing Nuts or Wire Nuts.
 - b. Rated 150° C, 600V; Ideal Industries Inc.'s High Temperature Wire-Nut Model 73B, 59B.
 2. Indent Type with Insulating Jacket:
 - a. Rated 105° C, 600V; Buchanan/Ideal Industries Inc.'s Crimp Connectors, Ideal Industries Inc.'s Crimp Connectors, Penn-Union Corp.'s Penn-Crimps, or Thomas & Betts Corp.'s STA-KON.
 3. Indent Type (Uninsulated): Anderson/Hubbell's Versa-Crimp, VERSAtile, Blackburn/T&B Corp.'s Color-Coded Compression Connectors, Electrical Products Div./3M's Scotchlok 10000, 11000 Series, Framatome Connectors/Burndy's Hydent, Penn-Union Corp.'s BCU, BBCU Series, or Thomas & Betts Corp.'s Compression Connectors.
 4. Connector Blocks: NIS Industries Inc.'s Polaris System, or Thomas & Betts Corp.'s Blackburn AMT Series.
 5. Resin Splice Kits: Electrical Products Div./3M's Scotchcast Brand Kit Nos. 82A Series, 82-B1 or 90-B1, or Scotchcast Brand Resin Pressure Splicing Method.
 6. Heat Shrinkable Splices: Electrical Products Div./3M's ITCSN, Raychem Corp.'s Thermofit Type WCS, or Thomas & Betts Corp.'s SHRINK-KON Insulators.
 7. Cold Shrink Splices: Electrical Products Div./3M's 8420 Series.
- C. Gutter Taps: Anderson/Hubbell's GP/GT with GTC Series Covers, Blackburn/T&B Corp.'s H-Tap Type CF with Type C Covers, Framatome Connectors/Burndy's Polytap KPU-AC, H-Crimpfit Type YH with CF-FR Series Covers, ILSCO's GTA Series with GTC Series Covers, Ideal Industries Inc.'s Power-Connect GP, GT Series with GIC covers, NSI Industries Inc.'s Polaris System, OZ/Gedney Co.'s PMX or PT with PMXC, PTC Covers, Penn-Union Corp.'s CDT Series, or Thomas & Betts Corp.'s Color-Keyed H Tap CHT with HTC Covers.

- D. Terminals: Nylon insulated pressure terminal connectors by Amp-Tyco/Electronics, Electrical Products Div./3M, Framatome Connectors/Burndy, Ideal Industries Inc., Panduit Corp., Penn-Union Corp., Thomas & Betts Corp., or Wiremold Co.
- E. Lugs:
 - 1. Single Cable (Compression Type Lugs): Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, NSI Industries Inc.'s L, LN Series, Penn-Union Corp.'s BBLU Series, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
 - 2. Single Cable (Mechanical Type Lugs): Copper, one or 2 hole style (to suit conditions); Blackburn/T&B Corp.'s Color-Keyed Locktite Series, Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Locktite Series.
 - 3. Multiple Cable (Mechanical Type Lugs): Copper, configuration to suit conditions; Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Color-Keyed Locktite Series.

2.04 TAPES

- A. Insulation Tapes:
 - 1. Plastic Tape: Electrical Products Div./3M's Scotch Super 33+ or Scotch 88, Plymouth Rubber Co.'s Plymouth/ Bishop Premium 85CW.
 - 2. Rubber Tape: Electrical Products Div./3M's Scotch 130C, or Plymouth Rubber Co.'s Plymouth/Bishop W963 Plysafe.
- B. Moisture Sealing Tape: Electrical Products Div./3M's Scotch 2200 or 2210, or Plymouth Rubber Co.'s Plymouth/Bishop 4000 Plyseal-V.
- C. Electrical Filler Tape: Electrical Products Div./3M's Scotchfil, or Plymouth Rubber Co.'s Plymouth/Bishop 125 Electrical Filler Tape.
- D. Color Coding Tape: Electrical Products Div./3M's Scotch 35, or Plymouth Rubber Co.'s Plymouth/Bishop Premium 37 Color Coding.

2.05 WIRE-PULLING COMPOUNDS

- A. To suit type of insulation; American Polywater Corp.'s Polywater Series, Electric Products Div./3M's WL, WLX, or WLW, Greenlee Textron Inc.'s Y-ER-EAS, Cable Cream, Cable Gel, Winter Gel, Ideal Industries Inc.'s Yellow 77, Aqua-Gel II, Aqua-Gel CW, or Thomas & Betts Corp.'s Series 15-230 Cable Pulling Lubricants, or Series 15-631 Wire Slick.

2.06 TAGS

- A. Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inches high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

2.07 WIRE MANAGEMENT PRODUCTS

- A. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc: Catamount/T&B Corp., or Ideal Industries Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install conductors in raceways after the raceway system is completed, clear of burrs and debris.
- B. No grease, oil, or lubricant other than wire-pulling compounds specified may be used to facilitate the installation of conductors.

3.02 CIRCUITING

- A. Do not change, group or combine circuits other than as indicated on the drawings.

3.03 COMMON NEUTRAL CONDUCTOR

- A. A common neutral may be used for 2 or 3 branch circuits where the circuits are indicated on the drawings to be enclosed within the same raceway, provided each branch circuit is connected to different phase busses in the panelboard.
- B. Exceptions - The following circuits shall have a separate neutral:
 - 1. Circuits containing ground fault circuit interrupter devices.
 - 2. Circuits containing solid state dimmers.
 - 3. Circuits recommended by equipment manufacturers to have separate neutrals.

3.04 CONDUCTOR SIZE

- A. Conductor Size:
 - 1. For Electric Light and Power Branch Circuits: Install conductors of size shown on drawings. Where size is not indicated, the minimum size allowed is No. 12 AWG.
 - 2. For Class 1 Circuits:
 - a. No. 18 and No. 16 AWG may be used provided they supply loads that do not exceed 6 amps (No. 18 AWG), or 8 amps (No. 16 AWG).

- b. Larger than No. 16 AWG: Use to supply loads not greater than the ampacities given in NFPA 70 Section 310-15.
- 3. For Class 2 Circuits: Any size to suit application.
- 4. For Class 3 Circuits: Minimum No. 18 AWG.

3.05 COLOR CODING

- A. Color Coding for 120/208 Volt Electric Light and Power Wiring:
 - 1. Color Code:
 - a. Power: 1, 2, 3 and 4
 - 2. White to be used only for an insulated grounded conductor (neutral). If neutral is not required use black and red, or black, red and blue for phase to phase circuits.
 - a. "White" for Sizes No. 6 AWG or Smaller:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length.
 - b. "White" for Sizes Larger Than No. 6 AWG:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length, or:
 - 3) Distinctive white markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install white color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 - 3. Colors (Black, Red, Blue):
 - a. For Branch Circuits: Continuous color outer finish.
 - b. For Feeders:
 - 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutter, pullboxes, and manholes.
- C. More Than One Nominal Voltage System Within A building: Permanently post the color coding scheme at each branch-circuit panelboard.
- D. Existing Color Coding Scheme: Where an existing color coding scheme is in use, match the existing color coding if it is in accordance with the requirements of NFPA 70.
- E. Color Code For Wiring Other Than Electric Light and Power: In accordance with ICEA/NEMA WC-30 "Color Coding of Wires and Cables". Other coding methods may be used, as approved.

3.06 IDENTIFICATION

- A. Identification Tags: Use tags to identify feeders and designated circuits. Install

tags so that they are easily read without moving adjacent feeders or requiring removal of arc proofing tapes. Attach tags with non-ferrous wire or brass chain.

1. Interior Feeders: Identify each feeder in pullboxes and gutters. Identify by feeder number and size.
 2. Exterior Feeders: Identify each feeder in manholes and in interior pullboxes and gutters. Identify by feeder number and size, and also indicate building number and panel designation from which feeder originates.
 3. Street and Grounds Lighting Circuits: Identify each circuit in manholes and lighting standard bases. Identify by circuit number and size, and also indicate building number and panel designation from which circuit originates.
- B. Identification Plaque: Where a building or structure is supplied by more than one service, or has any combination of feeders, branch circuits, or services passing through it, install a permanent plaque or directory at each service, feeder and branch circuit disconnect location denoting all other services, feeders, or branch circuits supplying that building or structure or passing through that building or structure and the area served by each.

3.07 WIRE MANAGEMENT

- A. Use wire management products to bundle, route, and support wiring in junction boxes, pullboxes, wireways, gutters, channels, and other locations where wiring is accessible.

3.08 EQUIPMENT GROUNDING CONDUCTOR

- A. Install equipment grounding conductor:
1. Where specified in other Sections or indicated on the drawings.
 2. In conjunction with circuits recommended by equipment manufacturers to have equipment grounding conductor.
- B. Equipment grounding conductor is not intended as a current carrying conductor under normal operating circumstances.
- C. Color Coding For Equipment Grounding Conductor:
1. Color Code: Green.
 2. "Green" For sizes No. 6 AWG or Smaller:
 - a. Continuous green outer finish, or:
 - b. Continuous green outer finish with one or more yellow stripes, or:
 - c. Bare copper (see exception below).
 3. "Green" For Sizes Larger Than No. 6:
 - a. Stripping the insulation or covering from the entire exposed length (see exception below).
 - b. Marking the exposed insulation or covering with green color coding tapes.
 - c. Identify at each end and at every point where the equipment grounding conductor is accessible.
 4. Exception For use of Bare Copper: Not allowed for use where NFPA 70

specifically requires equipment grounding conductor to be insulated, or where specified in other Sections or indicated on the drawings to be insulated.

3.10 INSULATED CONDUCTOR AND CABLE SCHEDULE - TYPES AND USE

- A. Electric Light and Power Circuits:
 - 1. XPLE or XPLO: Wiring in dry or damp locations (except where special type insulation is required).
 - 2. XPLE OR XPLO Wiring in wet locations (except where type USE or USE-2 insulated conductors are specifically required, or special type insulation is required).
 - 3. USE, or USE-2: Wiring indicated on the drawings to be direct burial in earth.
 - 4. USE, or USE-2 Marked "Sunlight Resistant":
 - a. Service entrance wiring from overhead service to the service equipment.

3.11 CONNECTOR SCHEDULE - TYPES AND USE

- A. Temperature Rating: Use connectors that have a temperature rating, equal to, or greater than the temperature rating of the conductors to which they are connected.
- B. Splices:
 - 1. Dry Locations:
 - a. For Conductors No. 8 AWG or Smaller: Use spring type pressure connectors, indent type pressure connectors with insulating jackets, or connector blocks (except where special type splices are required).
 - b. For Conductors No. 6 AWG or Larger: Use connector blocks or uninsulated indent type pressure connectors. Fill indentions in uninsulated connectors with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with heat shrinkable splices or cold shrink splices.
 - c. Gutter Taps in Panelboards: For uninsulated type gutter taps fill indentions with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with gutter tap cover.
 - 2. Damp Locations: As specified for dry locations, except apply moisture sealing tape over the entire insulated connection (moisture sealing tape not required if heat shrinkable splices or cold shrink splices are used).
 - 3. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits, cold shrink splices or heat shrinkable splices. Exception: Splices above ground which are totally enclosed and protected in NEMA 3R, 4, 4X enclosures may be spliced as specified for damp locations.
- C. Terminations:

1. For Conductors No. 10 AWG or Smaller: Use terminals for:
 - a. Connecting wiring to equipment designed for use with terminals.
2. For Conductors No. 8 AWG or Larger: Use compression or mechanical type lugs for:
 - a. Connecting cables to flat bus bars.
 - b. Connecting cables to equipment designed for use with lugs.
3. For Conductor Sizes Larger Than Terminal Capacity On Equipment:
Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type connectors suitable for reducing connection.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260526

SERVICE GROUNDING AND BONDING

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ground Clamps (Cable to Pipe): Blackburn/T&B Corp.'s GUV, Framatome Connectors/Burndy Corp.'s GAR, GD, GP, GK, or OZ/Gedney Co.'s ABG, CG.
- B. Ground Clamps (Cable to Rod): Blackburn/T&B Corp.'s GG, GGH, JAB, JABH, GUV, Dossert Corp.'s GN, GPC, Framatome Connectors/Burndy Corp.'s GP, GX, GRC, or OZ/Gedney Co.'s ABG.
- C. Ground Lugs: Copper, one or 2 hole style (to suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
- D. Exothermic Type Weld: Erico Inc.'s Cadweld Process, or Furseweld/T&B Corp.'s Exothermic Welding System.
- E. Compression Connectors: Amp Inc.'s Ampact Copper Grounding System, or Burndy Corp.'s Hyground System.
- F. Rod Electrodes: Copper clad (minimum .010 jacket) ground rods minimum 5/8 inches diameter by 8'-0" long.
- G. Plate Electrodes: Copper plates minimum 0.06 inches thick by 2'-0" square feet of surface area.
- H. Grounding Electrode Conductors and Bonding Conductors: All grounding shall be performed per IEEE and NEC. All electrical equipment shall be grounded or bonded per IEEE and NEC requirements.
- I. Hardware: Silicon-bronze bolts, nuts, flat and lock washers etc. as manufactured by Dossert Corp., Framatome Connectors/Burndy Corp., or OZ/Gedney Co.

PART 3 EXECUTION

3.01 INSTALLATION

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- A. Connections:
1. Make grounding and bonding connections, except buried connections, with silicon-bronze hardware and ground clamps, ground lugs or compression connectors, to suit job conditions.
 2. For buried connections use exothermic type weld or compression connectors.

END OF SECTION

SECTION 260529

FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Shop Drawings: Show support details if different from methods specified or shown on the drawings.
- B. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors Type 3, Class 3: Molly/Emhart's Parasleeve Series, Phillips' Red Head, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors Type 4, Class 1 Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Non-Drilling Anchors (FS FF-S-325 Group VIII, Type 1): Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- D. Stud Anchors (FS FF-S-325 Group VIII, Type 2): Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following: Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is

indicated.

1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
2. Lag Bolts: FS FF-B-561, square head type.
3. Machine Screws: FS FF-S-92, cadmium plated steel.
4. Machine Bolts: FS FF-B-584 heads; FF-N-836 nuts.
5. Wood Screws: FS FF-S-111 flat head carbon steel.
6. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
7. Lock Washers: FS FF-W-84, helical spring type carbon steel.
8. Toggle Bolts: Tumble-wing type; FS FF-B-588, type, class and style as required to sustain load.

- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.04 TPR (THE PEEL RIVET) FASTENERS

- A. 1/4 inch diameter, threadless fasteners distributed by Subcon Products, 315 Fairfield Road, Fairfield, NJ 07004 (800) 634-5979.

2.05 POWDER DRIVEN FASTENER SYSTEMS

- A. Olin Corp.'s Ramset Fastening Systems, or Phillips Drill Company Inc.'s Red Head Powder Actuated Systems.

2.06 HANGER RODS

- A. Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

2.07 "C" BEAM CLAMPS

- A. With Conduit Hangers:
1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erco Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
 2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erco Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
 2. For 3/8 Inch Hanger Rods: Caddy/Erco Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.

3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.08 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
 1. Phosphate and baked green enamel/epoxy.
 2. Pre-galvanized.
 3. Electro-galvanized.
 4. Hot dipped galvanized.
 5. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
 1. B-Line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 2. Grinnell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.09 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
 1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series.
 2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/ Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.
- E. Supporting Fittings for Pendent Mounted Industrial Type LED Fixtures on Exposed Conduit System:
 1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.

2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHMF, or Crouse-Hinds Co.'s UNH-1.
 4. Eyelet: Unistrut Corp.'s M2250.
 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 3. Toggle bolts to fasten items to hollow masonry and stud partitions.
 4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
 5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.

- d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.
- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking With Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 - 1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 - 2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
 - a. Before Fill Has Been Placed:
 - 1) Use thru-bolts and fish plates.
 - 2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - b. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction Work Contractor has placed concrete fill over decks.
 - b. Existing Construction: Toggle bolts may be installed in cells for a maximum load
15_LBS .
 5. Attachment to Hollow Block or Tile Filled Concrete Deck:
 - a. New Construction: Use cast-in-place concrete inserts by having Construction Work Contractor omitting blocks and pouring solid blocks with insert where required.
 6. Attachment to Waffle Type Concrete Decks:
 - a. New Construction:
 - 1) Use cast-in-place concrete inserts in fresh concrete.
 - 2) If concrete fill has been applied over deck, thru-bolts and fish plates may be used where additional concrete or roofing is to be placed over the deck.

7. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
8. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 - 1) Use tee hanger inserts between adjacent flanges.
 - 2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 - 1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.
 - d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
9. Attachment to Wood Construction: Use side beam brackets fastened to the sides of wood members to make attachments for hangers.
 - a. Under 15 lbs Load: Attach side beam brackets to wood members with 2 No. 18 x 1-1/2 inch long wood screws, or 2 No. 16 x 1-1/2 inch long drive screws.
 - b. Over 15 lbs Load: Attach side beam brackets to wood members with bolts and nuts or lag bolts. Do not use lag bolts in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts and nuts or lag bolts in the side of wood members at the mid-point or slightly above. Install plain washers under all nuts.

LOAD	LAG BOLT SIZE	BOLT DIA.
15 lbs to 30 lbs	3/8 x 1-3/4 inches	3/8 inch
31 lbs to 50 lbs	1/2 x 2 inches	1/2 inch
Over 50 lbs to load limit of structure.	Use bolt & nut	5/8 inch

- c. Bottom chord of wood trusses may be utilized as structural support, but method of attachment must be specifically approved.
 - d. Do not make attachments to the diagonal or vertical members of wood trusses.
 - e. Do not make attachments to the nailing strips on top of steel beams.
10. Attachment to Metal Stud Construction: Use supporting fasteners manufactured specifically for the attachment of raceways and boxes to metal stud construction.
 - a. Support and attach outlet boxes so that they cannot torque/twist. Either:
 - 1) Use bar hanger assembly, or:
 - 2) In addition to attachment to the stud, also provide far side box support.

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 1. Use hangers secured to surface with specified method of attachment where conduit is

suspended from the surface.

- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 - 1. Where conduit is supported from steel decking which does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 - 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
 - 2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 LIGHTING FIXTURE SUPPORT SCHEDULE

- A. General: Do not support fixtures from ceilings or ceiling supports unless it is specified or indicated on the drawings to do so.
 - 1. Support fixtures with hanger rods attached to beams, joists, or trusses. Hanger rod diameter, largest standard size that will fit in mounting holes of fixture.
 - a. Where approved, channel supports may span and rest upon the lower chord of trusses and be utilized for the support of lighting fixtures.
 - b. Where approved, channel supports may span and be attached to the underside of beams, joists, or trusses and be utilized for the support of lighting fixtures.
 - 2. Use 2 nuts and 2 washers on lower end of each hanger rod to hold and adjust fixture (one nut and washer above top of fixture housing, one nut and washer below top of fixture housing).
 - a. Where specified that an adequately supported outlet box is to support a fixture or be utilized as one point of support, support the box so that it may be adjusted to bring the face of the outlet box even with surface of ceiling.
- B. Specific Installations Where Fixtures May Be Supported From New Ceilings Being Installed By Construction Work Contractor:
 - 1. Support surface mounted LED fixtures and incandescent fixtures directly from plywood backed gypsum board ceilings.
 - 2. Support surface mounted LED fixtures and incandescent fixtures directly from framing or furring members of fire rated suspended ceilings (double gypsum board).
 - 3. Support recessed mounted LED fixtures and incandescent fixtures directly from furring members of furred gypsum board ceilings.
 - 4. Support recessed mounted LED fixtures and incandescent fixtures directly from the suspension system of suspended acoustical ceilings. Exception: Support each fixture weighing more than 50 pounds (including lamps) independent of the suspended ceiling grid.
 - 5. Deliver documents which state actual fixture weights and indicate fixture locations

to the Construction Work Contractor (thru the Director's Representative).

- C. Number of Supports For Ceiling Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 - 1. Commercial and Industrial LED Fixtures:
 - a. Support individual LED fixtures less than 2 feet wide at 2 points.
 - b. Support continuous row LED fixtures less than 2 feet wide at points equal to the number of fixtures plus one. Uniformly distribute the points of support over the row of fixtures.
 - c. Support individual LED fixtures 2 feet or wider at 4 corners.
 - d. Support continuous row LED fixtures 2 feet or wider at points equal to twice the number of fixtures plus 2. Uniformly distribute the points of support over the row of fixtures.
 - e. An adequately supported outlet box may be utilized as one point of support for fixtures weighing less than 50 pounds.
 - 2. Commercial and Industrial Incandescent Fixtures: Support fixture from adequately supported outlet box, to suit fixture design (fixture weight less than 50 pounds).
- D. Number of Supports For Wall Mounted Lighting Fixtures: Provide at least the following number of supports. Provide additional supports when recommended by fixture manufacturer, or shown on the drawings.
 - 1. Commercial and Industrial LED Fixtures:
 - a. Support individual LED fixtures 2 feet long or less at 2 points.
 - b. Support individual LED fixtures over 2 feet long at 3 points.
 - c. Support continuous row LED fixtures at points equal to twice the number of fixtures. Uniformly distribute the points of support.
 - d. Outlet box shall not be counted as a point of support.

3.06 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.
- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 - 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 - 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 - 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION

SECTION 260534

OUTLET, JUNCTION, AND PULL BOXES

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.
 - 1. For fire rated construction, prove that materials and installation methods proposed for use are in accordance with the listing requirements of the classified construction.

PART 2 PRODUCTS

2.01 GALVANIZED STEEL OUTLET BOXES

- A. Standard galvanized steel boxes and device covers by Appleton Electric Co., Beck Mfg./Picoma Industries, Cooper/Crouse-Hinds, Raco/Div. of Hubbell, or Steel City/T & B Corp.

2.02 GALVANIZED STEEL JUNCTION AND PULL BOXES

- A. Code gage, galvanized steel screw cover boxes by Delta Metal Products Inc., Hoffman Enclosures Inc., Hubbell Wiegmann, Lee Products Co., or Rittal/Electromate.

2.03 THREADED TYPE BOXES:

- A. Outlet Boxes:
 - 1. For Dry, Damp Locations: Zinc electroplate malleable iron or cast iron alloy boxes by Appleton Electric Co., Cooper/Crouse-Hinds Co., or OZ/ Gedney Co., with zinc electroplate steel covers to suit application.
 - 2. For Wet Locations: Malleable iron or cast iron alloy boxes with hot dipped galvanized or other specified corrosion resistant finish as produced by Cooper/Crouse-Hinds (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws, and malleable iron covers gasketed to suit application.
- B. Junction And Pull Boxes:
 - 1. For Dry, Damp Locations: Zinc electroplate cast iron boxes by Appleton Electric Co., Cooper/Crouse-Hinds, or OZ/Gedney Co., with zinc electroplate steel or cast iron cover.
 - 2. For Wet Locations: Cast iron boxes by Cooper/Crouse-Hinds' (hot dipped galvanized or Corro-free epoxy powder coat), or OZ/Gedney Co. (hot dipped galvanized), with stainless steel cover screws and cast iron cover gasketed to suit application.

- C. Conduit Bodies, Threaded (Provided with a Volume Marking):
 - 1. For Dry, Damp Location: Zinc electroplate malleable iron or cast iron alloy bodies with zinc electroplate steel covers; Appleton Electric Co.'s Unilets, Cooper/Crouse-Hinds' Condulets, or OZ/Gedney Co.'s Conduit Bodies.
 - 2. For Wet Locations: Malleable iron or cast iron alloy bodies with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds' Condulets (hot dipped galvanized or Corro-free epoxy power coat), or OZ/Gedney Co.'s Conduit Bodies (hot dipped galvanized) with stainless steel cover screws and malleable iron covers gasketed to suit application.

2.04 CORROSION RESISTANT BOXES

- A. Plastic Coated Outlet and Junction Boxes: Threaded type malleable iron boxes coated with 40 mils thick polyvinylchloride coating; Ocal/T&B Corp.'s Ocal-Blue System, PCD Inc.'s KorKap, KorKap XL, or Robroy Industries' Plastibond or Perma-Cote System.
- B. Non-Metallic Junction and Pullboxes: Glass fiber reinforced polyester; Carlon/Div. of Lamon and Sessions' Himeline Series, Cooper/Crouse-Hinds' Krydon Products, or Robroy Industries' Stahlin Enclosures.

2.05 OUTLET BOXES AND RELATED PRODUCTS FOR FIRE RATED CONSTRUCTION

- A. Parameters For Use of Listed Metallic Outlet or Switch Boxes: UL Electrical Construction Equipment Directory - Metallic Outlet Boxes (QCIT).
- B. Wall Opening Protective Materials: As listed in UL Fire Resistance Directory - Wall Opening Protective Materials (CLIV), or UL Electrical Construction Equipment Directory - Wall Opening Protective Materials (QCSN).

PART 3 EXECUTION

3.01 PREPARATION

- A. Before proceeding with the installation of junction and pull boxes, check the locations with the Director's Representative and have same approved.

3.02 INSTALLATION

- A. Mounting Position of Wall Outlets For Wiring Devices: Unless otherwise indicated, install boxes so that the long axis of each wiring device will be vertical.
- B. Height of Wall Outlets: Unless otherwise indicated, locate outlet boxes with their center lines at the following elevations above finished floor:

Switches	4'-0"
Single & Duplex Receptacles	1'-6"**

*In areas containing heating convectors, install outlets above convectors at height indicated on drawings.

- C. Supplementary Junction and Pull Boxes: In addition to junction and pull boxes indicated on the drawings and required by NFPA 70, provide supplementary junction and pull boxes as follows:
1. When required to facilitate installation of wiring.
 2. At every third 90 degree turn in conjunction with raceway sizes over 1 inch.
 3. At intervals not exceeding 100 feet in conjunction with raceway sizes over 1 inch.

3.03 OUTLET, JUNCTION, AND PULL BOX SCHEDULE

- A. Boxes For Concealed Conduit System:
1. Non-Fire Rated Construction:
 - a. Depth: To suit job conditions and comply with NFPA 70 Article 370.
 - b. For Lighting Fixtures: Use galvanized steel outlet boxes designed for the purpose.
 - 1) For Fixtures Weighing 50 lbs. or Less: Box marked "FOR FIXTURE SUPPORT".
 - 2) For Fixtures More Than 50 lbs: Box listed and marked with the weight of the fixture to be supported (or support fixture independent of the box).
 - c. For Ceiling Suspended Fans:
 - 1) For Fans Weighing 35 lbs or Less: Marked "Acceptable for Fan Support."
 - 2) For Fans Weighing More Than 35 lbs, up to 70 lbs: Marked "Acceptable for Fan Support up to 70 lbs (or support fan independent of the box)."
 - d. For Junction and Pull Boxes: Use galvanized steel boxes with flush covers.
 - e. For Switches, Receptacles, Etc:
 - 1) Plaster or Cast-In-Place Concrete Walls: Use 4 inch or 4-11/16 inch galvanized steel boxes with device covers.
 - 2) Walls Other Than Plaster or Cast-In-Place Concrete: Use type of galvanized steel box which will allow wall plate to cover the opening made for the installation of the box.
 2. Recessed Boxes in Fire Rated (2 hour maximum) Bearing and Nonbearing Wood or Steel Stud Walls (Gypsum Wallboard Facings):
 - a. Use listed single and double gang metallic outlet and switch boxes. The surface area of individual outlet or switch boxes shall not exceed 16 square inches.
 - b. The aggregate surface area of the boxes shall not exceed 100 square inches per 100 square feet of wall surface.
 - c. Securely fasten boxes to the studs. Verify that the opening in the wallboard facing is cut so that the clearance between the box and the wallboard does not exceed 1/8 inch.
 - d. Separate boxes located on opposite sides of walls or partitions by a minimum horizontal distance of 24 inches. This minimum separation distance may be reduced when wall opening protective materials are installed according to the requirements of their classification.
 - e. Use wall opening protective material in conjunction with boxes installed on opposite sides of walls or partitions of staggered stud construction in accordance with the classification requirements for the protective material.
 3. Other Fire Rated Construction: Use materials and methods to comply with the listing requirements for the classified construction.

B. Boxes For Exposed Conduit System:

1. Dry and Damp Locations: Use zinc electroplate or hot dipped galvanized threaded type malleable iron or cast iron alloy outlet, junction, and pullboxes or conduit bodies provided with a volume marking in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Galvanized steel boxes may be used in conjunction with conduit sizes over 1 inch in non-hazardous dry and damp locations.
 - b. Galvanized steel boxes may be used in conjunction with electrical metallic tubing where it is allowed (specified) to be installed exposed as branch circuit conduits at elevations over 10'-0" above finished floor.
2. Wet Locations: Use threaded type malleable iron or cast iron alloy outlet junction, and pullboxes or conduit bodies (provided with a volume marking) with hot dipped galvanized or other specified corrosion resistant coating in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Use corrosion resistant boxes in conjunction with plastic coated rigid ferrous metal conduit.
3. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Equipment Used With Exposed Raceway):
 - a. Use finishing collar where surface mounted equipment is installed on an exposed raceway outlet box and the equipment base is larger than the outlet box.
 - b. Use combination finishing collar/outlet box where surface mounted equipment is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into equipment body due to equipment design.

- C. Specific Purpose Outlet Boxes: Use to mount equipment when available and suitable for job conditions. Unless otherwise specified, use threaded type boxes with finish as specified for exposed conduit system, steel (painted) for surface metal raceway system and galvanized steel for recessed installations.

- D. Stencil cover of pullboxes used on systems over 600 V, in white lettering minimum 1/2 inches high, the words "DANGER HIGH VOLTAGE - KEEP OUT".

END OF SECTION

SECTION 260925

WIRELESS LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 DESCRIPTION of WORK

- A. Provide a wireless lighting control system consisting of control switches, and other controlling devices for automatic control of lighting in individual interior spaces as shown on drawings.

1.02 SYSTEM DESCRIPTION

- A. The general operation of lighting and controlled loads shall include:
 - 1. Interior lighting: Each room shall have at least one accessible lighting control to independently activate general lighting within the room. Where shown on the drawings, rooms shall be provided with automatic controls capable of limiting the hours of lighting use to the occupancy hours of the room.

1.03 SUPPLEMENTAL SUBMITTALS

- A. Product Data: Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.
- B. System one-line diagram showing types of switches and sensors and wiring.
- C. Specification Conformance Document: Indicate whether the submitted equipment:
 - 1. Meets specification exactly as stated.
 - 2. Meets specification via an alternate means and indicate the specific methodology used.
- D. Field tests as specified in Part 3
- E. Warranty

1.04 QUALITY ASSURANCE

- A. Manufacturer: Minimum 10 years experience in manufacture of lighting control devices.
- B. Manufacturer's Quality System: Registered to ISO 9001:2000 Quality Standard, including in-house engineering for product design activities.
- C. Wireless occupancy sensor shall be tested and comply with the limits for a class B device, pursuant to part 15 of the FCC rules.

1.05 MAINTENANCE MATERIAL REQUIREMENTS

- A. Manufacturer is to make ordering of new equipment for expansions, replacements, and spare parts available to end user.
- B. Manufacturer is to make new replacement parts available for minimum of ten years from date of manufacture.

1.06 WARRANTY

- A. Provide manufacturer's 5 year parts warranty.

PART 2- PRODUCTS

2.01 GENERAL

- A. Provide system hardware that is designed, tested, manufactured, and warranted by a single manufacturer.
- B. Lighting Controls: Ten-year operational life while continually at any temperature in an ambient temperature range of 0°C (32°F) to 40°C (104°F) and 90 percent non-condensing relative humidity.
- C. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.

2.02 MANUFACTURERS

- A. Wireless Occupancy Sensors
 - 1. Leviton LevNet RF
 - 2. Lutron Maestro Wireless
 - 3. Philips OccuSwitch Wireless
 - 4. Hubbel wiSTAR

2.03 WIRELESS WALL-MOUNT OCCUPANCY SENSORS

- A. Wireless Wall-Mount Sensors
 - 1. Provide 180° or 90° coverage range as indicated on drawings.
 - 2. Have an operational lifetime of 10 years without the need to replace batteries when installed per manufacturer's instructions.
 - 3. Communicate directly to compatible RF receiving devices through use of a radio frequency communications link.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

4. Not require external power packs, power wiring, or communication wiring.
 5. Provide a clearly visible method of indication to verify that motion is being detected during testing and that the unit is communicating to compatible RF receiving devices (dimmers and switches).
 6. Utilize Infrared as its sensing mechanism coupled with XCT Technology. Signal processing technology detects passive infrared (PIR) signals without the need to change the sensor's sensitivity threshold.
 7. Have optional, readily accessible, user adjustable controls for timeout, automatic/manual-on, and sensitivity.
 8. Have the ability to be placed in test mode to verify correct coverage and operation from the front of the unit.
 9. Have a radio frequency line of sight range of up to 50 feet and through walls range of up to 30 feet between sensor and compatible RF receiving device(s).
 10. Turn off lighting automatically after reasonable and adjustable time delay once the last person to occupy the space vacates a room or area. Adjustable timeout shall be available for 15 minutes.
 11. For 180° field-of-view model, the sensor can cover 1500 sqft area with minor motion detection and shall be:
 - a. Lutron Maestro model LRF2-VWLB-P-WH
 - b. Philips OccuSwitch Wireless model LRM1776
 - c. Leviton LevNet model WSWDR-H9W
- For 90° field-of-view model, the sensor can cover upto 1225 sqft with minor motion detection and shall be:
- a. Lutron Maestro model LRF2-VKLB-P-WH
 - b. Philips OccuSwitch Wireless model LRM1771
 - c. Hubbell wiSTAR model WIS-OSW-WH
 - d. Leviton LevNet model WSWDR-H9W

B. Wireless Ceiling Sensor

Provide matching ceiling mounting bracket and hardware. Wireless Ceiling-Mount Sensors shall be

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

1. Leviton LevNet model WSC15-M9N
2. Philips OccuSwitch Wireless model LRM1743
3. Hubbell wiSTAR WIS-OSC-WH
4. Lutron Maestro model LRF2-VCR2B-P-WH

C. Wireless Receiver Switch

The local lighting switch shall be:

1. Lutron Maestro model MRF2-8S-DV-WH
2. Philips OccuSwitch Wireless model LRA1721
3. Leviton model WSS20-GUZ

D. Wall Sensor and Switch Combination

The combination wall sensor/switch uses both ultrasonic and infrared detection technology and provides 180° field-of-view, pushbutton for manual ON/OFF, Time Delay adjustment for delayed-OFF setting from 30 seconds to 30 minutes. The maximum sensing distance in front of the sensor shall be 40 feet and each side shall be 30 feet. Combination sensor and switch shall be:

1. For Occupancy Mode
 - a. Leviton OSSMT-GDW (with neutral) or OSSMT-GDW (non-neutral version)
 - b. Philips OccuSwitch LRS2220-DV-SS
 - c. Hubbell LHMTS(single)-LHMTD(dual circuit)
 - d. Lutron MS-B102 (with neutral) or Lutron MS-A102(non-neutral version)
3. Provide matching designer-style wallplates of type specified in Article 2.04.

2.04 WALL PLATES

- A. Provide wall plate for wiring devices. Material shall be 0.035-inch thick, satin-finished stainless steel. Metal screw heads to match plate finish.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The wireless sensor cannot detect occupancy through solid objects. Therefore, install sensor free from obstruction.
- B. Do not locate sensor near forced air vents as hot moving air can cause the sensor to false trigger. Leave at least four feet minimum distance between air vents and the sensor.

3.02 MOUNTING

- A. Provide wall or corner mounting brackets compatible with drywall and plaster walls.
- B. Provide all necessary mounting hardware including vandal resistant locking screw(s) and instructions for both temporary and permanent mounting.
- C. Provide temporary mounting means to allow user to check proper performance and relocate as needed before permanently mounting sensor. Temporary mounting method shall be designed for easy, damage-free removal.
- D. Sensor lens shall illuminate during test mode when motion is detected to allow installer to verify coverage prior to permanent mounting.

3.03 FIELD QUALITY CONTROL

- A. Install equipment in accordance with manufacturer's installation instructions.
- B. Provide complete installation of system in accordance with Contract Documents.
- C. Provide equipment at locations and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.
- D. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 - 2. Operational Test: Verify actuation of each sensor and adjust time delays.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 SWITCHES

- A. Local Switches, Single Pole:
1. 15A, 120/277 V ac; Bryant's 4801, Crouse-Hinds/AH's 1891, General Electric's GE5931-1G, Hubbell's 1201/1101, Leviton's 1201/1101, Pass & Seymour's 15AC1, or Woodhead's 1891.
 2. 20A, 120/277 V ac; Bryant's 4901, Crouse-Hinds/AH's 1991, General Electric's GE 5951-1G, Hubbell's 1121/1221, Leviton's 1121/1221, Pass & Seymour's 20AC1, or Woodhead's 1991.

2.02 RECEPTACLES

- A. Specification Grade Receptacles:
1. Duplex receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Bryant's 5252/5242 , Crouse-Hinds/AH's 5252/5242, General Electric's GEN5252-1, Hubbell's 5252/5242, Leviton's 5252/5242, Pass & Seymour's 5252/5242.
- B. Safety Grounding Receptacles:
1. Duplex receptacle, NEMA 5-15R (15A, 125 V, 2P, 3W); Bryant's SG-62, 8200S, Crouse-Hinds/AH's 6352, General Electric's GE4058-1, Hubbell's SG-62, Leviton's 5262-SG or Pass & Seymour's SG-62.
- C. Ground Fault Interrupter Receptacles:
1. Duplex receptacle rated 15A (NEMA 5-15R), circuit-ampacity 20A; Bryant's GFR52FT, Crouse-Hinds/AH's GF5242, General Electric's GF5242, Hubbell's GF5252, Leviton's 6599, Pass & Seymour's 1591S, or Daniel Woodheads 5252GF.
 2. Duplex receptacle rated 20A (NEMA 5-20R), circuit ampacity 20A; Bryant's GFR53FT, Crouse-Hind/AH's GF5342, General Electric's GF5342, Hubbell's GF 5352, Leviton's 6899, Pass & Seymour's 2091S, or Daniel Woodheads 5352GF.

-

2.03 WALL PLATES

- A. Stainless Steel Wall Plates: Type 302 stainless steel with satin finish; Bryant, Crouse-Hinds/AH's Series, General Electric, Hubbell, Leviton, or Pass & Seymour.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- B Weatherproof Covers: Crouse-Hinds WLRS, WLRD, Hubbell or Pass & Seymour.
- C. Covers for Threaded Type Boxes: Stamped sheet steel, gasketed device covers as produced by Crouse-Hinds Co., or OZ/Gedney Co.

2.04 NAMEPLATES

- A. Phenolic Type: Standard phenolic nameplates with 3/16 inch minimum size lettering engraved thereon.
- B. Embossed Aluminum: Standard stamped or embossed aluminum tags, 3/16 inch minimum size lettering, as produced by Seton Name Plate Corp. or Tech Products Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install wiring devices in outlet boxes.
- B. Local Switches:
 - 1. Install local switches rated 15A, 120/277 V ac for switches unless otherwise shown on the drawings or specified.
 - 2. Install switches indicated Sa, Sb, Sc, etc, for control of outlets, with corresponding letters on the same circuit.
 - 3. Where more than one switch occurs at same location in a 120 volt system, arrange switches in gangs and cover with one face plate.
 - 4. Install single and double pole switches so that switch handle is up when switch is in the "On" position.
- C. Receptacles:
 - 1. Install Specification Grade receptacles, NEMA 5-15R, 15A, 125 V, 2P, 3W, for duplex receptacles and single receptacles unless otherwise shown on the drawings or specified.
 - 2. Install receptacles with ground pole in the down position.
- D. Wall Plates:
 - 1. Install wall plates on all wiring devices in dry locations, with finish to match hardware in each area.
 - 2. Install hospital wall plates on Type HG receptacles.
 - 3. Install blank wall plates on outlet boxes which are for future equipment except telephone outlets.
 - 4. Install 5/8 inch bushed wall plates on telephone outlets.
 - 5. Fasten wall plates with vandal resistant screws in patients' area. Deliver 10 screw keys to the facility.
 - 5. Fasten wall plates with vandal resistant screws in offices and public access areas. For all other locations pop rivet wall plates to the wiring devices. Deliver 10 screw keys to the facility.
- E. Weatherproof Covers: Install weatherproof covers on wiring devices in damp and wet locations.

ADA Upgrades
Bernice Spreckman Community Center, City of Yonkers

- F. Nameplates: Provide phenolic or embossed aluminum nameplate for each special purpose receptacle indicating phase, ampere and voltage rating of the circuit. Attach nameplate with rivets or tamperproof fasteners to wall plate or to wall above receptacle. Wall plates may be engraved with required data in lieu of separate nameplates.
- G. Mats: Where flush plates are required over outlet boxes that cannot be set deep enough for the plates to fit closely over the finished wall surfaces, provide oak mats to fill the space between the finished wall surface and the plate.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 262815

OVERCURRENT PROTECTIVE DEVICES, CIRCUIT BREAKERS AND FUSES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide circuit breakers for use in panelboards.

1.02 SUPPLEMENTAL SUBMITTALS

- A. Product Data: Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 2. Time-current curves, coordination charts and tables, and related data.

PART 2 – PRODUCTS

1.01 CIRCUIT BREAKERS

- A. General

Circuit breakers shall be thermal-magnetic type, conforming to the following Specifications:

- 1. Connection to bus shall be by “bolt-on”. Plug-in type circuit breakers are not acceptable.
- 2. Multi-pole breakers shall have barriers between poles
- 3. Multi-pole breakers shall have separate tripping element for each pole. Each tripping element shall open all poles. Multi-pole breakers shall have one handle controlling all poles.
- 4. Breakers of 225-ampere trip rating or less shall have non-tamperable, permanently set trip elements enclosed and sealed in molded composition housing.
- 5. Single pole breakers shall be rated for not less than 277 volts, A.C., multi-pole breakers shall be rated for not less than 277 volts A.C.
- 6. Where spaces for future breakers are required, copper connections for mounting of future breakers shall be provided.
- 7. Circuit breakers shall be mounted in standard panel boards as indicated on the drawings. Frame and sizes of circuit breakers shall conform to the following:

- a. Use standard molded-case type.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Examine utilization equipment nameplates and installation instructions.

END OF SECTION

SECTION 265100

LED INTERIOR BUILDING LIGHTING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. Provide luminaires, supports and accessories including plaster frames, trim rings and back boxes for plaster, drywall, or concrete ceilings as necessary.
- B. The types of luminaires to be installed are indicated and detailed on the luminaire schedule on the Drawings, which also provides details on manufacturers, catalog numbers, lamping, etc.
- C. Coordinate with other trades to avoid conflicts between installation of luminaires and supports with the installation of mechanical equipment, ceiling structures, etc.
- D. All luminaires shall operate on nominal 120 volts, 60 Hz single phase service as indicated on the Drawings and in the Specifications.

1.02 REFERENCE STANDARDS

- A. National Energy Policy Act of 2005, Public Law No. 109-58.
- B. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008, as modified by the 2014 Electrical Code.
- D. IESNA LM-79-08 IESNA - Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.
- E. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- F. IESNA TM-21-2011 – Projecting Long Term Lumen Maintenance of LED Light Sources.
- G. UL 1310 and 8750 – Light Emitting Diode (LED) Equipment for Use in Lighting Products.
- H. OSHA 29CFR1910.7 – luminaires shall be listed by nationally recognized testing laboratory approved by United States Department of Labor, Occupational Safety and Health Administration (OSHA).
- I. ANSI C82.11 – Performance requirement for high frequency ballasts.

- J. ANSI/IES RP-16-10 – Nomenclature and definitions for illuminating engineering.
- K. ANSI C62.41 – Recommended practice in low power circuits.
- L. IEC 61347-1 – General and safety requirements for lamp control gear.
- M. IEC 61347-2-13 – Particular requirements for electronic control gear for LED modules.
- N. IEC 62384 - DC or AC supplied electronic control gear for LED modules – performance requirements.
- O. IEC 61000-3-2 - Harmonic current emissions.
- P. IEC 61547 - EMC immunity requirements.
- Q. IEC 62386-101/102/207 – Digital addressable lighting interface (DALI).
- R. Federal Communications Commission (FCC) rules – Part 15 Class B: Radio Frequency Devices.
- S. Entertainment Services and Technology Association
 - 1. ESTA E1.3 - Entertainment Technology - Lighting Control System - 0 to 10V Analog Control Protocol.

1.03 DEFINITIONS

CALiPER	DOE Commercially Available LED Product Evaluation and Reporting program for the testing and monitoring of commercially available LED Luminaires and lights. http://www1.eere.energy.gov/buildings/ssl/m/caliper.html
CCT	Correlated Color Temperature: The temperature in units of kelvin of a blackbody whose chromaticity most nearly resembles that of the light source in question.
cd	Candela: SI Unit of luminous intensity, equal to 1 lumen per steradian (lm/sr).
Chromaticity	The property of color of light defined by the dominant or complementary wavelength and purity aspects of the color taken together.
CRI	Color Rendering Index – measure of the degree of color shift of reference objects when illuminated by the light source as compared to a reference source of comparable color temperature.
fc	Footcandle: Unit of illuminance, equal to 1 lm/ft ² .

L80	The extrapolated life in hours of the luminaire when the luminous output depreciates 20 percent from initial values.
LED	Light Emitting Diode
METS	Material Engineering and Testing Services of the Translab
MacAdam	Shape on the CIE chromaticity diagram that illustrates how much one can “stray” from the target before perceiving a difference from the target color.
NEMA	National Electrical Manufacturers Association
NRTL	Nationally Recognized Testing Laboratory
NVLAP	National Voluntary Laboratory Accreditation Program - A program under the US DOE to accredit independent testing laboratories to qualify.
PF	Power Factor - The ratio of the real power component to the total (complex) power component.
Rated Power	Power consumption that the luminaire was designed and tested for at ambient temperature (70°F or 21°C).
RoHS	Compliance aims to restrict certain dangerous substances commonly used in electronic equipment, including Lead, Cadmium, Mercury and others.
SPD	Surge Protection Device - A subsystem or component(s) that can protect the unit against short duration voltage and current surges.
SSL	Solid State Lighting
THD	Total Harmonic Distortion - The amount of higher frequency power on the power line.

1.04 SUPPLEMENTAL SUBMITTALS

A. Product Data

1. Provide standard print catalog sheets, Specifications, installation instructions, and photometric data from a recognized independent laboratory for each type of luminaire. Submittals that do not include distribution curves and photometric data will be rejected. All options and specified requirements shall be identified on submittal.

B. Mounting Details

Submit mounting details for each type of luminaire including attachments to structure, anchors, rods, hickeyes, etc.

C. Samples

1. Submit luminaire samples as requested.

2. Submit mounting hardware as requested.

D. Submission of Substitute Luminaires (luminaires other than specified herein or on the Luminaire Schedule).

1. Submittals for substitute luminaires shall be the standard print catalog sheets from the manufacturers (CADD drawings and computer printouts are not acceptable).

2. Substitute luminaires shall meet or exceed photometric quality of luminaires designated on the schedule. Photometric data of substitute luminaires shall be substantiated by an independent testing lab, such as I.T.L. Photometric data by Lumen Micro or similar software programs are not acceptable.

3. Substitute luminaires shall meet or exceed the quality of the luminaires designated on luminaires schedule in construction, finishing, materials, reflector, diffuser etc.

4. Substitute luminaires shall closely match the appearance, dimensions and features of the luminaires designated.

5. Submit one sample of each type of substitute luminaires as requested, with one set of mounting hardware for approval.

6. In order to ensure that the work is performed in an orderly and expeditious manner, the Contractor

7. No more than three (3) submittals shall be permitted for substitution of each specific luminaire type. Should the third submittal be rejected, the Contractor shall be required to provide the luminaires specified on the luminaire schedule.

E. Qualifications

1. Manufacturer

F. Mock-up

G. Spare parts

H. Warranty

1.05 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Provide products of firms listed in Part 2 that are regularly engaged in the manufacture of lighting fixtures and components of types and ratings required and whose products have been in satisfactory use in similar service for not less than 5 years. The manufacturer of the lighting fixtures and components shall comply with the provisions of the appropriate code and standards. All fixtures shall be pretested before shipping.

C. Design Qualification Testing

1. Design Qualification Testing shall be performed by a National Voluntary Laboratory Accreditation Program (NVLAP) testing facility. Such testing may be performed by the manufacturer or an independent testing lab hired by the manufacturer on new luminaire designs and when a major design change has been implemented on an existing design. A major design change is defined as a design change (electrical or physical), which changes any of the performance characteristics of the luminaire, results in a different circuit configuration for the power supply, or changes the layout of the individual LEDs in the module.
2. A quantity of two units for each design shall be submitted for Design Qualification Testing.
3. Product submittals shall be accompanied by product specification sheets or other documentation that includes the designed parameters as detailed in this specification. These parameters include (but are not limited to):
 - a. Maximum power in Watts.
 - b. L80 in hours, when extrapolated for the worse case operating temperature. TM21 report shall be submitted to demonstrate this.

Product submittals shall be accompanied by performance data that is derived in accordance with appropriate IESNA testing standards and tested in a laboratory that is NVLAP accredited for Energy Efficient Lighting Products.

1.06 LUMINAIRE PROTECTION

- A. The Contractor is required to protect luminaires from damage during installation and up to time of acceptance by the Owner. Broken luminaires, glassware, plastics, LED Modules, etc. shall be replaced by the Contractor with new parts, without any additional expense to the Owner until final acceptance.

1.07 SPARE PARTS

- A. Provide complete luminaires to the owner of 10% of the order Delivered
 - 1. Spares shall be provided and delivered to the Owner's Representative with an itemized list and a receipt taken, certifying that these spare parts have been delivered securely packed and received in acceptable condition.

1.08 WARRANTY

- A. The manufacturer shall provide a single source, 5 year limited warranty against loss of performance and defects in materials and workmanship for all components of the luminaire. Warranty is from the time of acceptance of the Luminaires. All warranty documentation shall be provided to customer prior to the first shipment.
- B. Provide manufacturer's warranty covering 5 years on drivers from date of installation. Refer to manufacturer's terms and conditions on the website for detailed information.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide luminaires as designated on the luminaire schedule. Luminaires of the luminaire schedule are designated by types, manufacturers and catalog numbers. Substitute luminaires by approved manufacturers listed in these specifications will be approved, provided that all requirements are satisfied.
- B. The requirements specified herein are minimum requirements and shall be supplemented by any other requirements indicated on the luminaire schedule. All luminaires, including those designated on the luminaire schedule on the drawings by Catalog Numbers, or Catalog Numbers mentioned in the Specifications, shall nevertheless be specially modified to meet the requirements of these specifications.
- C. All luminaires and components shall be UL listed or listed by another nationally recognized Testing Agency approved by the Department of Buildings and meet Electrical Code.

2.02 MANUFACTURERS

- A. LED luminaires For Building Interior: Selection shall be limited to luminaires as indicated on the drawings.
- B. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.
- C. Codes: Materials and installation shall be in accordance with the latest revision of the National Electrical Code and any applicable Federal, State, and local codes and regulations.

- D. UL or ETL US Listing: All fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the "Standards for Safety" to UL 8750 or others as they may be applicable. A listing shall be provided for each fixture type, and the appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.
- E. Luminaire shall be DLC Certified (Design Lights Consortium)
- F. Base Bid Manufacturers: Are listed on fixture schedule and specification. Manufacturers listed without accompanying catalog numbers are responsible for meeting the quality standards and photometric distribution set by the specified product.
- G. Alternate Manufacturers: Identification by means of manufacturer's names and catalog numbers is to establish basic features, quality and performance standards. Any substitutions by other manufacturers listed must meet or exceed these standards and shall be approved by the owner. Mock-ups in a sample classroom will be required in addition to submissions indicated to prove the quality of light prior to approval to manufacture for the project.
- H. Luminaire shall carry the Lighting Facts label, verified based on LM-79 test reports. Refer to the following web site: www.lightingfacts.com.

2.03 DIRECT/INDIRECT LED LUMINAIRES

- A. Direct/indirect LED luminaire housing and end-caps shall be constructed of no less than 22 gauge die-formed steel, or extruded aluminum in white finish. Refer to Article 2.05 for technical requirements of the luminaire construction.
- B. Luminaires shall be provided with fully adjustable aircraft cable support for pendant mounting. Cable and cable adjuster shall be independently rated to support an 800# load. Cable suspension adjustment for mounting height shall be located on luminaires and not at ceiling.
- C. Distribution shall be between 70% up and 30% down with minimum of 90% efficiency.

PART 3 - EXECUTION

3.01 LUMINAIRE INSTALLATION

- A. General
 - 1. The Contractor shall be responsible for the proper and safe mounting and support of all luminaires. Installation shall meet all the requirements of the National Electrical Code. Provide all items of equipment (stems, hangers, rods, inserts, boxes, brackets, yokes, channels, frames, etc.) required to adequately and safely support each luminaire in a manner acceptable to the owner.

2. Provide a luminaire at each location shown on Drawings of the type indicated by symbol or other notation. If the type is not specifically noted on Drawings, the Contractor shall provide without extra cost luminaires of the same type called for under similar condition elsewhere on the Drawings as determined by the owner.
3. The Contractor shall examine the drawings and coordinate closely with the all General Construction trades on all work involved with each type of luminaire to be installed. Contractor shall verify all sizes, locations and conditions under which luminaire are to be installed. Provide plaster frames and running bars (black iron) etc. as required.
4. The Contractor is required to protect luminaires from damage during installation, up to time of acceptance by the owner. Any broken or marred luminaire, glassware, plastics, lamps, etc. shall be replaced by the Contractor at no additional cost to the owner.
5. A suitable outlet box shall be provided by the Contractor for each luminaire provided. The box shall be cast into concrete or supported using two double split type anchors when installed in concrete walls or ceiling.
6. Number of supports for luminaires shall be as specified in "Luminaire Support Schedule" in Article 3.07.
7. A surface or pendant type luminaire, regardless of its weight, shall not be mounted directly on the concealed or exposed ceiling spline of a lightweight, mechanical acoustical ceiling system. Such luminaires shall be supported from the building structure.
8. For all pendant mounted luminaires, regardless of weight and ceiling types, provide outlet boxes capable of supporting up to 150 pounds, Westinghouse model 01050/01052 or equal.

3.02 MOUNTING HEIGHT OF LUMINAIRES

- A. Luminaires shall be hung in accordance with the mounting heights indicated on Drawings and meeting Electrical Code. Mounting heights A.F.F. (distance above finished floor) are detailed on the Luminaire Schedule, or elsewhere on the drawings.
- B. The Contractor shall provide stems of sufficient length to assure luminaire mounting at the specified mounting height.

3.03 LUMINAIRE SUPPORT SCHEDULE

- A. Unless otherwise indicated on drawings, provide the following number of supports for luminaires.
 1. An adequately supported outlet box with luminaire stud may be utilized as one point of support for surface or recessed luminaires weighing less than 40 lbs. For all

pendant mounted luminaires, regardless of weight and ceiling type, provide outlet boxes capable of supporting up to 150 lbs.; Westinghouse model 01050/01052 or equal.

B. Ceiling Mounted Luminaires (Surface Mounted, Pendant Mounted or Recessed Mounted)

1. Ceiling Mounted Luminaires:

- a. Support individual luminaires less than 2 feet wide at 2 points.
- b. Support continuous row of luminaires less than 2 feet wide at points equal to the number of luminaire sections plus one, except that supports shall not exceed 12 foot on centers and shall be evenly distributed over the entire length of the luminaire's row.
- c. Support individual luminaires 2 feet or wider at 4 corners.
- d. Support continuous row of luminaires 2 feet or wider at points equal to twice the number of luminaire sections plus 2. Uniformly distribute the points of support over the row of luminaires.

3. FIELD QUALITY CONTROL

- A. Perform field inspection, testing, and adjusting.
- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.
- C. Test and calibrate all controls associated with luminaires, i.e. daylighting, occupancy sensors, etc.).

3.11 LED CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from lens and enclosures
 1. For cleaning acrylic lenses or diffusers, use a feather duster or dry cotton cheesecloth to rid the lens/diffuser of any minor dust. For fingerprints, smudges, or other dirt present, use an ammonia-based cleaner (such as Windex) and wipe carefully with cotton cheesecloth (so as to avoid injury from any prismatic texture of the lens).
 2. Contractor shall replace the lens if Job site contamination cannot be removed using the above recommendations.

ADA Upgrades

Bernice Spreckman Community Center, City of Yonkers

3. Clean photometric control surfaces as recommended by manufacturer.

END OF SECTION